Draft Environmental Impact Statement

NIH Bethesda Chilled Water System Improvements

National Institutes of Health
Bethesda, Maryland

March 2015

National Institutes of Health
Turning Discovery Into Health

DRAFT

ENVIRONMENTAL IMPACT STATEMENT

For

NIH BETHESDA CHILLED WATER SYSTEM IMPROVEMENTS

March 2015

Prepared For:
National Institutes of Health
U.S. Department of Health and Human Services

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NIH BETHESDA CHILLED WATER SYSTEM IMPROVEMENTS

NATIONAL INSTITUTES OF HEALTH
MONTGOMERY COUNTY
BETHESDA, MARYLAND
March 2015

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ABSTRACT

The National Institutes of Health (NIH) is contemplating implementation of chilled water system improvements at the NIH Bethesda Campus. The need for the chilled water system improvements is to prevent a disruption in the chilled water supply which would result in severe consequences on patient care, animal welfare, and biomedical research. Improvements are needed to address real deficiencies within the campus water systems.

Three alternatives were considered in detail in the Draft Environmental Impact Statement. The Proposed Action would install a Thermal Energy Storage System and an Industrial Water Storage System to provide sufficient storage capacity to meet two days of chilled water demand and two days of industrial water demand should an outside disturbance interrupt the water supply. The Alternative Action would install a Thermal Energy Storage System and a Potable Water Storage System to provide sufficient storage capacity to meet two days of chilled water demand and two days of potable water demand. The No-Action Alternative would continue current NIH operations and would not implement chilled water system improvements.

The NIH's preferred alternative is the Proposed Action alternative. Comments on the Draft Environmental Impact Statement will be accepted for 60 days following the Notice of Availability in the Federal Register. Comments should be sent to Valerie Nottingham at the above address.

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SUMMARY

S.1 BACKGROUND

The National Institutes of Health (NIH) Bethesda Campus (hereafter referred to as "Campus") occupies approximately 310 acres of land within the Washington, D.C. metropolitan area in Montgomery County, Maryland (Figure 1-1). The NIH, an Operating Division of the United States Department of Health and Human Services (HHS), received the property on which the Campus is located through a series of generous land donations from Luke and Helen Woodward Wilson between 1935 and 1948. The Campus opened the doors of its first four buildings in 1939 and has since grown into a world renowned state-of-the-art biomedical research complex with over 20,000 employees.

The Campus contains over 90 buildings. These highly functional facilities enable the NIH to fulfill its mission of seeking fundamental knowledge about the nature and behavior of living systems and applying that knowledge to enhance health, lengthen life, and reduce the burdens of illness and disability. The Campus is home to 27 institutes and centers that support or conduct cutting-edge research on five key research themes, which include the following:

- Applying genomics and other high throughput technologies;
- Translating basic science discoveries into new and better treatments;
- Using science to enable health care reform;
- Focusing on global health; and
- Reinvigorating and empowering the biomedical research community.

The NIH utilizes a variety of utilities to support its facilities and operations, including chilled water and potable water. The NIH primarily utilizes chilled water for building climate control. Chilled water is generated by supplying water to chillers located at Building 11, Central Utility Plant (CUP). Chilled water from the CUP is conveyed to other building via a campus-wide distribution network.

NIH facilities require potable water for a variety of additional uses. The hospital, laboratories, cafeterias, and animal facilities use potable water for daily operations. Many buildings utilize potable water to charge, test, and use fire protection systems (e.g., sprinklers, standpipes). These and other uses contribute to a current campus demand for potable water of approximately one million gallons per day (MGD), which is supplied by the Washington Suburban Sanitary Commission (WSSC).

S.2 PURPOSE AND NEED FOR ACTION

The overall purpose of the actions analyzed in this EIS is to accomplish the following:

- Ensure an uninterrupted and adequate supply of chilled water in the event of system maintenance requirements or an emergency that compromises WSSC's ability to provide the NIH with potable water; and

- Ensure an uninterrupted and adequate supply of industrial water, which is water that will be utilized at the CUP to generate chilled water or steam. An uninterrupted supply of industrial water is required for the CUP to continue generating chilled water.

The need for the actions analyzed in this EIS is to prevent a disruption in the chilled or potable water supply, which would result in severe consequences on patient care, animal welfare, and biomedical research. Improvements are needed to address real deficiencies within the campus water systems, including the following:

- Aging chilled water facilities may not continue to meet demand; and
- The Campus is not insulated from water emergencies that could compromise the WSSC's ability to provide water to the Campus.

S.3 PROPOSED ACTION

The Proposed Action would implement chilled water system improvements that would enable the NIH Bethesda to adequately accomplish the project goals outlined above. This would include sufficient storage capacity to meet two days of chilled water demand and two days of industrial water demand should an outside disturbance interrupt the normal supply of water by the WSSC.

Elements of the Chilled Water System Improvements project that the NIH would implement under the Proposed Action include the following:

Thermal Energy Storage System

This system would be located at the Building 34 site and would store up to approximately nine million gallons of chilled water (Figure S-1). Components of the system would include a storage tank, at or partially below-grade, with a footprint of approximately 12,000 SF; a pump house building with a footprint of approximately 5,000 SF or less; support equipment, such as pumps, valves, piping, controls, and an emergency generator; and security fencing, lighting, and other site improvements. The NIH would use this system to meet chilled water demands within the Campus.

Industrial Water Storage System

This system would be located at the Parking Lot 41 site and would store up to approximately five million gallons of industrial water (Figure S-1). Industrial water is water that the CUP utilizes to generate steam or chilled water. Components of the system would include a storage tank, partially below-grade; a pump house building with a footprint of approximately 5,000 SF; support equipment, such as pumps, valves, variable frequency drivers, electrical equipment, switchgear, piping, controls, instrumentation, and an emergency generator; and security fencing, lighting, and other site improvements. The NIH would use this system to ensure an adequate supply of water to the chillers.

Other Supporting Infrastructure

The Thermal Energy Storage System and the Industrial Water Storage System would each require new or upgraded utility infrastructure at locations outside the limit of disturbance for each system. Potential locations for many components of this infrastructure have been identified during the planning process. However, precise details including piping locations and sizes are not fully developed. Examples of the types of infrastructure that the NIH may install or upgrade include additional equipment (e.g., pumps, variable frequency drives, electrical equipment, switchgear, emergency generator, control valves, backflow preventers, pressure reducing valves, controls, and instrumentation); other utility buildings; aboveground or buried piping; aboveground or buried utilities; and site improvements (e.g., repairs to existing features, new concrete slabs).

Changes to Water Operations

Implementation of the Proposed Action would result in modifications to chilled water operations within the Campus. These changes in operations would include the following:

Operation of New Equipment and Infrastructure: NIH would operate the new equipment and infrastructure described above.

Changes to CUP Operations: Under normal operations, the Industrial Water Storage System would continuously supply water to the CUP for industrial purposes. To minimize energy cost, the NIH would normally operate the CUP chillers at night to fill the Thermal Energy Storage System with chilled water. Nighttime operations would reduce energy use as the chillers operate more efficiently during cooler temperatures. Chilled water from the CUP would either be diverted to the Thermal Energy Storage System or supplied directly to the distribution system to meet campus demand. Chilled water requirements could be met at any time by chilled water supplied from the Thermal Energy Storage System and/or the CUP.

Figure S-1. Proposed Action – Main Elements and Supporting Infrastructure Upgrades

S.4 ALTERNATIVE ACTION

The Alternative Action would implement water infrastructure improvements that would enable the NIH to adequately accomplish the project goals outlined above (Figure S-2).

Elements of the Chilled Water System Improvements project that the NIH would implement under the Alternative Action include the following:

Thermal Energy Storage System

The characteristics, features, and location of the Thermal Energy Storage System would be identical to the Proposed Action as discussed in Section S.1 (Proposed Action).

Potable Water Storage System

The Potable Water Storage System would store up to nine million gallons of potable water to ensure an adequate supply of industrial water to the chillers and for potable water requirements on the Campus. The proposed location for the Potable Water Storage System would be the same as that described for the Industrial Water Storage System under the Proposed Action. The characteristics and components of the Potable Water Storage System would be similar to the Industrial Water Storage System, except that the storage tank would be larger. The tank would be about 90 feet in height, which is similar to the planned height of MLP-12 once fully built. The pump house, support equipment, and utilities and site improvements would otherwise be identical to the described features of the Industrial Water Storage Tank.

Other Supporting Infrastructure

The characteristics and features of many components of this supporting infrastructure would be more extensive than that described for the Proposed Action. As with the Proposed Action, potential locations for many components of this infrastructure have been identified during the planning process. However, precise details including piping locations and sizes are not fully developed. Examples of likely new or modified supporting infrastructure include the following:

<u>Equipment</u>: The NIH would install equipment such as pumps, valves, variable frequency drives, electrical equipment, emergency generators, switchgear, valves, piping, controls, and instrumentation. This equipment would be located outside (e.g., on cement pads), underground, and/or in new or existing buildings, including but not limited to the CUP.

<u>Booster Pump Station</u>: The NIH would install a Booster Pump Station to ensure adequate water pressure for campus fire pumps and building sprinkler systems. The Booster Pump Station would offset the anticipated pressure drop associated with the planned backflow preventers (see below). The proposed location for the Booster Pump Station would be at the north end of the Campus near the North Gate. For purposes of this document, this site is herein referred to as “the site near North Gate" (Figure 2-6). The building for the Booster Pump Station would have a footprint of about 5,000 SF or less, and would be less than 15 feet in height. These booster pumps are electric-powered and anticipated to operate continuously. Figure 2-7 illustrates the limit of disturbance for the Booster Pump Station.

<u>Backflow Preventers</u>*:* The NIH would install backflow preventers at all active water utility connections so water from the Campus cannot flow back into the WSSC system. The number and location of backflow preventers has not yet been finalized. Backflow preventers would likely be

housed in small buildings, similar to a storage shed, each with a footprint of approximately 500 SF or less. Three locations for proposed backflow preventers are illustrated in Figure 2-6, Figure 2-8, and Figure 2-9.

Other Utility Buildings: If required by the design, the NIH would construct small utility buildings in addition to those buildings more specifically discussed in this section. The size for these buildings is uncertain, but would be about 400 SF or less each. The requirement for these buildings would be identified during design.

Piping: The NIH would install various new or modified piping to connect the storage tanks to the CUP, and the existing campus-wide water distribution networks. Generally, the NIH would run new water pipes underground, although in some locations water pipes may be installed aboveground. Although the NIH identified potential locations for these water pipes during the planning process, precise details including piping locations and sizes are not yet known. Examples of likely new or modified piping routes would include the following:

- A new 16-inch (diameter) pipe to connect the existing WSSC line along West Cedar Lane, via the new Booster Pump Station, to the existing 16-inch pipe on Center Drive. The NIH would install backflow preventers on this line to prevent flow from the Campus to the WSSC line.

- A new 16-inch pipe to supply chilled water from the CUP to the Thermal Energy Storage System. A second new 16-inch pipe would supply chilled water from the Thermal Energy Storage System to the campus chilled water distribution system. The NIH would bury these pipes underground, likely in the vicinity of Service Road West.

- A new 16-inch pipe to supply water from the WSSC supply line under Old Georgetown Road to the Potable Water Storage System. This pipe would be located in the area of the Bethesda Trolley Trail. A second new 16-inch pipe would supply water from the Potable Water Storage System to the CUP. This pipe would be located in the vicinity of Service Road West.

- A new 12-inch pipe on the east side of the Campus to ensure adequate pressure and flow to fire protection systems whether flows are supplied by the Booster Pump Station or the pumps at the Potable Water Storage System. The new pipes would connect existing 12-inch pipes near Building 33 to the existing 6-inch pipes south of Building 6A and west of Building 67.

Severing Existing Connections: The NIH would close about four to five of the existing connections to WSSC supply lines to reduce the required number of backflow preventers on the Campus. Refer to Section 4.1 (Utilities) for additional detail.

Utilities and Site Improvements*:* The NIH would install or modify aboveground or belowground utilities, such as electricity telecommunication, and controls. The NIH would implement limited site improvements, consisting of repairs to existing sidewalks or roads damaged during excavation or minor modifications to existing features as needed to accommodate new infrastructure. The NIH may construct concrete slabs to support new equipment. Other additional site improvements not specifically listed may be required.

Figure S-2. Alternative Action – Main Elements and Supporting Infrastructure Upgrades

Changes to Water Operations

Changes to water operations would be similar to the Proposed Action with the following exceptions:

- Implementation of the Alternative Action would result in modifications to both potable and chilled water operations within the Campus.
- Operation of the Potable Water Storage System would designate NIH as a continuous water source, which would result in the necessity for water treatment (e.g., addition of treatment chemicals to the tank) and additional monitoring in accordance with applicable drinking water regulations. A chlorine additive would likely be used to inhibit bacterial growth, although the specific type of chlorine additive has not yet been identified.
- The Potable Water Storage System rather than the Industrial Water Storage System would continuously supply water to the CUP (under normal operations) for industrial purposes.

S.5 NO-ACTION ALTERNATIVE

The No-Action Alternative would not implement either the Proposed Action or the Alternative Action. Under the No-Action Alternative, the CUP would continue to provide chilled water to the Campus directly. The NIH would not achieve security from potential interruptions in the water supply, which could significantly disrupt mission operations.

The No-Action Alternative would not meet the Purpose and Need criteria defined in Section S.2 (Purpose and Need).

S.6 ONGOING PLANNING INITIATIVES

In addition to those project elements covered by this EIS, the NIH has plans to implement numerous other projects throughout the Campus that have been evaluated under separate NEPA analyses. These projects include various planned developments identified in NIH's current master plan and demolition of the Building 34 complex.

2013 Campus Master Plan and Parking Garage MLP-12

In 2013, the NIH developed a comprehensive 20-year Master Plan for the Campus. The purpose of the *2013 Comprehensive Campus Master Plan* (*Campus Master Plan*) is to provide a realistic and orderly phased development of the Campus in furtherance of the NIH's scientific mission.

The *Campus Master Plan* organizes the Campus into five research clusters to facilitate collaboration; an administrative and biomedical research education cluster; and a utility support and service cluster (Figure 1-3). Each cluster would be served by easily accessible garages to provide employee parking within a five-minute walking distance to the workplace (NIH, 2013).

The proposed construction of multi-level parking garage 12 (MLP-12) as described in the *Campus Master Plan* is highly relevant to some of the project elements analyzed in this EIS. The planned site of MLP-12 currently consists of a portion of Parking Lot 41 and a portion of the grassy hill that slopes down and north from Parking Lot 41 to Medlars Drive. For the purposes of this EIS, the planned site of MLP-12 is herein referred to as "the MLP-12 site." The MLP-12 site is adjacent to the planned site where NIH would construct the Industrial Water Storage System under the Proposed Action or the Potable Water Storage System under the Alternative Action.

The NIH evaluated the *Campus Master Plan*, including construction of MLP-12, under the *Campus Master Plan EIS* and issued a Record of Decision (ROD) on February 13, 2015.

Demolition of the Building 34 Complex

The NIH plans to demolish Building 34, a refrigeration plant constructed in 1968; Building 34A, an addition to the south end of Building 34 constructed in 1981; and an associated parking lot adjacent to the buildings. These facilities are no longer in use and the NIH plans to demolish the facility and the associated parking lot under a separate effort.

The NIH's decision to demolish Buildings 34 and 34A was driven by the age and condition of the facility, including the presence of hazardous materials such as asbestos, lead, mercury, oil, and polychlorinated biphenyls (PCBs). Due to the severely deteriorated and unsafe condition of the facility, it would be cost prohibitive and potentially unsafe to remediate and renovate the facility.

For the purposes of this EIS, the location of Building 34, 34A, and the associated parking lot is referred to as "the Building 34 site." The Building 34 site is the planned site where NIH would construct the Thermal Energy Storage System under the Proposed Action or the Alternative Action.

The NIH is currently evaluating the demolition of Building 34, Building 34A, and the associated parking lot under an Environmental Assessment (EA). In January of 2015, the NIH issued the Final Environmental Assessment that identified no significant environmental impacts. The NIH anticipates that this NEPA action will be completed prior to the issuance of the Final EIS for the Chilled Water Systems Improvement project.

S.7 DECISION TO BE MADE

Based on the environmental analysis, public comments on the Draft EIS, and consideration of other factors, the NIH will decide whether to proceed with the Proposed Action, Alternative Action or the No-Action Alternative. The scope of the EIS is confined to issues and potential environmental consequences relevant to the above decisions.

The Council on Environmental Quality (CEQ) regulations implementing the National Environmental Policy Act (NEPA) requires consideration of environmental effects and prescribes mitigation where practical to limit those effects. Reconsideration of previous NIH decisions or programmatically prescribing mitigation or standards for future NIH activities is beyond the scope of this document.

The No-Action Alternative would not meet the purpose and need criteria defined earlier. As a result, NIH considers the No-Action Alternative to be less desirable than the Proposed Action or the Alternative Action.

The NIH prefers the Proposed Action over the Alternative Action because the Alternative Action would require the NIH to become a continuous water source, which would incur more upfront and ongoing costs for treatment, maintenance, and monitoring of the campus potable water system. Additionally, relative to the Alternative Action, the Proposed Action would retain more connections to WSSC water mains (for redundancy), would not require installation and operation of pumps to maintain adequate pressure for fire service, would maintain existing flow dynamics of potable water within the Campus, and would require less construction (and therefore pose less potential for construction-related impacts to campus neighbors).

S.8 SUMMARY OF ENVIRONMENTAL CONSEQUENCES AND MITIGATION MEASURES

The Proposed Action would result in temporary impacts from construction and demolition activities, as well as some continuing impacts due to operation of the new facilities and changes in the operation of existing facilities. The No-Action Alternative would result in no change relative to current impacts of existing chilled water operations. The environmental consequences and mitigation measures associated with the Proposed Action, Alternative Action and the No-Action Alternative are described in Table S-1 below.

Table S-1. Summary of Environmental Effects and Mitigation Measures

Resource	Proposed Action	Alternative Action	No-Action Alternative
Utilities			
Potable Water	Effects: • No temporary construction-related impacts on potable water quality or availability to off-campus users. • Potential temporary minor impacts on quality or availability of potable water to on-campus users during construction activities. • Minor infrequent impact on potable water demand due to the need to draw down the water level in one of the systems. • No long-term impact on quality or availability of potable water to the community. • Campus would continue to be vulnerable to WSSC outages. Mitigation: • When feasible, potable water line modifications would be accomplished via night work in order to minimize the potential impact to nearby buildings. • Precautions would be taken during demolition and construction to ensure that the existing utility lines are not damaged and service impacts are minimized. • Campus would be subject to mandatory evacuations during outages due to lack of water to supply sprinklers.	Effects: • Potential temporary minor impacts on quality or availability of potable water to on- and off-campus users during construction activities. • No impact on quality or supply of potable water to the community. • Major benefit on reliability of the campus potable water supply. • Would require the NIH to become a continuous water source. Mitigation: • When feasible, potable water line modifications would be accomplished via night work in order to minimize the potential impact to nearby buildings. • Precautions would be taken during demolition and construction to ensure that the existing utility lines are not damaged and service impacts are minimized. • Installation of backflow preventers to protect off-campus water quality. • The NIH would acquire permits for a continuous water source and perform water treatment, maintenance, and monitoring of the potable water system.	Effects: • Campus would continue to be vulnerable to WSSC outages. Mitigation: • Campus would be subject to mandatory evacuations during outages due to lack of water to supply sprinklers.

Table S-1. Summary of Environmental Effects and Mitigation Measures

Resource	Proposed Action	Alternative Action	No-Action Alternative
Chilled Water	Effects: • Major benefit to the reliability of the campus chilled water supply by holding enough chilled water to meet demand for at least two days. • Moderate increase in NIH's daily chilled water capacity, which would ensure the CUP has adequate capacity to meet the present and projected cooling demand at the Campus. • Potential temporary minor impacts on availability of chilled water during construction activities. Mitigation: • NIH would take precautions during demolition and construction to ensure that the utility lines are not damaged and service impacts are minimized.	Effects: • Similar to those for Proposed Action. • Additional benefit to the reliability of the campus chilled water supply by holding enough chilled water to meet demand for at least two days AND holding enough industrial water to permit the CUP to generate an additional two day supply of chilled water. Mitigation: • Same as Proposed Action.	Effects: • Campus would continue to be vulnerable to WSSC and CUP outages. Mitigation: • The NIH would need to develop an alternative approach to comply with Class II ODS phase-out requirements and meet projected chilled water demand.
Other Campus Utilities	Effects: • Minor impact on existing components of utility distribution networks within limit of disturbance of each project site. • No impact on demand for fuel oil, natural gas, steam, compressed air. Mitigation: • New utilities infrastructure would be located and installed in such a way as to minimize the impact to existing utility networks. • The NIH would ensure the construction contractor does not disturb, impact, or damage the existing fuel oil storage tanks adjacent to the Building 34 site during work at that site.	Similar to Proposed Action, except Alternative Action would impact campus utilities in additional locations.	Effects: • No change to Campus infrastructure or displacement of utility distribution networks. Mitigation: • No mitigation necessary.

Table S-1. Summary of Environmental Effects and Mitigation Measures

Resource	Proposed Action	Alternative Action	No-Action Alternative
Energy and Sustainability			
--	Effects: • Improved efficiency in chilled water operations and shift in electrical consumption from peak (daytime) hours to off-peak (nighttime) hours. • No net impact on energy demand. Mitigation: • New buildings would comply with all applicable sustainability requirements. • Additional sustainability-related mitigation identified below under stormwater and waste.	Effects: • Similar to Proposed Action, except Alternative Action would result in a minor increase in energy demand due to additional electricity required for pumping capacity. Mitigation: • Same as Proposed Action.	Effects: • No changes to campus infrastructure or energy use. Mitigation: • No mitigation necessary.
Water Resources			
Groundwater	Effects: • Temporary potential for spills during construction activities that could impact groundwater quality. • No impact on groundwater consumption. Mitigation: • Implementation of appropriate pollution prevention measures to avoid spills and exposure of groundwater to contamination.	Same as Proposed Action.	Effects: • No change to water infrastructure; therefore, no potential impacts to groundwater. Mitigation: • No mitigation necessary.

Table S-1. Summary of Environmental Effects and Mitigation Measures

Resource	Proposed Action	Alternative Action	No-Action Alternative
Surface Water	Effects: • No direct impacts to streams. • Minor indirect impacts to NIH Stream due to runoff from construction sites. Mitigation: • Implementation of SEC and stormwater management techniques and pollution prevention measures to ensure that sediment, petroleum products and other contaminants do not migrate to the stream during construction.	Effects: • Potential minor direct impact to NIH Stream during water line construction. • Minor indirect impacts to campus streams due to runoff from construction sites. • Minor indirect impact to campus streams due to potential increase in chlorine residual from CUP blowdown discharge. Mitigation: • Similar to Proposed Action, plus NIH would obtain all applicable permits, certifications, and reviews from federal and state authorities for pipeline construction in the vicinity of stream crossings. • NIH would evaluate need for NPDES permit modification due to chlorine residual.	Effects: • No direct or indirect impact on surface waters. Mitigation: • No mitigation necessary.
Wetlands	Effects: • No direct or indirect impact on wetlands. Mitigation: • No mitigation necessary.	Effects: • Potential direct impact on wetlands adjacent to NIH Stream. Mitigation: • NIH would perform a new wetlands delineation to verify 1993 delineation that indicated no wetlands present. • If wetlands are present, NIH would comply with all applicable regulations and requirements when installing the water pipe at the NIH stream.	Same as Proposed Action.

Table S-1. Summary of Environmental Effects and Mitigation Measures

Resource	Proposed Action	Alternative Action	No-Action Alternative
Floodplains	Effects: • No impact on 100-year floodplains. Mitigation: • No mitigation necessary.	Effects: • Potential impact to floodplains during construction of utility crossing (water pipe) at NIH Stream. Mitigation: • NIH would submit a utility crossing application to MDE for review and approval.	Same as Proposed Action.
Stormwater			
--	Effects: • Minor temporary impacts to stormwater quantity and quality during construction due to earth disturbances. • Minor increase in stormwater quantity relative to baseline conditions due to an increase in impervious surface at the Campus by approximately 153,000 SF. • Minor impacts to long-term stormwater quality. Mitigation: • Implementation of stormwater management practices during construction, including the development of an MDE-approved erosion and sediment control plan. • Long-term stormwater management facilities would be designed and installed per an MDE approved stormwater management plan. • Stormwater quality impacts will be mitigated through the use of environmental site design practices to restore the predevelopment hydrology at project sites.	Effects: • Minor temporary impacts to stormwater quantity and quality impacts during construction would be increased compared to Proposed Action due to additional construction sites. • Minor long-term impacts similar to the Proposed Action with a slightly greater impact to stormwater quantity due to a larger increase in impervious surface at the Campus (159,000 SF). Mitigation: • Similar to Proposed Action.	Effects: • No change to impervious or pervious areas or associated impacts to stormwater quality or quantity. Mitigation: • No mitigation necessary.

Table S-1. Summary of Environmental Effects and Mitigation Measures

Resource	Proposed Action	Alternative Action	No-Action Alternative
Visual Impacts			
Lighting Impacts	Effects: • Minor temporary increase in light trespass due to use of supplemental lighting during construction activities. • Minor long-term increase in light trespass due to installation of modest area lighting to ensure safety and security and to facilitate maintenance. Mitigation: • NIH would ensure construction contractors direct lighting away from the campus boundary whenever feasible. • New lighting systems would be sized appropriately and streetlights would direct lighting downward.	Effects: • Minor temporary increases in light trespass similar to Proposed Action except temporary construction impacts would be present at additional sites. • Minor long-term increases in light trespass similar to Proposed Action except lighting would be installed at additional sites (e.g., Booster Pump Station, backflow preventer buildings). Mitigation: • Similar to Proposed Action.	Effects: • No direct impact on lighting. Mitigation: • No mitigation necessary.
Viewscapes	Effects: • Minor to moderate adverse impacts to viewscapes from inside the Campus due to construction of the Industrial Water Storage System and Thermal Energy Storage System. • Minor adverse impact to external viewscapes. Mitigation: • Existing topography and vegetation would be maintained to reduce views of project elements from off-campus. • Height of new structures would not exceed the Master Plan building height guidance.	Effects: • Moderate adverse impact to viewscapes from outside the Campus due to the larger size of the Potable Water Storage System relative to the Industrial Water Storage System. • Moderate adverse impact to viewscapes from inside the Campus (for similar reasons as above). • Additional minor impacts to viewscapes from inside and outside the Campus due to construction of backflow preventer buildings and the Booster Pump Station. • Other impacts to viewscapes from inside and outside the Campus would be similar to the Proposed Action. Mitigation: • NIH would minimize disturbance to existing vegetation and install plantings to reduce visual impacts over time.	Effects: • No direct impact on external viewscapes. Mitigation: • No mitigation necessary.

Table S-1. Summary of Environmental Effects and Mitigation Measures

Resource	Proposed Action	Alternative Action	No-Action Alternative
Transportation and Traffic			
Roads, Transit, and Traffic	Effects: • Minor temporary impacts on off-campus traffic due to construction vehicles and changes to traffic patterns (which may impact volumes at Campus entrances). • Minor temporary impacts to on-campus vehicle, pedestrian and bicycle routes due to road or sidewalk closures. • Temporary impacts on campus shuttles with routes near construction sites. • Minor temporary impacts to on-campus vehicle, pedestrian and bicycle routes. • No long-term impact on traffic volume to, from, or within the Campus. Mitigation: • The NIH would communicate route closures to employees and establish alternate routes as needed. • The NIH would avoid backups at the service vehicle entrance by utilizing other gates as needed on peak days.	Effects: • Similar to Proposed Action except the Alternative Action would also have moderate temporary impacts to off-campus roads, transit, and traffic when installing new connections to WSSC water lines and/or severing existing connections. Mitigation: • Similar to Proposed Action except the NIH would also coordinate with WSSC and other stakeholders to minimize impacts to off-campus vehicular, pedestrian, and bicycle traffic during construction activities.	Effects: • No impacts on traffic or transportation. Mitigation: • No mitigation necessary.

Table S-1. Summary of Environmental Effects and Mitigation Measures

Resource	Proposed Action	Alternative Action	No-Action Alternative
Parking	Effects: • Temporary minor impact due to construction workers parking on-site, increasing demand for parking spaces. • Long-term minor impact on parking due to reduction of approximately 90 parking spaces within Lot 41. Mitigation: • The NIH would ensure the contract requires construction workers to park in designated areas within the Campus. • Additional parking for the projected future growth of an estimated 3,000 Bethesda Campus-based employees is being planned for at a ratio of 0.33 spaces per employee.	Same as the Proposed Action.	Effects: • No impacts on parking. Mitigation: • No mitigation necessary.
Noise Levels			
--	Effects: • Temporary minor noise impacts due to construction activities. • Long-term moderate noise impacts due to increased nighttime operations at the CUP. Mitigation: • NIH would limit most construction activity to between 7 AM and 5 PM and would ensure that noise levels from construction activities would not exceed 75 dBA at neighboring properties or 85 dBA if a noise suppression plan is approved by the Montgomery County DEP. • New equipment (e.g., pumps, generators) would be installed inside buildings or sound-attenuating enclosures to mitigate operational noise impacts. • NIH would utilize noise suppression techniques to mitigate noise from CUP operations, if necessary, to meet the Montgomery County nighttime noise ordinance of 55 dBA at the property lines.	Similar to Proposed Action except minor temporary construction noise would occur at additional sites.	Effects: • No impacts on noise levels. Mitigation: • No mitigation necessary.

Table S-1. Summary of Environmental Effects and Mitigation Measures

Resource	Proposed Action	Alternative Action	No-Action Alternative
Air Quality			
Ambient Air Quality	Effects: • Minor increase in air emissions from onsite stationary sources due to the occasional use of new emergency generators. • No impact to offsite stationary emissions as energy demand would not be impacted. • No long-term impact on vehicle-related air emissions. • Temporary minor increase in emissions associated with the use of construction equipment. • Potential temporary impacts on local air quality due to fugitive dust (PM) emissions from construction activities. • Net change in emissions of nonattainment criteria pollutants and their precursors (NOx, VOC, $PM_{2.5}$, and SO_2) would be well below Clean Air Act General Conformity Rule *de minimis* thresholds for each applicable calendar year. Mitigation: • Amendments to NIH's Title V permit for the new emergency generators would be completed, if necessary. • Implementation of best management practices (BMPs) to limit fugitive dust impacts from construction, demolition, and renovation activities.	Effects: • Minor increase in air emissions similar to Proposed Action except: • Somewhat higher increase in air emissions from onsite stationary sources due to one additional new emergency generator. • Minor net increase in offsite stationary emissions associated with minor increase in electricity demand (purchased electricity for additional pumps only partially offset by increased chiller efficiency). Mitigation: • Minor net increase in offsite stationary emissions.	Effects: • No changes in campus air quality compared to the baseline. Mitigation: • No mitigation necessary.

Table S-1. Summary of Environmental Effects and Mitigation Measures

Resource	Proposed Action	Alternative Action	No-Action Alternative
Greenhouse Gas Emissions	Effects: • Minor increase in Scope 1 GHG emissions associated with operation of new emergency generators. • Temporary minor increase in Scope 3 GHG emissions associated with construction activities. Mitigation: • No mitigation necessary.	Similar to the Proposed Action except there would be additional Scope 1 GHG emissions associated with the emergency generator at the Booster Pump Station and temporary Scope 3 GHG emissions from construction activities would be increased due to the larger construction scope.	Effects: • No change in GHG emissions. Mitigation: • No mitigation necessary.
Biological Resources			
Vegetation	Effects: • Minor temporary and long term impact on vegetation (including that in a designated no-mow area) due to net loss of 3.5 acres of vegetated area. • Cutting of trees within impacted vegetated project areas. Mitigation: • NIH would transplant affected trees, when feasible and re-plant trees (1:1) when not feasible to transplant. • Following construction, NIH would replant disturbed vegetated areas, when feasible.	Similar to the Proposed Action, except additional construction sites would result in additional impacts to vegetation (including that in no-mow areas) at these sites. The Alternative Action would result in a net loss of 3.7 acres of vegetated area.	Effects: • No impacts to vegetation or no-mow areas. Mitigation: • No mitigation necessary.
Wildlife	Effects: • Minor impacts to wildlife associated with vegetation loss and tree clearing. • Temporary wildlife disturbance due to construction and nighttime noise emissions. • No impacts to rare, threatened, or endangered species. Mitigation: • NIH would comply with the Migratory Bird Treaty Act as it pertains to tree cutting.	Effects: • Similar to the Proposed Action except the Alternative Action would occur at additional sites, including construction of a water line that would cross the NIH Stream. This could potentially have an adverse impact on aquatic life. Mitigation: • Similar to the Proposed Action and NIH would also ensure in-stream work would not be conducted from March 1 through June 15.	Effects: • No impacts to wildlife or habitat. Mitigation: • No mitigation necessary.

Table S-1. Summary of Environmental Effects and Mitigation Measures

Resource	Proposed Action	Alternative Action	No-Action Alternative
Topography, Geology, and Soils			
Topography	Effects: • Moderate localized impacts on topography due to construction activities, including extensive grading at the Parking Lot 41 site. Mitigation: • A retaining wall would be installed to stabilize the hillside at the site of the Industrial Water Storage System (Parking Lot 41) and thus prevent erosion.	Similar to the Proposed Action, except construction would occur at additional sites, including grading and construction of a terraced retaining wall at the site of the Booster Pump Station. Grading for installation of other supporting infrastructure is expected to be minor since most of the construction would occur in previously disturbed and developed areas.	Effects: • No impacts to wildlife or habitat. Mitigation: • No mitigation necessary.
Geology and Soils	Effects: • Moderate soil disturbances due to construction activities. • Potential soil quality impacts during construction due to soil compaction from heavy machinery traffic. Mitigation: • NIH would implement SEC measures during earth disturbance to minimize impacts to soil.	Similar to the Proposed Action, except moderate soil disturbances would be somewhat greater under the Alternative Action due to construction at additional sites.	Effects: • No impacts to geology or soils. Mitigation: • No mitigation necessary.
Wastes			
Non-Hazardous Solid Wastes	Effects: • Minor impacts to non-hazardous solid waste generation associated with construction activities. • No impact to solid waste generation from operations. Mitigation: • NIH would require in the construction contract that the contractors recycle and reclaim significant portions of waste and demolished materials.	Similar to the Proposed Action except minor non-hazardous solid waste impacts would be slightly greater under the Alternative Action due to construction at additional sites.	Effects: • No new generation of solid waste. Mitigation: • No mitigation necessary.

Table S-1. Summary of Environmental Effects and Mitigation Measures

Resource	Proposed Action	Alternative Action	No-Action Alternative
Hazardous Solid Wastes	Effects: • Minor impacts on hazardous waste generation (i.e., waste oil or diesel fuel) due to operation, maintenance and repair of new emergency generators. Mitigation: • Wastes would be stored and disposed or recycled in accordance with state and federal regulations.	Similar to the Proposed Action, except minor hazardous waste generation impacts under the Alternative Action would be somewhat greater due to installation of one additional generator and potential use of chlorine for water treatment at the Potable Water Storage System.	Effects: • No new generation of hazardous waste. Mitigation: • No mitigation necessary.
Cultural and Historic Resources			
Architectural Resources	Effects: • No adverse effect on any historic or MIHP-listed properties. Mitigation: • NIH would consult with MD SHPO to obtain their concurrence regarding lack of adverse effect on historic properties.	Effects: • Minor, permanent change to the appearance of the Officer's Quarters Historic District associated with demolition of the basketball court and construction of the Booster Pump Station and nearby backflow preventer enclosure. • No adverse effect on any historic or MIHP-listed properties. Mitigation: • NIH would mitigate the visual impacts of construction by designing the Booster Pump Station and backflow preventer enclosure to be consistent with the appearance of contributing resources within the district. • A sound-attenuating enclosure would be installed around the Booster Pump Station generator. • NIH would consult with MD SHPO to obtain their concurrence regarding lack of adverse effect on historic properties.	Effects: • No adverse effect on historic or MIHP-listed properties. Mitigation: • No mitigation necessary.

Table S-1. Summary of Environmental Effects and Mitigation Measures

Resource	Proposed Action	Alternative Action	No-Action Alternative
Archeological Resources	Effects: • No earth disturbance within archeologically sensitive areas. • No adverse effect on any archeological sites listed or eligible for listing on the National Register. Mitigation: • NIH would consult with MD SHPO obtain their concurrence regarding lack of adverse effect on archeological sites.	Similar to the Proposed Action.	Effects: • No adverse effect on archeological properties. Mitigation: • No mitigation necessary.
Land Use and Zoning			
--	Effects: • No impacts to land use or zoning within the Campus. • Land use would remain consistent with Montgomery County zoning, the MNCPPC *Bethesda-Chevy Chase Master Plan*, and land use goals and objectives of the *Campus Master Pla*n. Mitigation: • No mitigation necessary.	Same as the Proposed Action.	Effects: • No changes to land use. Mitigation: • No mitigation necessary.
Socioeconomics			
--	Effects: • Improved reliability of Campus chilled water supply would reduce potential for interruptions to the NIH biomedical research, a key driver of the Montgomery County economy. • Minor economic benefit to the local economy during construction activities (e.g., meals and incidentals for construction workers). • Temporary minor impacts on population and housing in the surrounding area due to construction workers. Mitigation: • No mitigation necessary.	Similar to the Proposed Action, except the Alternative Action would also improve the reliability of the Campus potable water supply, further reducing the potential for interruptions to the NIH biomedical research, a key driver of Montgomery County's economy.	Effects: • No reduction in the potential for interruptions to the NIH biomedical research. • No effect on the population, housing, or open spaces in the surrounding area. Mitigation: • No mitigation necessary.

Table S-1. Summary of Environmental Effects and Mitigation Measures

Resource	Proposed Action	Alternative Action	No-Action Alternative
Tank Failure			
--	Effects: • Localized impacts to soil erosion and vegetation. • Temporary impacts to surface water bodies from discharge of sediment and debris. • Potential damage to nearby vehicles, roads, or utilities on the Campus, including underground storage tanks adjacent to the proposed site for the Thermal Energy Storage System. • Potential injury of nearby persons on the Campus. • Temporary minor impacts to the supply of water to the CUP or supply of chilled water to the Campus. Mitigation: • The NIH would use site grading and/or retaining walls at the proposed site for the Thermal Energy Storage System to divert much of the floodwater away from existing underground storage tanks. • The NIH may install security fencing to prevent unauthorized access. • The NIH would properly maintain and monitor each tank and associated components.	Similar to the Proposed Action, except the following: • Failure of the Potable Water Storage System could result in a temporary disruption to the drinking water supply on the Campus. • Impacts resulting from floodwaters associated with failure of the Potable Water Storage System tank would likely be more severe as the tank capacity would be larger.	Effects: • No potential for tank failure. Mitigation: • No mitigation necessary.

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ABBREVIATIONS, ACRONYMS, AND SYMBOLS

ACHP	Advisory Council on Historic Preservation
ASTs	Aboveground Storage Tanks
BMPs	Best Management Practices
BWI	Baltimore Washington International Airport
CAA	Clean Air Act
CBD	Central Business District
CBP	Chesapeake Bay Program
CDP	Census-Designated Place
CEQ	Council on Environmental Quality
CFCs	Chlorofluorocarbons
CFS	Cubic feet per second
CH_4	Methane
CO	Carbon Monoxide
CO_2	Carbon Dioxide
COGEN	Cogeneration Boiler
COMAR	Code of Maryland Regulations
CUP	Central Utility Plant
CVIF	Commercial Vehicle Inspection Facility
CWA	Clean Water Act
CY	Cubic yards
dBA	A-weighted Decibel Scale
DBH	Diameter at Breast Height
DCA	Ronald Reagan National Airport
DDOE	District Department of the Environment
DED	Department of Economic Development
DEP	Department of Environmental Protection
DOE	Determination of Eligibility
DOT	Department of Transportation
DRM	Design Requirements Manual
EA	Environmental Assessment
EGUs	Electric Generation Units
EIS	Environmental Impact Statement
EISA 2007	Energy Independence and Security Act of 2007
EPAct 2005	Energy Policy Act of 2005
EO	Executive Order
ESA	Endangered Species Act of 1973
ESD	Environmental Site Design
˚F	Degrees Fahrenheit
FHWA	Federal Highway Administration
FIRMs	Flood Insurance Rate Maps
FONSI	Finding of No Significant Impact
FY	Fiscal Year
GCR	General Conformity Rule
GHGs	Greenhouse Gasses
g/HP-hr	Grams per Horsepower-hour
GPM	Gallons per Minute
GMLS	Grounds Maintenance and Landscaping Section
GPD	Gallons per Day
GSA	General Services Administration

(Continued)

Guiding Principles	Guiding Principles for Federal Leadership in High Performance and Sustainable
HAP	Hazardous Air Pollutant
HC	Hydrocarbon
HEPA	High Efficiency Particulate Arresting
HFCs	Hydrofluorocarbons
HHS	U.S. Department of Health and Human Services
IAD	Washington Dulles International Airport
IDA	International Dark Sky Association
IPCC	Intergovernmental Panel on Climate Change
IES	Illuminating Engineering Society
ISMP	Institutional Stormwater Management Plan
KV	Kilovolt
kW	Kilowatts
LOD	Limit of Disturbance
MACT	Maximum Achievable Control Technology
MARC	Maryland Regional Commuter Train Service
MCDOT	Montgomery County Department of Transportation
MDE	Maryland Department of the Environment
MDNR	Maryland Department of Natural Resources
MEP	Maximum Extent Practicable
MGD	Million gallons per day
MIHP	Maryland Inventory of Historic Properties
µg/m3	Micrograms per cubic meter of air
MLO	Model Lighting Ordinance
MLP	Multi Level Parking
MLP-12	Multi-Level Parking Garage 12
M-NCPPC	Maryland-National Capital Park and Planning Commission
MOU	Memorandum of Understanding
MOVES	Motor Vehicle emission Simulator
MRA	Maryland Recycling Act
MS4	Municipal Separate Storm Sewer System
MSW	Municipal Solid Waste
MT	Metric Tons
MVA	Megavolt-amps
MWAQC	Metropolitan Washington Air Quality Committee
MWCOG	Metropolitan Washington Council of Governments
NESHAPs	National Emission Standards for Hazardous Air Pollutants
NAAQS	National Ambient Air Quality Standards
NCPC	National Capital Planning Commission
NCR	National Capital Region
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NIH	National Institutes of Health
NIOSH	National Institute for Occupational Safety and Health
NMIM	National Mobile Inventory Model
NOI	Notice of Intent
N_2O	Nitrous Oxide
NO_2	Nitrogen Dioxide
NO_x	Nitrogen Oxide
NSA	Naval Support Activity

(Continued)

NSPS	New Source Performance Standards
NPDES	National Pollutant Discharge Elimination System
NSR	New Source Review
NWCCC	Northwest Childcare Center
O_3	Ozone
OSHA	Occupational Safety and Health Administration
Pb	Lead
PCBs	Polychlorinated Biphenyls
PEPCO	Potomac Electric Power Company
PFCs	Perfluorocarbons
PM	Particulate matter
PM_{10}	Coarse particulate matter
$PM_{2.5}$	Fine particulate matter
PPB	Parts per billion
PPH	Pounds per hour
PPM	Parts per million
PSD	Prevention of Significant Degradation
PSIG	Pounds per square inch
PTC	Permit to Construct
RCRA	Resource Conservation Recovery Act
ROD	Record of Decision
SDWA	Safe Drinking Water Act
SF	Square Feet
SF_6	Sulfur Hexafluoride
SHA	State Highway Administration
SHPO	State Historic Preservation Officer
SIP	State Implementation Plan
SO_2	Sulfur Dioxide
SWM	Stormwater Management
TAPs	Toxic Air Pollutants
T-BACT	Best Available Control Technology for Toxics
TSCA	Toxic Substances Control Act
TSD	Technical Support Document
TMDL	Total Maximum Daily Load
TMP	Transportation Management Plan
TPD	Tons per Day
TPY	Tons per Year
USACE	United States Army Corps of Engineers
USDOI	United States Department of the Interior
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USGBC	United States Green Building Council
USTs	Underground Storage Tanks
USU	Uniformed Services University of the Health Sciences
VOC	Volatile Organic Compounds
VRE	Virginia Railway Express
Washington Gas	Washington Gas Light Company
WMATA	Washington Metropolitan Area Transit Authority
WRNMMC	Walter Reed National Military Medical Center
WSSC	Washington Suburban Sanitary Commission

1. INTRODUCTION

This Environmental Impact Statement (EIS) has been prepared in accordance with the requirements of the National Environmental Policy Act (NEPA) of 1969, the Council of Environmental Quality (CEQ) regulations for implementing the procedural provisions of NEPA (40 CFR Parts 1500–1508 and 32 CFR Part 775), and the NEPA procedures defined in Parts 30-50 of the U.S. Department of Health and Human Services (HHS) General Administrative Manual.

1.1 Background

The National Institutes of Health (NIH) Bethesda Campus (hereafter referred to as "Campus") occupies approximately 310 acres of land within the Washington, D.C. metropolitan area in Montgomery County, Maryland (Figure 1-1). The NIH, an Operating Division of HHS, received the property on which the Campus is located through a series of generous land donations from Luke and Helen Woodward Wilson between 1935 and 1948. The Campus opened the doors of its first four buildings in 1939 and has since grown into a world renowned state-of-the-art biomedical research complex with over 20,000 employees.

The Campus contains over 90 buildings (Figure 1-2). These highly functional facilities enable the NIH to fulfill its mission of seeking fundamental knowledge about the nature and behavior of living systems and applying that knowledge to enhance health, lengthen life, and reduce the burdens of illness and disability. The Campus is home to 27 institutes and centers that support or conduct cutting-edge research on the following five key research themes:

- Applying genomics and other high throughput technologies;
- Translating basic science discoveries into new and better treatments;
- Using science to enable health care reform;
- Focusing on global health; and
- Reinvigorating and empowering the biomedical research community.

The NIH utilizes a variety of utilities to support its facilities and operations, including chilled water and potable water. The NIH primarily utilizes chilled water for building climate control. Chilled water is generated by supplying potable water to chillers located at Building 11, the Central Utility Plant (CUP). Chilled water from the CUP is conveyed to other buildings via a campus-wide distribution network.

NIH facilities require potable water for a variety of additional uses. The hospital, laboratories, cafeterias, and animal facilities use potable water for daily operations. Many buildings utilize potable water to charge, test, and use fire protection systems (e.g., sprinklers, standpipes). These and other uses contribute to a current campus demand for potable water of approximately one million gallons per day (MGD), which is supplied by the Washington Suburban Sanitary Commission (WSSC).

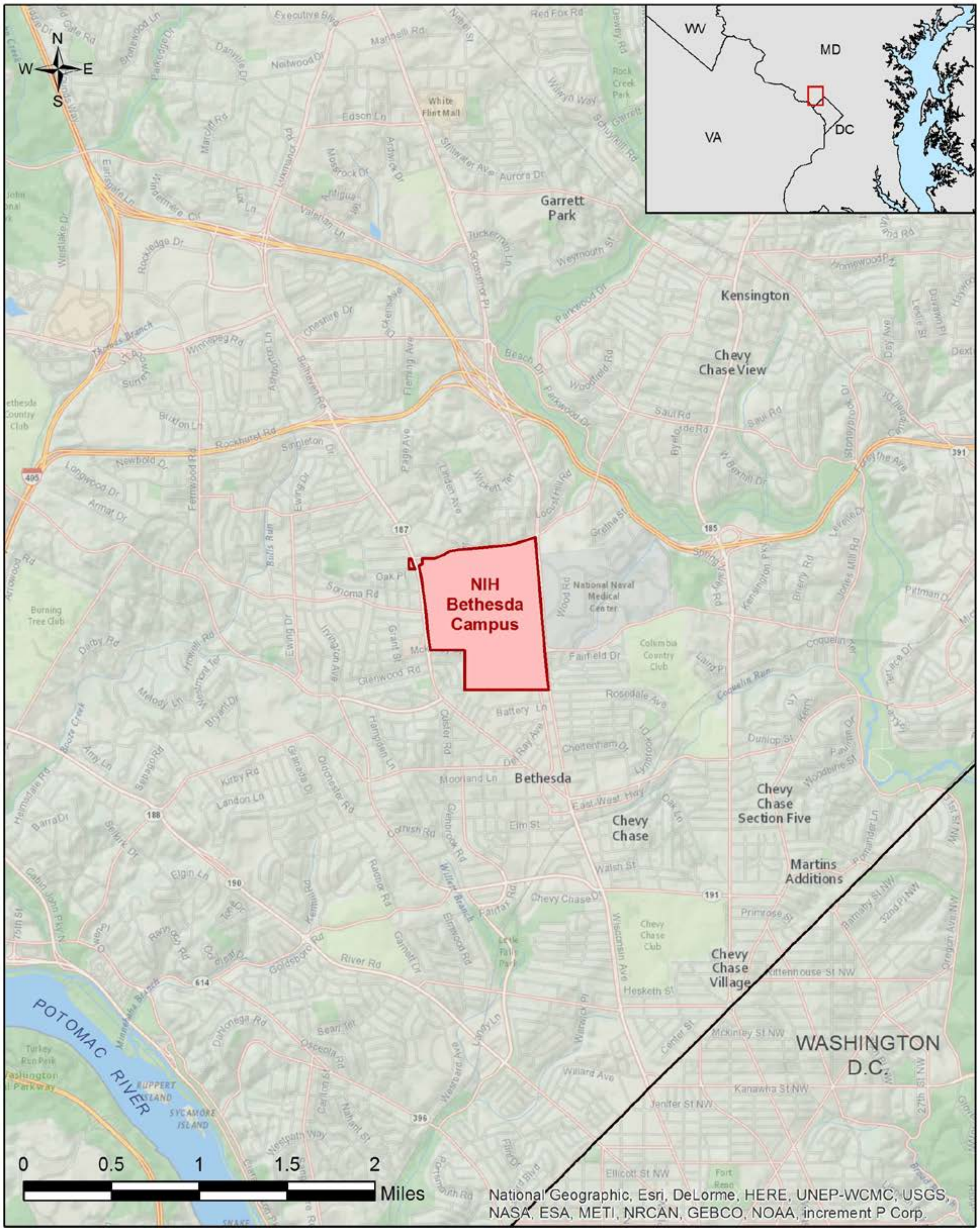
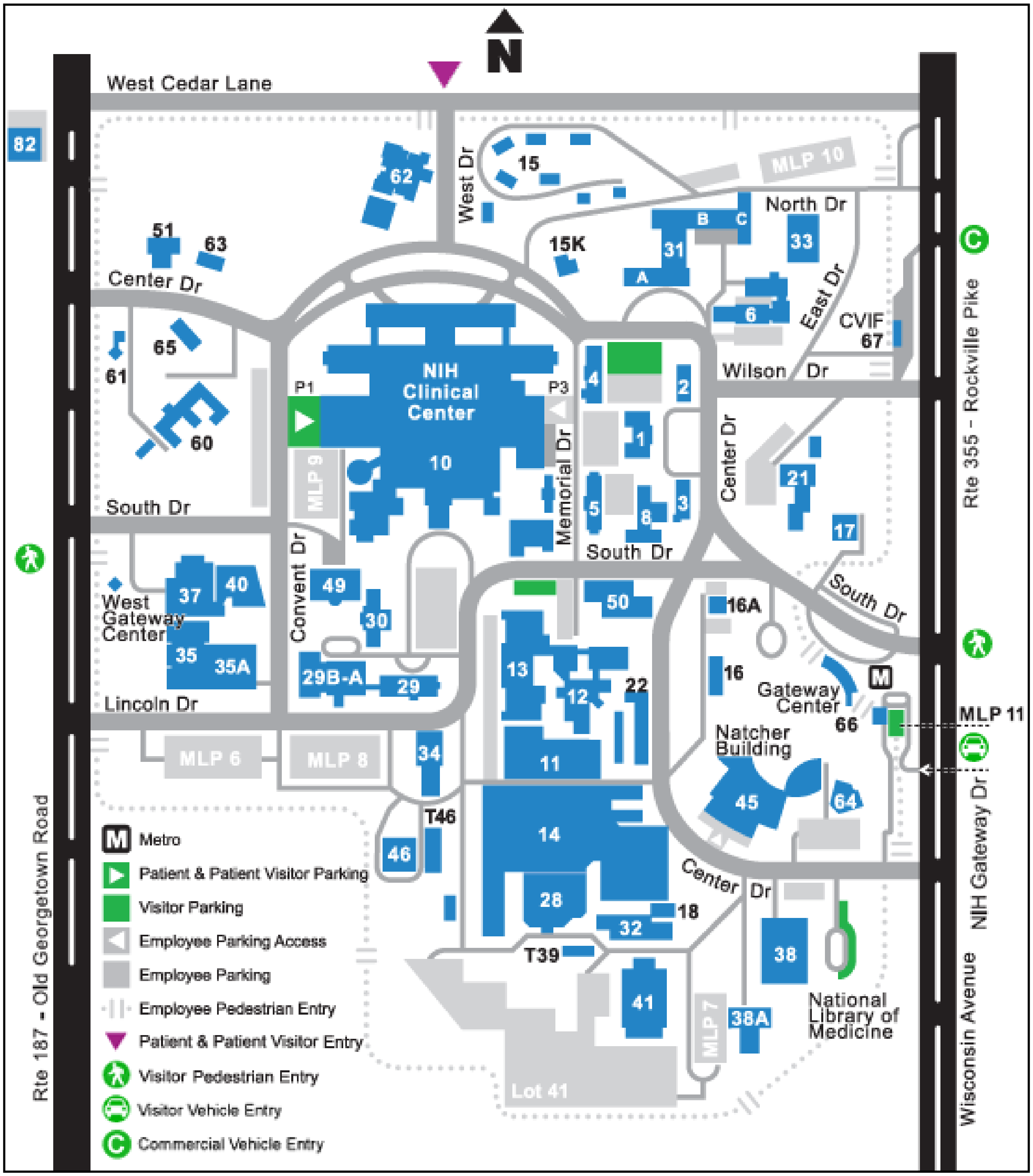


Figure 1-1. Location of the Campus



Source: http://www.ors.od.nih.gov/maps/Pages/NIH-Visitor-Map.aspx.

Figure 1-2. Existing Facilities on the Campus

1.2 Ongoing Planning Initiatives

In addition to those project elements covered by this EIS, the NIH has plans to implement numerous other projects throughout the Campus that have been evaluated under separate NEPA analyses. The following subsections provide an overview of the other projects that the NIH is currently considering.

1.2.1 *2013 Campus Master Plan and Parking Garage MLP-12*

In 2013, the NIH developed a comprehensive 20-year Master Plan for the Campus. The purpose of the *2013 Comprehensive Campus Master Plan* (*Campus Master Plan*) is to provide a realistic and orderly phased development of the Campus in furtherance of the NIH's scientific mission. The overall *Campus Master Plan* goals include the following:

- Foster innovative research to improve the Nation's health;
- Support the evolving requirements for biomedical research and education;
- Provide a secure and supportive environment for the people involved in NIH-activities, including scientists, professional/administrative staff, patients, visitors, and residents;
- Respect the stability and integrity of the surrounding residential community;
- Protect the environment of the Campus and the region;
- Foster communication about the NIH's goals and policies; and
- Meet the Federal Real Property Council's Performance Measures (NIH, 2013).

The *Campus Master Plan* organizes the Campus into five research clusters to facilitate collaboration; an administrative and biomedical research education cluster; and a utility support and service cluster (Figure 1-3). Each cluster would be served by easily accessible garages to provide employee parking within a five minute walking distance to the workplace (NIH, 2013). Refer to the *Campus Master Plan* for a more detailed discussion of the Plan's goals, objectives, and project elements.

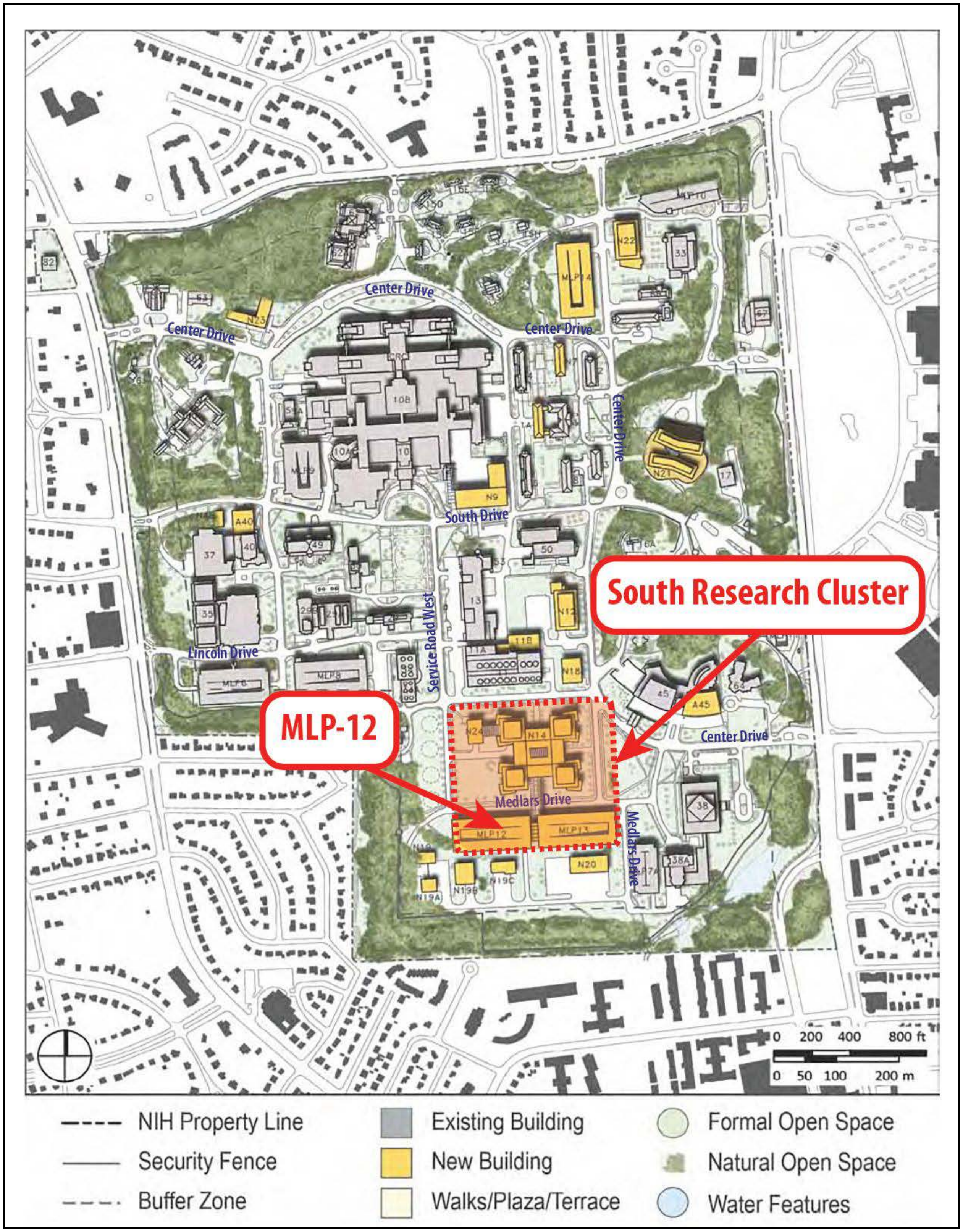
Realization of the *Campus Master Plan* at any given time will depend on the HHS and NIH priorities, governmental policy decisions, as well as budgetary considerations. The *Campus Master Plan* does not represent the pre-approval of any individual facilities project or the pre-approval of the particular needs of specific programs to be accommodated at the Campus. The *Campus Master Plan* is, therefore, designed as a flexible framework and a guide for the orderly future development of the Campus, if and as it occurs (NIH, 2013).

As described in Section 2 (Alternatives) the proposed construction of multi-level parking garage 12 (MLP-12) as described in the *Campus Master Plan* is highly relevant to some of the project elements analyzed in this EIS. As illustrated in the *Campus Master Plan* (Figure 1-3), MLP-12 would be part of the South Research Cluster, a planned research laboratory complex. The planned site of MLP-12 currently consists of a portion of Parking Lot 41 and a portion of the grassy hill that slopes down and north from Parking Lot 41 to Medlars Drive. For the purposes of this EIS, the planned site of MLP-12 is herein referred to as "the MLP-12 site."

Although the majority of the South Research Cluster is not funded or planned, NIH is considering construction of MLP-12 in fiscal year (FY) 2016. At this time, the NIH's intent is to initially construct the lowest level (slab foundation) of the garage and to design the facility to permit later construction of additional levels as warranted and if funds became available. This initial portion of MLP-12 would have a footprint of approximately 75,000 square feet (SF) and would accommodate approximately 233 parking spaces.

Vehicles could directly access the lower levels from Medlars Drive or the upper levels from Parking Lot 41. The scale and appearance would be similar to existing parking garages at the Campus, an example of which is pictured in Figure 1-4. The parking garage would have flights of stairs on all four corners of the building and may include elevators. Construction of MLP-12 would require site improvements and modifications, including demolition of Building T-39 and one other unnumbered structure, relocation of multiple small modular buildings (trailers), demolition of a portion of Lot 41, reconfiguration of remaining parking spaces in a portion of Parking Lot 41, grading and/or terracing of the hillside, and construction of road surfaces or walkways to provide vehicle and pedestrian access to the garage. These site modifications would result in a reduction of about 60 spaces from Parking Lot 41.

The NIH evaluated the *Campus Master Plan*, including construction of MLP-12, under the *Campus Master Plan EIS* and issued a Record of Decision (ROD) on February 13, 2015.



Source: (NIH, 2013).

Figure 1-3. Illustrative Master Plan

Figure 1-4. Example of Existing Parking Garage (MLP-8) on Campus

1.2.2 *Demolition of Building 34 and 34A*

The NIH plans to demolish Building 34, a refrigeration plant constructed in 1968; Building 34A, an addition to the south end of Building 34 constructed in 1981; and an associated parking lot adjacent to the buildings. For the purposes of this EIS, Buildings 34, 34A, and the parking lot are herein referred to as "the Building 34 Complex" and the location is herein referred to as "the Building 34 site."

As discussed in Section 2 (Alternatives) Buildings 34 and 34A are no longer in use and the NIH plans to demolish the facility and the associated parking lot under a separate effort.

The NIH's decision to demolish Buildings 34 and 34A is driven by the age and condition of the facility, including the presence of hazardous materials such as asbestos, lead, mercury, oil, and polychlorinated biphenyls (PCBs). Due to the severely deteriorated and unsafe condition of the facility, it would be cost prohibitive and potentially unsafe to remediate and renovate the facility.

The NIH is currently evaluating the demolition of Building 34, Building 34A, and the associated parking lot under an Environmental Assessment (EA). In January of 2015, the NIH issued the Final Environmental Assessment that identified no significant environmental impacts. The NIH anticipates that this NEPA action will be completed prior to the issuance of the Final EIS for the Chilled Water Systems Improvement project.

1.3 <u>Purpose and Need</u>

The overall purpose of the actions analyzed in this EIS is to accomplish the following:

- Ensure an uninterrupted and adequate supply of chilled water in the event of system maintenance requirements or an emergency that compromises WSSC's ability to provide the NIH with potable water; and

- Ensure an uninterrupted and adequate supply of industrial water, which is water that will be utilized at the CUP to generate chilled water or steam. An uninterrupted supply of industrial water is required for the CUP to continue generating chilled water.

- Ensure an uninterrupted and adequate supply of potable water, thus allowing for continued operations and preventing a mandatory evacuation of the campus buildings due to a lack of water to supply facility fire sprinklers and fire protection equipment in the event of an emergency that compromises WSSC's ability to provide the NIH with water.

The need for the actions analyzed in this EIS is to prevent a disruption in the chilled or potable water supply, which would result in severe consequences on patient care, animal welfare, and biomedical research. Improvements are needed to address real deficiencies within the campus water systems, including the following:

- Aging chilled water facilities may not continue to meet demand; and

- The Campus is not insulated from water emergencies that could compromise the WSSC's ability to provide water to the Campus.

The following subsections describe these factors in further detail.

1.3.1 *Aging Facilities and Maintenance*

Campus operations and achievement of the NIH mission depend on the reliability of the chilled water system. The Campus houses nine 5,000-ton chillers operating on R-22 refrigerant and three 5,000-ton chillers operating on R-134a refrigerant. The U.S. Environmental Protection Agency (USEPA) mandated the incremental phase-out of R22 refrigerant to reach a 99.5 percent reduction by the year 2020. The purpose of this mandatory phase-out is to comply with the Montreal Protocol, an international environmental agreement requiring worldwide phase-out of ozone-depleting chlorofluorocarbons (CFCs). R-22-based systems will be required to rely solely on recycled or reclaimed refrigerants after 2020 (USEPA, 2014a). Since R-22 is being phased out, the chillers at the Campus that operate on R-22 will eventually require replacement or conversion to R-134a, which will reduce the chilling capacity. The average age of these chillers is twelve years with half over 16 years old and thus they require frequent repair and maintenance (NIH, 2013).

A back-up chilled water supply would provide a source for chilled water at times when the chillers are unable to meet requirements at the Campus due to reduced capacity and increased demand. A back-up chilled water supply would also enable the Campus to continue operations while aging chillers are being serviced.

1.3.2 *Preparation for a Water Emergency*

Since the campus chilled water system does not currently have a back-up supply of chiller feed water, any disturbance in water delivery from the WSSC could prevent the CUP from meeting campus water requirements. A 2008 water main break approximately three miles west of the Campus reduced water pressure across the Campus, illustrating this vulnerability. Without a back-up supply of chiller feed water and chilled water, a water emergency may lead to disastrous consequences on patient care, biomedical research programs, and research animal welfare. Installation of a back-up supply of chiller feed water and chilled water would insulate the Campus from disasters that could prevent the WSSC from delivering water to the CUP for distribution throughout the Campus.

1.4 Public Scoping

Scoping is an early and open process for determining the range of significant issues to be analyzed in the EIS. A federal agency begins the scoping period for an EIS by publishing a Notice of Intent (NOI) in the Federal Register to let the public know that it is considering an action and will prepare an EIS. The NOI describes the proposed action and may provide background information on issues and potential impacts. During the scoping period, the public can provide comments on the proposed action, alternatives, issues, and potential environmental impacts to be analyzed in the EIS. Scoping may involve public meetings and other means to obtain public comments.

The NIH published an NOI for the EIS in the Federal Register on August 28, 2014. The NOI is provided in Appendix A. The public comment period ended on October 17, 2014.

Public Meeting

The NIH used the NOI, Bethesda Gazette, Washington Times, and flyers displayed at various businesses around Bethesda to inform the public of a public scoping meeting to be held at the Campus in Building 50, Room 1227/1233 on October 2, 2014, at 6:00 p.m. The purpose of the meeting was to solicit input from the general public regarding the Bethesda Campus Chilled Water Improvements project.

The NIH displayed a poster exhibit describing the NEPA process, suggestions for effective commenting, existing conditions at the Campus, and a project overview. Following the poster session, the NIH provided a brief presentation about the NEPA process and the proposed project and received public comments. The NIH provided a recorder and videographer to document oral comments.

Public Comments

Three members of the general public submitted comments on the Bethesda Campus Chilled Water Improvements projects, in person or in writing, by the October 17, 2014 deadline. One oral comment received during the public scoping meeting related to potential visual, stormwater, energy, and operational impacts of the project. This comment was also provided in writing and was considered during the development of this document. The other comments were not solution-oriented or relevant to the scope of the project and therefore did not warrant further analysis in the EIS.

No comments were received from public planning committees or county representatives.

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2. ALTERNATIVES

2.1 Proposed Action

The Proposed Action would implement chilled water system improvements that would enable the NIH Bethesda to adequately accomplish the project goals outlined in Section 1 (Introduction). The improvements would provide sufficient storage capacity to meet two days of industrial water demand should an outside disturbance interrupt the normal supply of water from the WSSC.

2.1.1 *Project Elements*

Elements of the Chilled Water System Improvements project that the NIH would implement under the Proposed Action are detailed below. Figure 2-1 illustrates relevant sites of interest, some of which are introduced below as potential construction sites. Figure 2-2 illustrates the location of elements of the Proposed Action at the Campus.

Thermal Energy Storage System

The Thermal Energy Storage System would store up to approximately nine million gallons of chilled water. Components of the Thermal Energy Storage System would include:

Storage Tank: The tank would likely be cylindrical, constructed of concrete or steel, have a footprint of approximately 12,000 SF, be at grade or partially below-grade, and similar to the height of the adjacent Building 11 or existing Building 34. The tank would be a neutral color, consistent with surrounding buildings.

Pump House: The NIH would construct a pump house building near the tank to house support equipment (e.g., pumps, valves, controls, electrical). The building could have multiple levels, including a below grade level (basement). The total size of the building would be about 10,000 SF or less, with a footprint of 5,000 SF or less.

Support Equipment: Various support equipment would be necessary, such as pumps, valves, piping, and controls. NIH would install an emergency generator rated up to 1,700 kW. Much of this equipment would be located in the pump house, although the NIH would install some equipment (e.g., the generator) outside on a cement slab. The NIH would install a sound-attenuating enclosure around the generator to minimize noise to surrounding areas. Other additional equipment not specifically listed may be required.

Utilities and Site Improvements: The NIH would install new aboveground or belowground utilities or modify existing utilities, such as electrical and water lines. The NIH would likely install security fencing to prevent unauthorized access to the area. The NIH would provide lighting for security and to facilitate maintenance. The NIH would construct access driveways, parking, and sidewalks to provide vehicular and pedestrian access to (or around) the tank. Other additional site improvements not specifically listed may be required.

The NIH would construct the Thermal Energy Storage System at the Building 34 site. Figure 2-3 illustrates the limit of disturbance (LOD) for the Thermal Energy Storage System. Figure 2-3 illustrates that the LOD is primarily pervious. As discussed in Section 3.4 (Stormwater Management), analysis in this EIS assumes post-demolition conditions at the Building 34 site.

In order for the Thermal Energy Storage System to operate, support equipment and site improvements would be required both within the limit of disturbance for the Thermal Energy Storage System and outside of that area. For the purposes of this EIS, references to the Thermal Energy Storage System include any support equipment and site improvements that would be located within the illustrated limit of disturbance. Refer to Other Supporting Infrastructure below, for discussion of support equipment that is outside the limit of disturbance for the Thermal Energy Storage System.

Industrial Water Storage System

The Industrial Water Storage System would store up to approximately five million gallons of industrial water to ensure an adequate supply of water to the chillers.

The proposed location for the Industrial Water Storage System is adjacent to the planned site of MLP-12 (see Section 1.2.1, 2013 Campus Master Plan and Parking Garage MLP-12). Figure 2-4 illustrates the limit of disturbance for the Industrial Water Storage System. Similar to the site of MLP-12, this site currently consists of a portion of Parking Lot 41 and a portion of the grassy hill that slopes down and north from Parking Lot 41 to Medlars Drive. For the purposes of this EIS, this site is herein referred to as "the Parking Lot 41 site."

Prior to construction of the Industrial Water Storage System, demolition of existing site improvements would occur including a portion of Parking Lot 41 and the existing sidewalk between that parking lot and Medlars Drive. Due to the existing sloping terrain at that site, excavation and stabilization would be required to create a relatively level area suitable for construction of the Industrial Water Storage System. Stabilization techniques that would likely be used at the site include construction of terraced retaining walls.

Components of the Industrial Water Storage System would include:

<u>Storage Tank</u>: The tank would be cylindrical in shape, partially below-grade, and about 50 feet in height. The NIH would likely construct the tank of steel or concrete that is painted a neutral color, consistent with surrounding buildings. The NIH would likely place architectural screening on or adjacent to the tank to reduce views of the tank.

<u>Pump House</u>: The NIH would construct a pump house building near the tank to house support equipment (e.g., pumps, valves, controls, electrical). The building could contain multiple levels, including a below grade level (basement). The total size of the building would be about 10,000 SF or less, with a footprint of 5,000 SF or less.

<u>Backflow Preventer</u>: The NIH would install a backflow preventer on the potable water supply line so water from the tank cannot flow back into the campus potable water distribution system. The backflow preventer would likely be housed in a small building, similar to a storage shed, with a footprint of approximately 500 SF or less.

<u>Support Equipment</u>: Various support equipment would be necessary, such as pumps, valves, variable frequency drives, electrical equipment, switchgear, piping, controls, and instrumentation. The NIH would also install an emergency generator rated up to 1,700 kW. Much of this equipment would be located in the pump house, although the NIH would install some equipment (e.g., the generator) outside (e.g., on cement pads) or underground. The NIH would install a sound-attenuating enclosure around the generator to minimize noise to surrounding areas. For the purposes of this EIS, any support equipment that would be located within the illustrated limit of

disturbance for the Industrial Water Storage System is considered integral to (part of) the Industrial Water Storage System.

Utilities and Site Improvements: The NIH would install new aboveground or belowground utilities or modify existing utilities, such as electrical and water lines. The NIH would likely install security fencing to prevent unauthorized access to the area. The NIH would provide lighting for security and to facilitate maintenance. The NIH would construct access driveways, parking, and sidewalks to provide vehicular and pedestrian access to (or around) the tank. Other additional site improvements not specifically listed may be required.

As discussed for the Thermal Energy Storage System, the support equipment and site improvements discussed above are considered integral to the system. However, additional support equipment and site improvements would be required at locations outside the limit of disturbance (e.g., underground water piping to connect the Industrial Water Storage System to the CUP, controls at the CUP). Refer to Other Supporting Infrastructure, below, for additional discussion.

The Industrial Water Storage System would be constructed adjacent to the planned site of MLP-12, which has been evaluated via a separate NEPA analysis (see Section 1.2.1 for additional detail).

Other Supporting Infrastructure

The Thermal Energy Storage System and the Industrial Water Storage System would each require new or upgraded utility infrastructure at locations outside the limit of disturbance for each system. Examples of the types of infrastructure changes that the NIH may implement are illustrated in Figure 2-2 and would include the following:

Equipment: The NIH would install equipment such as pumps, valves, variable frequency drives, electrical equipment, switchgear, piping, controls, and instrumentation. This equipment would be located outside (e.g., on cement pads), underground, and/or in new or existing buildings, including but not limited to the CUP.

Other Utility Buildings: If required by the design, the NIH would construct small utility buildings in addition to those buildings more specifically discussed in this section. The size for these buildings is uncertain, but would be about 400 SF or less each. The requirement for these buildings would be identified during design.

Piping: The NIH would install various new or modified piping to connect the storage tanks to the CUP and the existing campus-wide potable and chilled water distribution networks. Generally, the NIH would run new water pipes underground, although in some locations water pipes may be installed aboveground. Although the NIH identified potential locations for these water pipes during the planning process, precise details including piping locations and sizes are not fully developed. Examples of likely new or modified piping routes would include the following:

- A new 16-inch pipe to supply chilled water from the CUP to the Thermal Energy Storage System. A second new 16-inch pipe would supply chilled water from the Thermal Energy Storage System to the campus chilled water distribution system. The NIH would bury these pipes underground, likely in the vicinity of Service Road West.

- A new 10-inch pipe would supply water from the campus potable water distribution network to the Industrial Water Storage System. This pipe would connect to an existing water pipe about 500 feet northwest of the Industrial Water Storage System.

- A new 16-inch pipe would supply water from the Industrial Water Storage System to the CUP. This pipe would be located in the vicinity of Service Road West.

Utilities and Site Improvements*:* The NIH would install or modify aboveground or belowground utilities, such as electricity, telecommunication, and controls. The NIH would implement limited site improvements, consisting of repairs to existing sidewalks or roads damaged during excavation or minor modifications to existing features as needed to accommodate new infrastructure. The NIH may construct concrete slabs to support new equipment. Other additional site improvements not specifically listed may be required.

The examples above are not intended to provide a comprehensive list. The NIH would identify additional infrastructure modifications (primarily piping) during the design phase. Any additional supporting infrastructure modifications are expected to be consistent in nature and scale with the descriptions provided above.

Changes to Water Operations

Implementation of the Proposed Action would result in modifications to chilled water operations within the Campus. These changes in operations would include the following:

Operation of new equipment and infrastructure: NIH would operate the new equipment and infrastructure described above.

Changes to CUP operations: Under normal operations, the Industrial Water Storage System would continuously supply water to the CUP for industrial purposes. To minimize energy cost, the NIH would normally operate the CUP chillers at night to fill the Thermal Energy Storage System with chilled water. Nighttime operations would reduce energy use as the chillers operate more efficiently during cooler temperatures. Chilled water from the CUP would either be diverted to the Thermal Energy Storage System or supplied directly to the distribution system to meet campus demand. Chilled water requirements could be met at any time by chilled water supplied from the Thermal Energy Storage System and/or the CUP.

Existing conditions within the Campus and at the sites of the Proposed Action are discussed in Section 3 (Affected Environment). The potential environmental impacts and consequences associated with implementation of the Proposed Action are discussed in Section 4 (Environmental Consequences) and summarized in Table S-1. The potential for those impacts and consequences to combine with those from other past, present, or reasonably foreseeable future actions is discussed in Section 4 (Environmental Consequences).

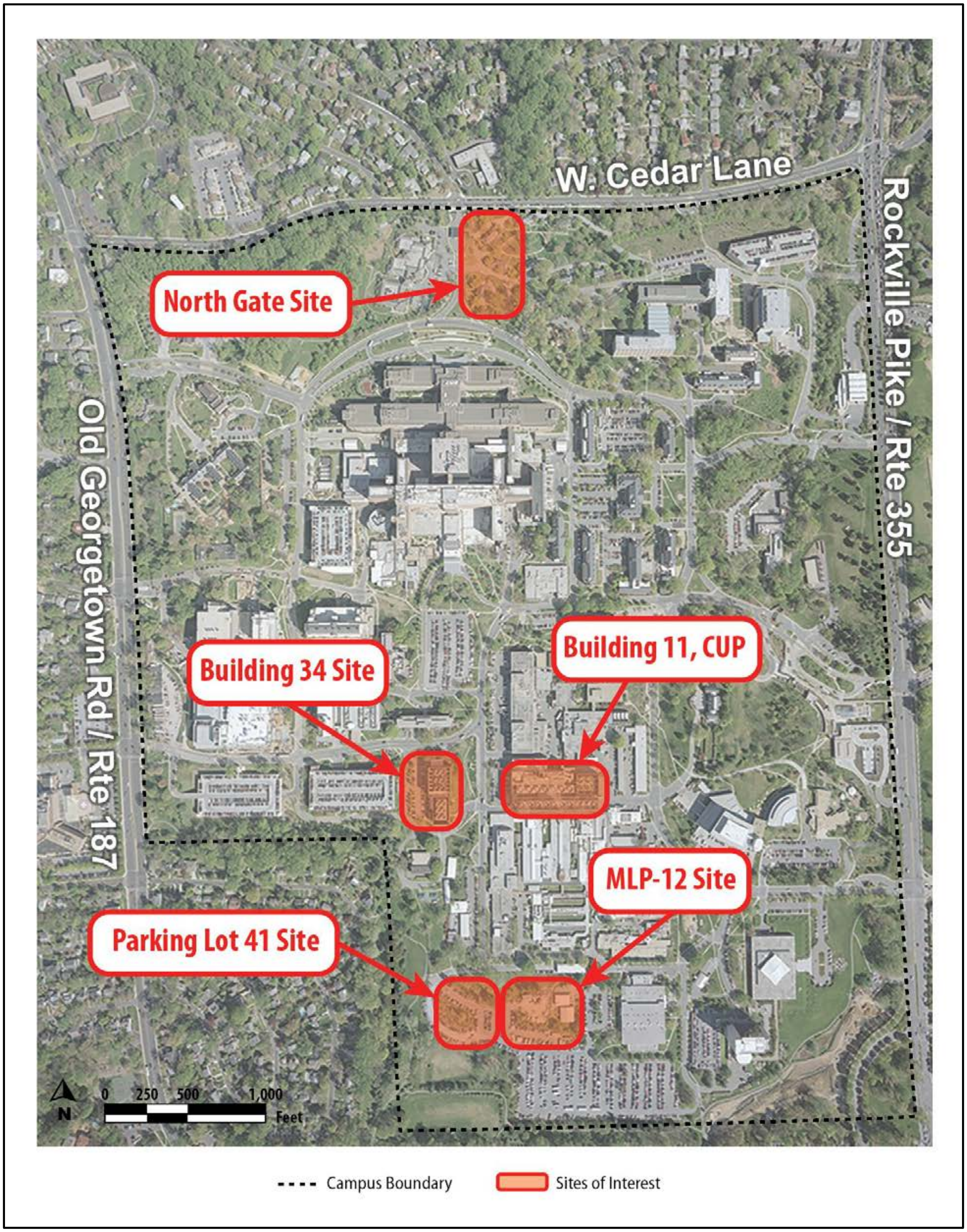


Figure 2-1. Sites of Interest

Figure 2-2. Proposed Action – Main Elements and Supporting Infrastructure Upgrades

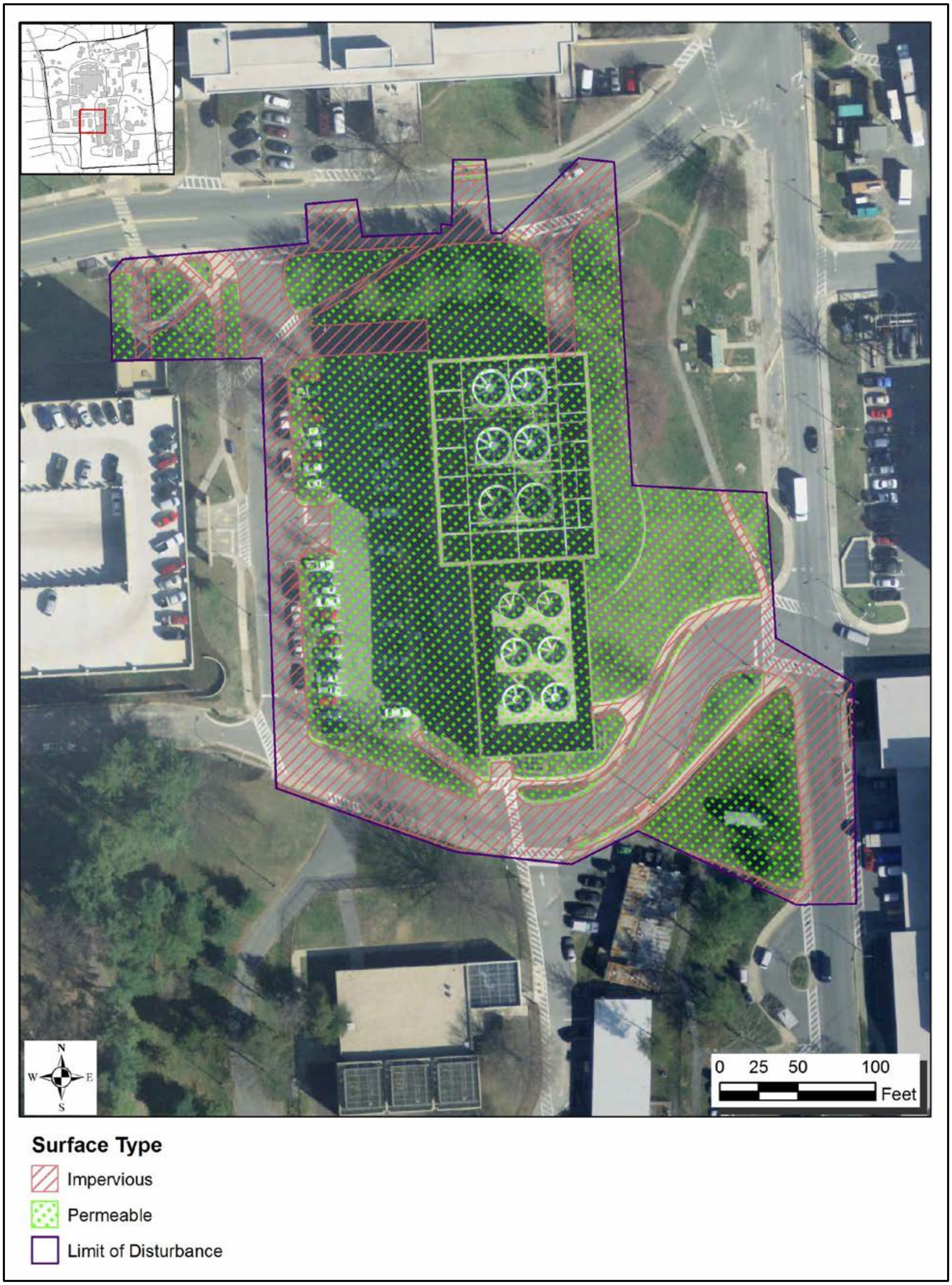


Figure 2-3. Thermal Energy Storage System Limit of Disturbance

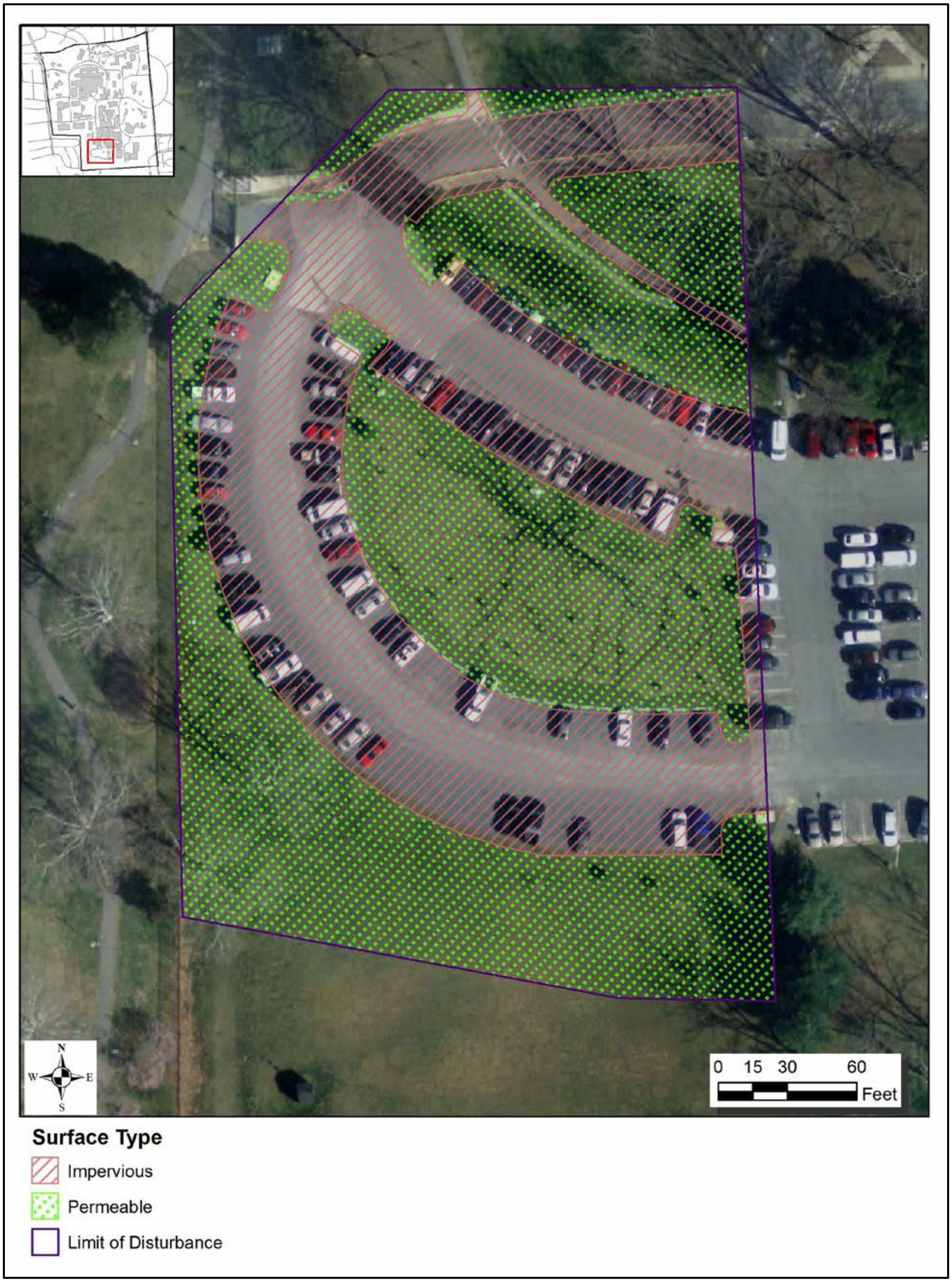


Figure 2-4. Industrial Water Storage System Limit of Disturbance

2.1.2 *Relationship with Other Planning Initiatives*

Under the Proposed Action, the Thermal Energy Storage System and Industrial Water Storage System would be constructed in areas that are expected to be affected by the other ongoing planning initiatives, as described below.

Construction of MLP-12

The proposed location for the Industrial Water Storage System is directly adjacent to the planned site for MLP-12. These two projects also share a common funding vehicle, and the schedule for execution of the two projects has the potential to overlap.

As noted in Section 1.2 (Ongoing Planning Initiatives), NIH plans to initially construct just the ground level of MLP-12. The ground level will be designed to permit construction of additional levels at a later date and as funding allows.

As discussed in Section 1.2 (Ongoing Planning Initiatives), the *Campus Master Plan* (including construction of MLP-12) was reviewed under a NEPA EIS which received a ROD on February 13, 2015. As the NEPA action for MLP-12 is complete, the environmental consequences of MLP-12 have already been evaluated and are therefore not included in the discussion of environmental consequences associated with the Proposed Action (i.e., Section 4, Environmental Consequences). Environmental consequences associated with MLP-12 are mentioned in Section 3 (Affected Environment) if relevant to the discussion of the site. Environmental consequences associated with MLP-12 that have the potential to combine with the impacts of the Proposed Action were also considered when developing Section 5 (Cumulative Impacts).

Demolition of Building 34

The proposed location for the Thermal Energy Storage System currently includes the vacant Building 34, Building 34A, and the associated parking lot. As discussed in Section 1.2 (Ongoing Planning Initiatives), the NIH has prepared a separate NEPA EA to evaluate potential demolition of these buildings and the associated parking lot.

As discussed in Section 1.2.2 (Demolition of Building 34 and 34A), the NIH's decision to demolish Building 34 is driven by the age and condition of those buildings, which contribute to a high cost of renovation. Demolition of Building 34 would not commit the NIH to executing any element of the Proposed Action. While the Thermal Energy Storage System element of the Proposed Action is greatly influenced by the scope and execution of this demolition, construction of other portions of the Proposed Action, such as the Industrial Water Storage System and supplemental infrastructure, are independent of the demolition of Building 34 and may occur at any time pending approval.

As the demolition at the Building 34 site is being evaluated as a separate NEPA action, and because significant elements of the Proposed Action are independent of that action, the environmental consequences of that demolition are not included in the discussion of environmental consequences associated with the Proposed Action (Section 4, Environmental Consequences). Environmental consequences associated with demolition at the Building 34 site are mentioned in Section 3 (Affected Environment) when relevant to the discussion of the site. Environmental consequences associated with demolition at the Building 34 site that have the potential to combine with the impacts of the Proposed Action were also considered when developing Section 5 (Cumulative Impacts).

As the Building 34 site would be utilized for new construction if the Proposed Action were implemented, it is anticipated that demolition of the Building 34 Complex would occur prior to the Proposed Action.

2.2 Alternative Action

The Alternative Action would implement water infrastructure improvements that would enable the NIH to adequately accomplish the project goals outlined in Section 1 (Introduction).

Figure 2-1 illustrates relevant sites of interest, some of which are referred to below as potential construction sites. Figure 2-5 illustrates the location of elements of the Alternative Action at the Campus.

2.2.1 *Project Elements*

Elements of the Chilled Water System Improvements project that the NIH would implement under the Alternative Action include the following:

Thermal Energy Storage System

The characteristics, features, and location of the Thermal Energy Storage System would be identical to the Proposed Action as discussed in Section 2.1.1 (Project Elements).

Potable Water Storage System

The Potable Water Storage System would store up to nine million gallons of potable water to ensure an adequate supply of industrial water to the chillers and for potable water requirements on the Campus. The proposed location for the Potable Water Storage System would be the same as that described for the Industrial Water Storage System under the Proposed Action as discussed in Section 2.1.1 (Project Elements). The characteristics and components of the Potable Water Storage System would be similar to the Industrial Water Storage System described previously for the Proposed Action, except that the storage tank would be larger. The tank would be about 90 feet in height, which is similar to the planned height of MLP-12 once fully built. Also, the Potable Water Storage System would likely require a water treatment system, including equipment to store and dispense treatment chemicals. Treatment chemicals would likely be stored in the pump house. The pump house, support equipment, and utilities and site improvements would otherwise be identical to the described features of the Industrial Water Storage Tank.

As discussed for the Thermal Energy Storage System, the support equipment and site improvements discussed above are considered integral to the system. However, additional support equipment and site improvements would be required at locations outside the limit of disturbance (e.g., underground water piping to connect the WSSC main to the Potable Water Storage System, controls at the CUP). Refer to Other Supporting Infrastructure, below, for additional discussion.

The Potable Water Storage System would be constructed adjacent to the planned site of MLP-12, which has been evaluated via a separate NEPA analysis (see Section 1.2.1 for additional detail).

Other Supporting Infrastructure

The characteristics and features of many components of this supporting infrastructure would be more extensive than that described for the Proposed Action. As with the Proposed Action, potential locations for many components of this infrastructure have been identified during the planning process. However, precise details including piping locations and sizes are not fully developed. Examples of likely new or modified supporting infrastructure include the following:

Equipment: The NIH would install equipment such as pumps, valves, variable frequency drives, electrical equipment, emergency generators, switchgear, valves, piping, controls, and instrumentation. This equipment would be located outside (e.g., on cement pads), underground, and/or in new or existing buildings, including but not limited to the CUP.

Booster Pump Station: The NIH would install a Booster Pump Station to ensure adequate water pressure for campus fire pumps and building sprinkler systems. The Booster Pump Station would offset the anticipated pressure drop associated with the planned backflow preventers (see below). The proposed location for the Booster Pump Station would be at the north end of the Campus near the North Gate. For the purposes of this document, this site is herein referred to as “the site near North Gate" (see Figure 2-6). The building for the Booster Pump Station would have a footprint of about 5,000 SF or less, and would be less than 15 feet in height. These booster pumps are electric-powered and anticipated to operate continuously. Figure 2-7 illustrates the limit of disturbance for the Booster Pump Station.

Backflow Preventers*:* The NIH would install backflow preventers at all active water utility connections so water from the Campus cannot flow back into the WSSC system. The number and location of backflow preventers has not yet been finalized. Backflow preventers would likely be housed in small buildings, similar to a storage shed, each with a footprint of approximately 500 SF or less. Three locations for proposed backflow preventers are illustrated in Figure 2-6, Figure 2-8, and Figure 2-9.

Other Utility Buildings: If required by the design, the NIH would construct small utility buildings in addition to those buildings more specifically discussed in this section. The size for these buildings is uncertain, but would be about 400 SF or less each. The requirement for these buildings would be identified during design.

Piping: The NIH would install various new or modified piping to connect the storage tanks to the CUP, and the existing campus-wide water distribution networks. Generally, the NIH would run new water pipes underground, although in some locations water pipes may be installed aboveground. Although the NIH identified potential locations for these water pipes during the planning process, precise details including piping locations and sizes are not yet known. Examples of likely new or modified piping routes would include the following:

- A new 16-inch (diameter) pipe to connect the existing WSSC line along West Cedar Lane, via the new Booster Pump Station, to the existing 16-inch pipe on Center Drive. The NIH would install backflow preventers on this line to prevent flow from the Campus to the WSSC line.

- A new 16-inch pipe to supply chilled water from the CUP to the Thermal Energy Storage System. A second new 16-inch pipe would supply chilled water from the Thermal Energy Storage System to the campus chilled water distribution system. The NIH would bury these pipes underground, likely in the vicinity of Service Road West.

- A new 16-inch pipe to supply water from the WSSC supply line under Old Georgetown Road to the Potable Water Storage System. This pipe would be located in the area of the Bethesda Trolley Trail. A second new 16-inch pipe would supply water from the Potable

Water Storage System to the CUP. This pipe would be located in the vicinity of Service Road West.

- A new 12-inch pipe on the east side of the Campus to ensure adequate pressure and flow to fire protection systems whether flows are supplied by the Booster Pump Station or the pumps at the Potable Water Storage System. The new pipes would connect existing 12-inch pipes near Building 33 to the existing 6-inch pipes south of Building 6A and west of Building 67.

Severing Existing Connections: The NIH would close about four to five of the existing connections to WSSC supply lines to reduce the required number of backflow preventers on the Campus. Refer to Section 4.1 (Utilities) for additional detail.

Utilities and Site Improvements*:* The NIH would install or modify aboveground or belowground utilities, such as electricity telecommunication, and controls. The NIH would implement limited site improvements, consisting of repairs to existing sidewalks or roads damaged during excavation or minor modifications to existing features as needed to accommodate new infrastructure. The NIH may construct concrete slabs to support new equipment. Other additional site improvements not specifically listed may be required.

Similar to the Proposed Action, the examples above are not intended to provide a comprehensive list. The NIH would identify modifications (primarily piping) during the design phase. Any additional supporting infrastructure modifications are expected to be consistent in nature and scale with the descriptions provided above.

Changes to Water Operations

Changes to water operations would be similar to the Proposed Action as discussed in Section 2.1.1 (Project Elements) with the following exceptions:

- Implementation of the Alternative Action would result in modifications to both potable and chilled water operations within the Campus.

- Operation of the Potable Water Storage System would designate NIH as a continuous water source, which would result in the necessity for water treatment (e.g., addition of treatment chemicals to the tank) and additional monitoring in accordance with applicable drinking water regulations. A chlorine additive would likely be used to inhibit bacteria growth, although the specific type of chlorine additive has not yet been identified.

- The Potable Water Storage System rather than the Industrial Water Storage System would continuously supply water (under normal conditions) to the CUP for industrial purposes.

Existing conditions are discussed in Section 3 (Affected Environment). The potential environmental impacts and consequences of the Alternative Action are discussed in Section 4 (Environmental Consequences) and summarized in Table S-1.

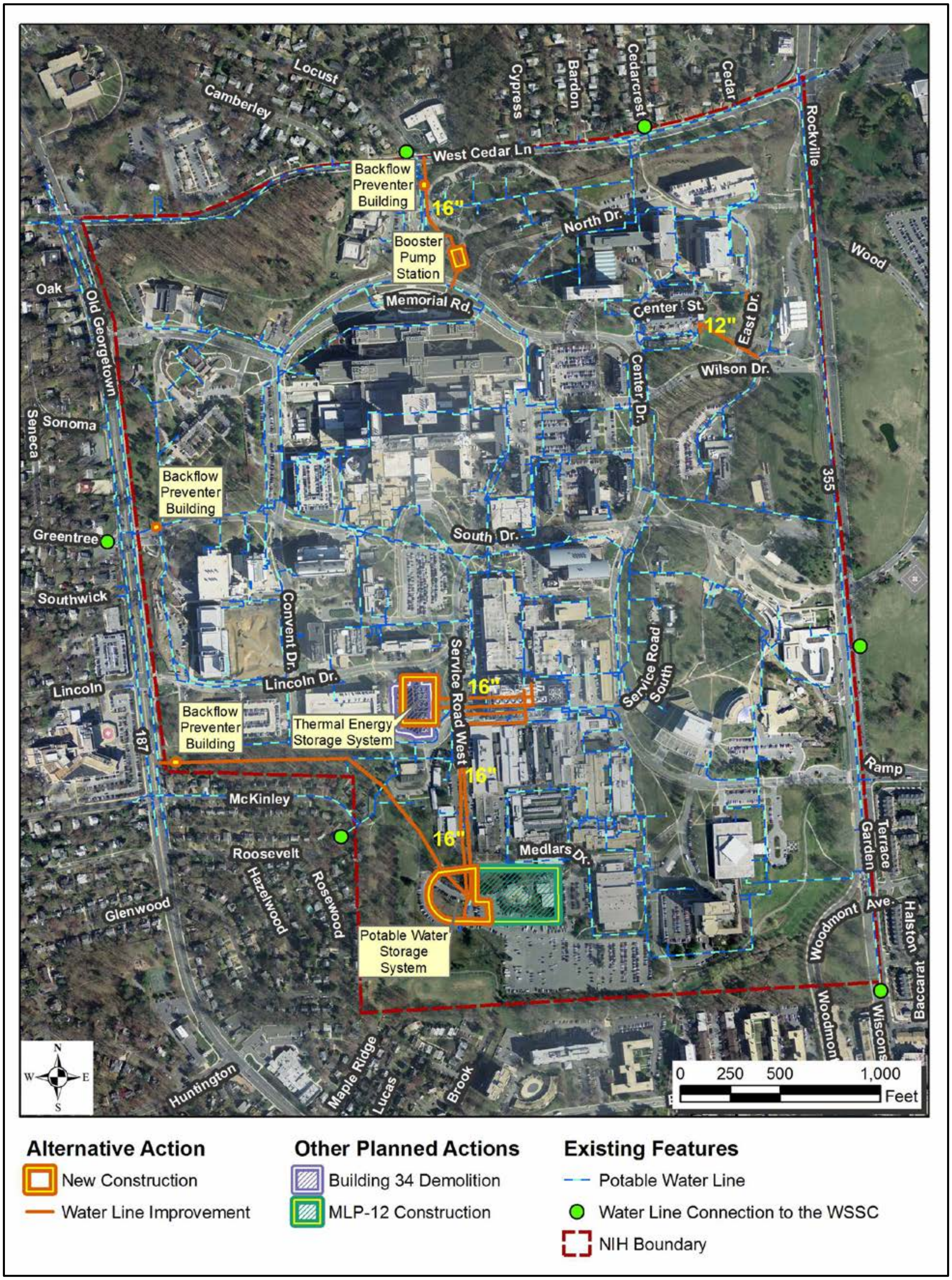


Figure 2-5. Alternative Action – Main Elements and Supporting Infrastructure Upgrades

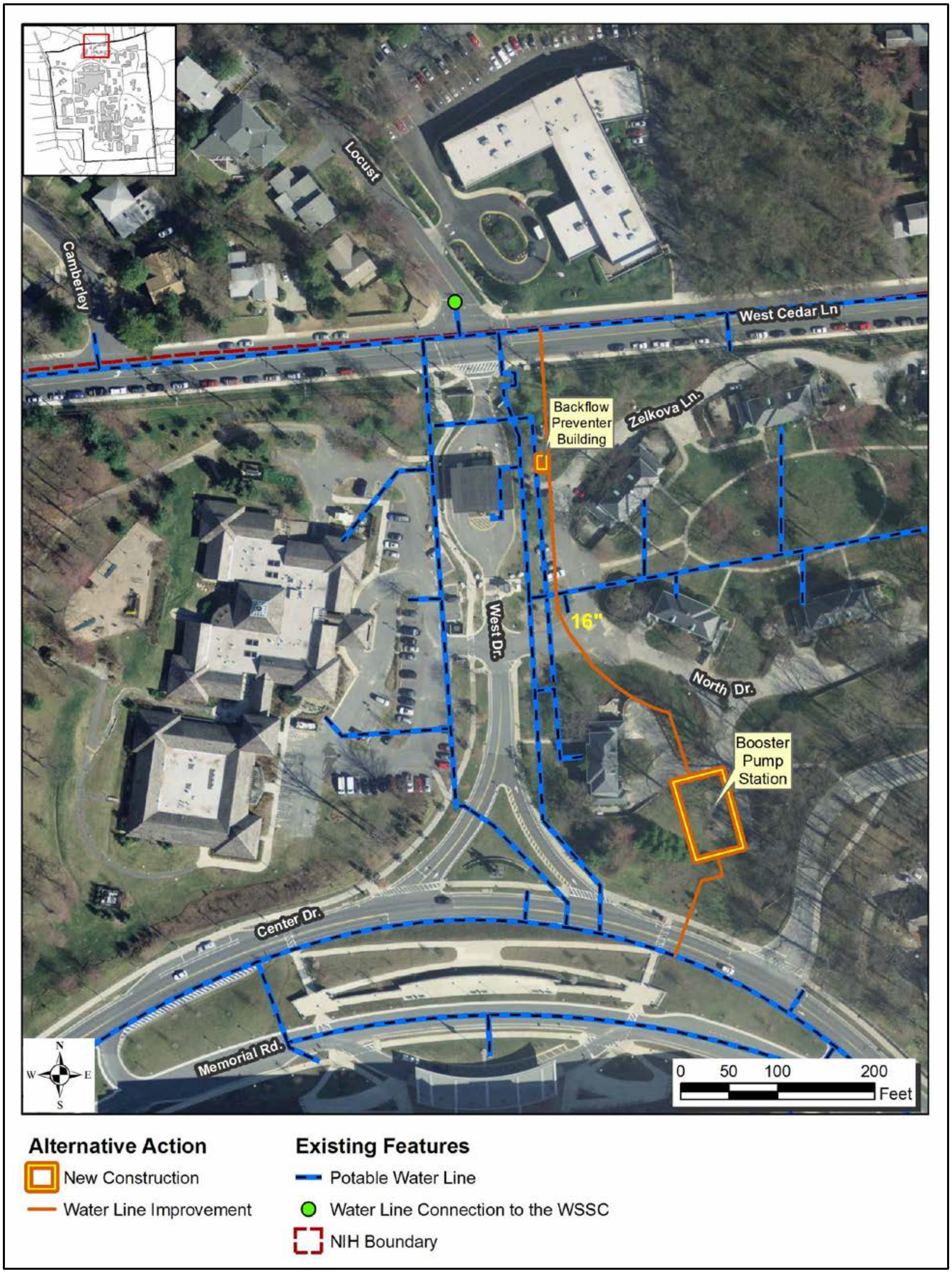


Figure 2-6. Alternative Action – Booster Pump Station and Backflow Preventer

Figure 2-7. Alternative Action – Booster Pump Station Limit of Disturbance

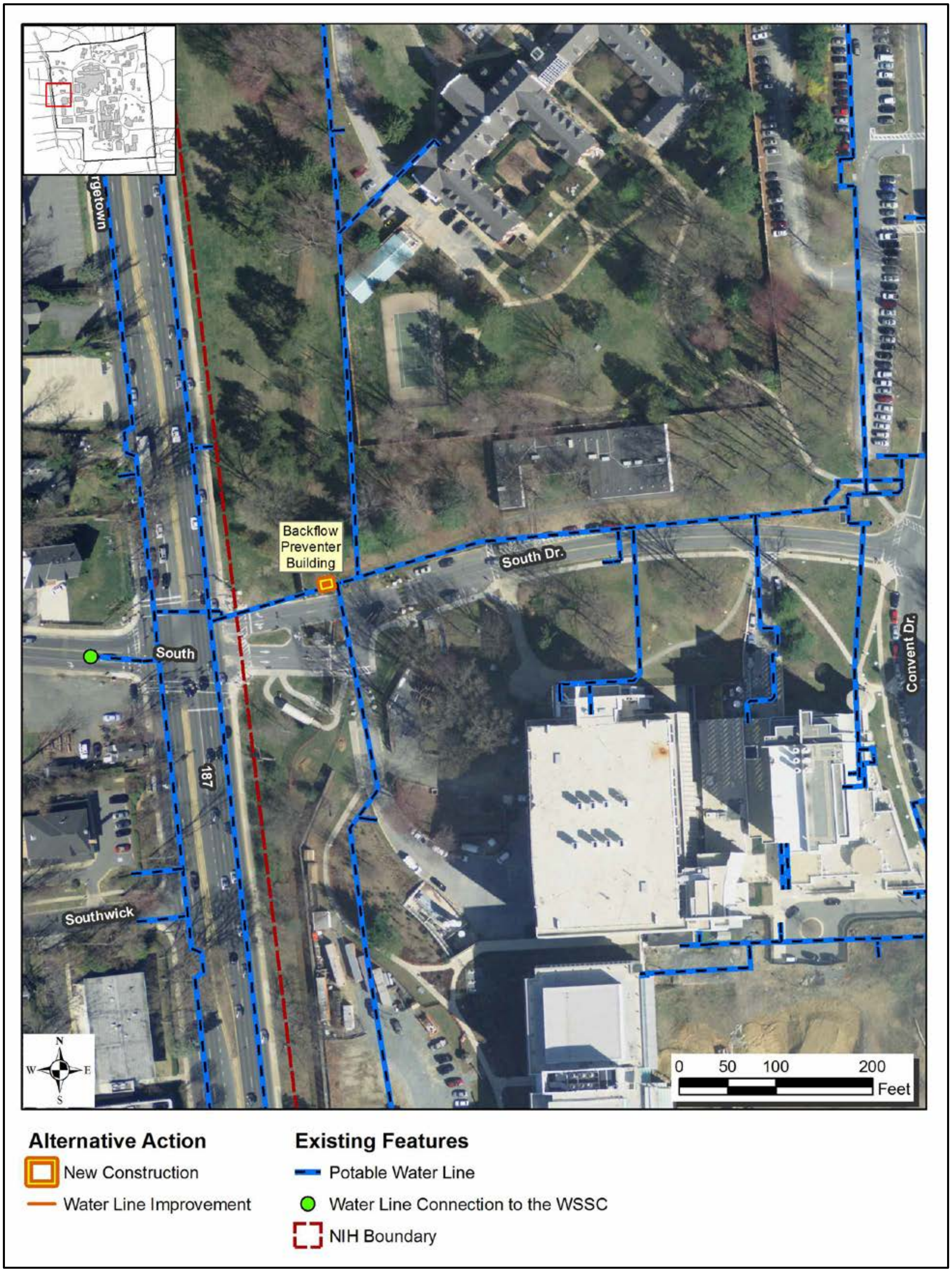


Figure 2-8. Alternative Action – Backflow Preventer Near South Drive

Figure 2-9. Alternative Action – Backflow Preventer Near Lincoln Drive

2.2.2 *Relationship with Other Planning Initiatives*

Under the Alternative Action, the NIH would continue pursuing the other ongoing planning initiatives discussed in Section 1.2, including demolition of Building 34 and construction of MLP-12. Following the rationale described in Section 2.1.2 (Relationship with Other Planning Initiatives), the expected environmental consequences associated with Building 34 demolition and MLP-12 construction are mentioned in Section 3 (Affected Environment) if relevant to the discussion of the site. Environmental consequences associated with Building 34 demolition and MLP-12 construction that have the potential to combine with the impacts of the Proposed Action were also considered when developing Section 5 (Cumulative Impacts).

2.3 No-Action Alternative

The No-Action Alternative would not implement either the Proposed Action or the Alternative Action. Under the No-Action Alternative, the CUP would continue to provide chilled water to the Campus directly. The NIH would not achieve security from potential interruptions in the water supply, which could significantly disrupt mission operations.

The potential environmental impacts and consequences of the No-Action Alternative are discussed in Section 4 (Environmental Consequences) and summarized in Table S-1. The No-Action Alternative would not meet the Purpose and Need criteria defined in Section 1.3 (Purpose and Need). As a result, the No-Action Alternative is considered less desirable than the Proposed Action and the Alternative Action.

2.4 Selection of the Proposed Action as the Preferred Alternative

Either the Proposed or Alternative Action would meet the purpose and need described in Section 1.3 (Purpose and Need) in the following ways:

- The proposed installation of a nine million gallon Thermal Energy Storage System and either a five million gallon Industrial Water Storage System or a nine million gallon Potable Water Storage System would provide the Campus with a back-up supply of chilled water; and

- The construction of the Thermal Energy Storage System and either the Industrial Water Storage System or the Potable Water Storage System would ensure that the Campus is insulated from temporary water shortages that result from internal maintenance of CUP water chillers and/or WSSC inability to deliver water to the Campus.

The NIH does not prefer the No-Action Alternative because it does not meet the Purpose and Need.

The NIH prefers the Proposed Action over the Alternative Action because the Alternative Action would require the NIH to become a continuous water source, which would incur more upfront and ongoing costs for treatment, maintenance, and monitoring of the campus potable water system. Additionally, relative to the Alternative Action, the Proposed Action would retain more connections to WSSC water mains (for redundancy), would not require installation and operation of pumps to maintain adequate pressure for fire service, would maintain existing flow dynamics of potable water within the Campus, and would require less construction (and therefore pose less potential for construction-related impacts to campus neighbors).

2.5 Alternatives Considered but Not Carried Forward

The NIH considered the following alternatives that meet the criteria identified in Section 1.3 (Purpose and Need), but rejected them from further consideration as discussed below.

2.5.1 *Co-location of a Potable or Industrial Water Storage System at the Building 34 Site with the Thermal Energy Storage System*

The NIH considered construction of a second tank at the Building 34 site in addition to the Thermal Energy Storage System. The second tank would either be a nine million gallon Potable Water Storage System or a five million gallon Industrial Water Storage System. This option was eliminated because the tanks would be in close proximity, which could complicate the construction effort and potentially result in delays.

2.5.2 *Demolition of Parking Lot 10H and Construction of an Underground Thermal Energy Storage System*

Parking Lot 10H is located south of Building 10. In the *Campus Master Plan*, the NIH considered demolishing Parking Lot 10H, and constructing an underground Thermal Energy Storage System at that site. An underground tank was considered to minimize the visual impact as Parking Lot 10H is prominently located within the center of the Campus. This alternative was not carried further due to high cost and issues with technical feasibility.

Construction of an underground tank was determined to not be technically feasible due to the shallow depth of bedrock as determined by initial soil borings. Preliminary calculations of tank geometry based on the depth of the bedrock indicated a 'short and wide' tank would be required to achieve the desired tank capacity. The height and width of the tank would be sub-optimal from the perspective of thermal efficiency. A 'short and wide' tank will be significantly less thermally efficient as there is a greater surface area for heat energy to rise through and out of the liquid. This thermal loss exceeds the projected efficiency gains due to the insulating effects of being located underground. As a result, the projected thermal efficiency would be lower than the proposed aboveground tank (Oppelt, 2015).

Although the low thermal efficiency was the primary concern, NIH also was concerned about the potential need to blast bedrock and the associated noise and vibration impacts on the Campus and community. Blasting would potentially be required to eliminate any high points in the bedrock, if found.

2.5.3 *Construction of an Elevated Water Tower*

The NIH considered construction of a 150-foot tall elevated tower water tank at the Building 34 site or near the proposed site of MLP-12. This option was eliminated due to technical issues and concern that nearby residents would not support its construction due to its potential impact on the landscape. Technical issues included the need to pump water to fill the tower (due to pressure drop associated with the backflow preventers) and vulnerability to operational problems caused by fluctuating WSSC water pressures.

2.5.4 *Collection of Stormwater in a Centralized Tank*

The NIH considered collecting stormwater from various sites around the Campus (e.g., rooftops, parking lots) and conveying that water to a Stormwater Storage System which would operate in tandem with the Industrial Water Storage System or Potable Water Storage System. This alternative would permit NIH to utilize stormwater for chilled water generation at the CUP, reducing the amount of potable water consumed on campus. A smaller Industrial Water Storage System or Potable Water Storage System (relative to the Proposed and Alternative Actions) would ensure adequate availability of water during dry periods and meet potable water demand (e.g., drinking water) in the event of a water emergency.

NIH determined this option was not reasonable, as it would require installation of a campus-wide network to convey stormwater from collection points to the Stormwater Storage System, would necessitate the installation of a robust water purification system, and over time would offer diminishing returns due to ongoing NIH efforts to reduce stormwater runoff by increasing infiltration.

3. AFFECTED ENVIRONMENT

3.1 Utilities

Background

Utilities are the basic services needed for a building or campus to function. The Campus relies on a mix of on-site and off-site generated utilities, including the generation and distribution of electricity, steam, compressed air, and chilled water from the CUP, and the distribution of electricity, natural gas, and potable water from local utilities.

Potable Water

WSSC supplies potable water to the Campus along with over 1.8 million people in Montgomery and Prince George's counties. The WSSC Patuxent and Potomac Water Filtration Plants supply water to the WSSC transmission and distribution grid, which supplies water to the Campus. Water enters the Campus through seven separate metered locations:

- 16-inch line at Old Georgetown Road and South Drive;
- 12-inch line at West Cedar Lane and Cedarcrest Drive;
- 12-inch line at West Cedar Lane and West Drive;
- 10-inch line at West Cedar Lane and West Drive;
- 10-inch line via Roosevelt Street in Edgewood/Glenwood;
- 8-inch line at Rockville Pike and Woodmont Avenue; and
- 8-inch line at South Drive and Rockville Pike.

Once the water enters the Campus, it is distributed through a network of NIH water mains ranging in size from 6 inches to 16 inches. The grid forms 14 square loops that surround individual clusters of buildings throughout the Campus.

The NIH uses potable water at the Campus primarily for drinking, chilled water generation, and steam generation. Water is conveyed through the potable water distribution network to the CUP where it is either boiled to make steam or chilled to make chilled water. The steam and chilled water are then distributed from the CUP to individual buildings through their respective networks.

In 2011 and 2012, the NIH used an average of 2.37 MGD of water. Peak daily water demand for the Campus is 3.84 MGD. Water usage is highest on weekdays between 8:00 am and 4:00 pm at approximately 1,000 gallons per minute (GPM), and lowest during the evening and weekends, decreasing to approximately 400 GPM.

Executive Order (EO) 13514 requires government agencies, including the HHS, to reduce their potable water consumption intensity by 26 percent by FY 2020 compared to FY 2007. The NIH contributes to HHS's efforts toward this requirement by implementing water conservation measures and by evaluating water intensity impacts associated with planned projects.

Chilled Water

The NIH primarily utilizes chilled water for building climate control. The CUP has twelve 5,000-ton capacity chillers with a total nominal plant capacity of 60,000 tons and a firm capacity of 55,000 tons. As discussed in Section 1.3.1 (Aging Facilities and Maintenance), since R-22 is being phased out, the chillers at the Campus that operate on R-22 will eventually require replacement or conversion to R-134a, which will reduce the chilling capacity. Peak chilled water demand within the Campus is 58,100 tons during the summer.

Nine of the chillers are powered by electricity and three of the chillers are capable of either electric or steam-powered operation. Each chiller has an associated cooling tower located on the roof of the CUP. The CUP also has four 2,500-ton "free cooling" flat plate heat exchangers that are capable of meeting the majority of the cooling demand during winter temperatures. The total nominal heat exchanger capacity (maximum output with all equipment operating) is 10,000 tons with a firm capacity (maximum output assuming a piece of equipment is out of service for maintenance or repairs) of 7,500 tons. The heat exchangers do not typically operate during the summer and therefore do not contribute to the overall plant capacity during that time.

Chilled water generated at the CUP is distributed through a 66,000-linear foot (LF) network of major lines located in tunnels and utility trenches, and minor lines buried directly in the ground. The main chilled water tunnel runs north-south between Building 11 and the Clinical Center and continues south to service Building 14. Buildings to the south of Building 11 and buildings in the northeast section of the Campus are serviced through pipes in utility trenches.

<u>Steam</u>

Steam is generated within the CUP through a combination of five natural gas and fuel oil-fired boilers and a natural gas fired cogeneration (COGEN) unit. Four of the boilers are rated at 150,000 pounds per hour (pph) and the fifth is rated at 200,000 pph. The COGEN unit is rated at 107,000 pph but can supply up to 180,000 pph when the turbine heat is supplemented by fuel oil-fired duct-mounted burners. The COGEN unit uses exhaust air from the turbine to generate steam at the same temperature and pressure as the boilers. The total nominal capacity is 907,000 pph and the firm capacity is 707,000 pph; however, the NIH can generate 980,000 pph of steam for short periods of time using the additional capacity of the COGEN unit. Peak steam demand within the campus is 880,600 pph during the winter months when peak heating occurs.

A network of pipes distributes steam across the Campus. The network includes approximately 11,000 linear feet of pipe in utility tunnels, 5,000 feet of pipe in trench envelopes, and 68,000 feet of direct buried pipe. Steam is distributed to individual buildings where it is used for space heating, domestic water heating, laboratory bench supply, animal cage cleaning, humidification, and sterilization of laboratory and hospital equipment.

<u>Natural Gas</u>

Washington Gas Light Company (Washington Gas) supplies natural gas to the Campus through mains along West Cedar Lane and Old Georgetown Road. Natural gas enters the Campus through two eight-inch service mains and a six-inch service main. The two eight-inch mains enter the Campus at the Washington Gas Pressure Regulating Station in the southwest corner of the Campus along Old Georgetown Road. One of the eight-inch mains delivers 100-pound force per square inch (psig) natural gas to the CUP as fuel for the boilers. The natural gas supplied to the boilers accounts for over 99 percent of NIH's natural gas use on the Campus. The other eight-inch line follows the southern boundary before exiting the Campus along Rockville Pike to supply gas to the Walter Reed National Military Medical Center. The six-inch service main enters the Campus from West Cedar Lane and supplies low pressure 15-psig natural gas to 38 campus buildings through a network of distribution pipes ranging in size from 3/8 inch to six-inch. Though Washington Gas owns and operates the service mains, the NIH owns and operates the smaller building service lines. There are approximately 15,000 LF of natural gas lines at the Campus.

A 2005 analysis indicated that the existing campus infrastructure is capable of delivering approximately 700,000 cubic feet per hour of natural gas. This capacity is less than the theoretical peak natural gas demand of 739,500 cubic feet per hour; however, this theoretical peak demand assumes all dual-fuel equipment is operating solely on natural gas. Due to a curtailment agreement between Washington Gas and NIH, alternative fuels (e.g., oil) are utilized when temperatures drop below 27 degrees Fahrenheit (˚F). Therefore, the actual peak demand for natural gas is lower than the theoretical peak demand and the physical capacity of the system does not limit the amount of gas supplied to Campus.

Electricity

The Potomac Electric Power Company (PEPCO) supplies the Campus with electricity via three substations, located in Building 17, Building 46, and Building 63. Four 35-kilovolt (KV) lines distribute electricity to the Campus from Rockville Pike and three 35-KV lines distribute electricity to the Campus from Old Georgetown Road. The total campus allotted capacity is 169,000 KVA. The substations are serviced through a combination of overhead and underground lines and are considered to have high operational reliability. The primary distribution network consists of over 21 miles of 13.8-KV lines directly serving all campus buildings.

Electricity can also be generated by the COGEN unit in the CUP. The COGEN unit has a nominal gross capacity of 23 Megavolt-amps (MVA) and generates approximately 19.6 MVA of electricity. The COGEN unit generates both electricity and steam at a high efficiency and is therefore operated continuously. The electricity generated by the COGEN unit is delivered via a 15-KV underground cable to the NIH West Substation. Campus electricity demand is highest during the summer when extra electricity is required to operate the chillers at the CUP.

Chilled water production accounts for between 50 and 60 percent of the peak electricity demand. Peak electricity demand is 74,300 KVA and generally corresponds with peak chilled water demand.

Emergency Electricity

The Campus has 63 permanently installed generators with a total capacity of 52,050 kW and seven portable trailer-mounted generators with a total capacity of 1,540 kW that supply emergency electricity. Fifty-five generators are diesel powered, seven are natural gas powered, and one is steam powered.

Fuel Oil

Fuel oil is used in the dual-fuel boilers during natural gas curtailment periods and in duct-mounted burners in the COGEN unit during maximum electricity and steam production. The CUP has two main 567,000-gallon underground tanks for fuel oil storage. There are also two 100,000-gallon underground tanks for fuel oil storage located adjacent to Building 34. Building 58 serves as a transfer station between the main tanks and the day tanks via a 1,550-LF underground trench.

Compressed Air

The CUP generates compressed air at 125 psig and delivers the air throughout the Campus at approximately 110 psig. Compressed air is used for process needs and provides the motive force for operating duct dampers in HVAC systems. The distribution system includes a network of pipes to the north, south, and west of the CUP.

Energy Efficiency Guidelines

EO 13423 requires government agencies to reduce their energy intensity by 30 percent by FY 2015, compared to FY 2003. EO 13423 also requires agencies, such as HHS, to reduce greenhouse gas (GHG) emission intensity by 30 percent by 2015, compared to FY 2003. The NIH contributes to HHS's efforts toward this requirement by implementing energy conservation measures and by designing new buildings to minimize energy consumption. Boilers at the Campus have been modernized to include economizers and burn natural gas instead of fuel oil. Three boilers feature oversized combustion chambers leading to more efficient steam generation. The COGEN unit, installed in 2003, produces both electricity and steam at over double the efficiency (75 percent compared to 35 percent) of traditional power plants. The COGEN unit uses clean burning natural gas as its fuel source, thus reducing GHG emissions. EO 13423 also encourages the use of more energy efficient combined heating, cooling, and power facilities. The COGEN unit uses combined heating and power generation to reduce energy demand, and can additionally reduce energy demand by using the CUP's three steam powered chillers to produce both electricity and chilled water. Current chillers at the CUP are more efficient than the older units and use 32 percent less energy. The Campus also utilizes "free cooling" heat exchangers that use outdoor air to cool returned chilled water during the winter.

Sites of the Evaluated Alternatives

Building 34 Site

Under the Proposed Action, the Thermal Energy Storage System would be located at the Building 34 site.

The Building 34 site contains two existing chilled water lines. One chilled water line enters the site from the northeast corner along Lincoln Drive and ends at Building 34. The remaining chilled water line runs along Lincoln Drive from the west and enters the site near the northeast corner before exiting the site near the southeast corner along Convent Drive. Potable water lines run along the edge of the site as illustrated in Figure 3-1. A single steam line running along Lincoln Drive enters the site in the northeast corner and ends at Building 34. Two electricity distribution lines run through the site, with one ending at Building 34 and the other continuing through the site running between Building 29 and Building 46. The locations of the existing chilled water, potable water, natural gas, electric, and steam lines are illustrated in Figure 3-1 and Figure 3-2.

The Building 34 site is adjacent to two 100,000-gallon underground storage tanks used for fuel oil. The tanks are located east of Building 34 and along Service Road West.

Under the Alternative Action, the proposed use for the site and existing conditions would be identical to the description above for the Proposed Action.

Parking Lot 41 Site

Under the Proposed Action, the Industrial Water Storage System would be located at the Parking Lot 41 site as illustrated in Figure 3-3. An existing potable water line runs along Medlars Drive and enters the site from the northeast and exits the site to the south. This existing line is illustrated below in Figure 3-4. There are no existing chilled water, natural gas, electric, or steam lines at the site.

Under the Alternative Action, the proposed use for the site differs as the NIH would construct the Potable Water Storage System instead of the Industrial Water Storage System. The existing conditions are identical to those discussed above for the Proposed Action.

Site Near North Gate

Under the Proposed Action, the NIH would not construct any project elements at the site near North Gate.

Under the Alternative Action, the NIH would construct the Booster Pump Station at the site near North Gate. This site has an existing electrical distribution line running along the northern site boundary. There is no existing chilled water, potable water, steam, natural gas, or compressed air on the site. The proposed piping would interact with existing potable water and natural gas lines to the north and south and electrical lines to the north of the site as seen in Figure 3-5 and Figure 3-6.

Sites for Other Supporting Infrastructure

Under the Proposed Action, the NIH would install supporting infrastructure (e.g., piping and electrical lines) in various locations throughout the Campus. Locations where NIH would install some of this infrastructure are illustrated in Figure 2-2 and locations for other items are not yet identified. Examples of existing utilities located within these sites include existing chilled water lines, potable water lines, electrical lines, natural gas, and compressed air lines that are in the vicinity of the planned route for the water lines that would connect the Industrial Water Storage System to the CUP.

Under the Alternative Action, NIH would install supporting infrastructure in additional locations throughout the Campus. Locations where NIH would install some of this infrastructure are illustrated in Figure 2-5 and locations for other items are not yet identified. Examples of existing utilities located within these sites include the following:

- An existing buried eletrical line near Old Georgetown Road runs southwest to northeast across the planned route for the water line that would convey water from Old Georgetown Road to the Potable Water Storage System.
- Existing electrical, telecom, natural gas, and potable water lines run west to east across the planned route for the water line that would convey water from West Cedar Lane to the Booster Pump Station.
- Existing elecrical lines run north to south across the planned route for the water line that would connect existing water lines in the area of Building 6A to existing water lines in the area of Building 67.
- Existing chilled water lines, potable water lines, electrical lines, natural gas, and compressed air lines are in the vicinity of the planned route for the water lines that would connect the Potable Water Storage System to the CUP.

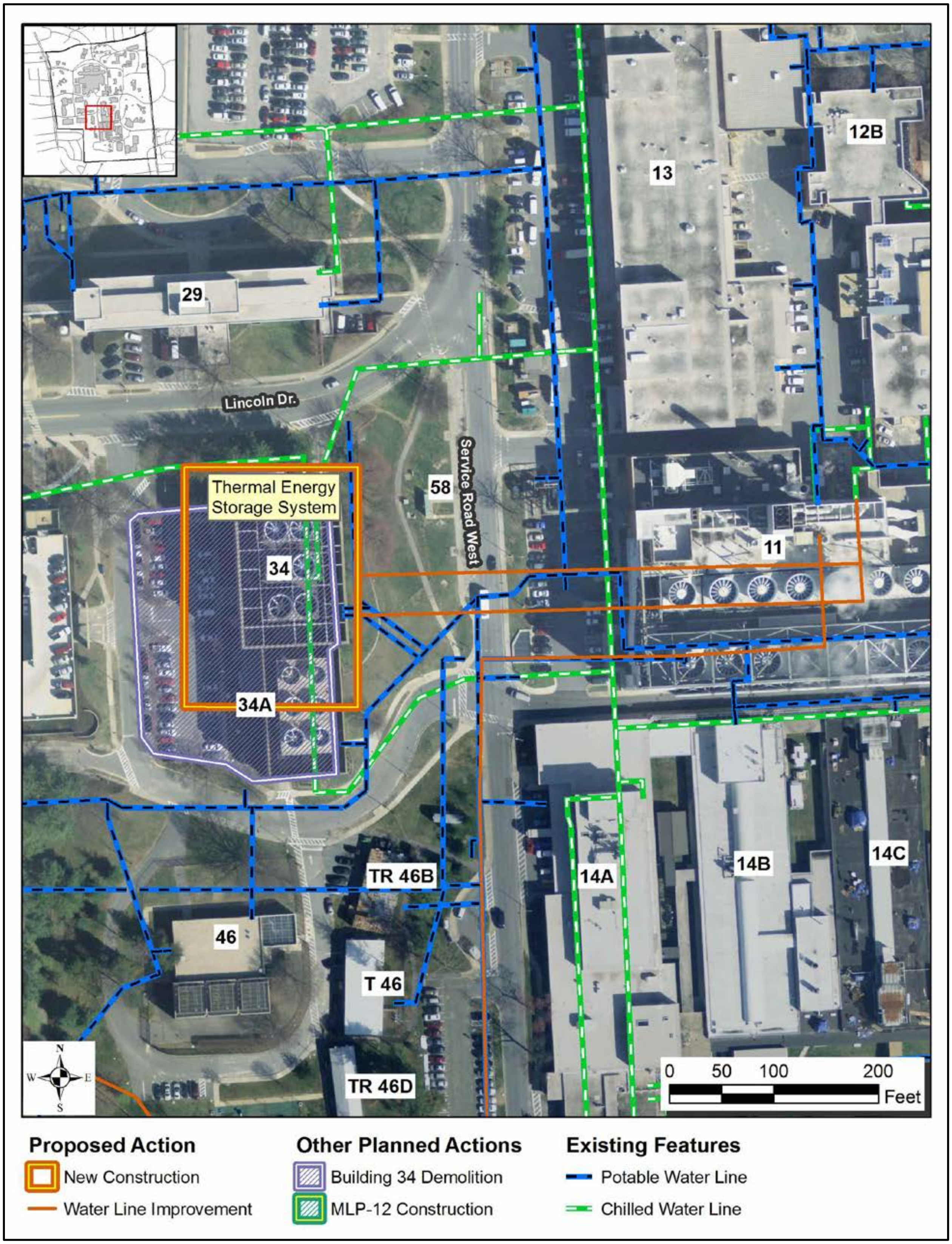


Figure 3-1. Existing Water Lines Map, Building 34 Site

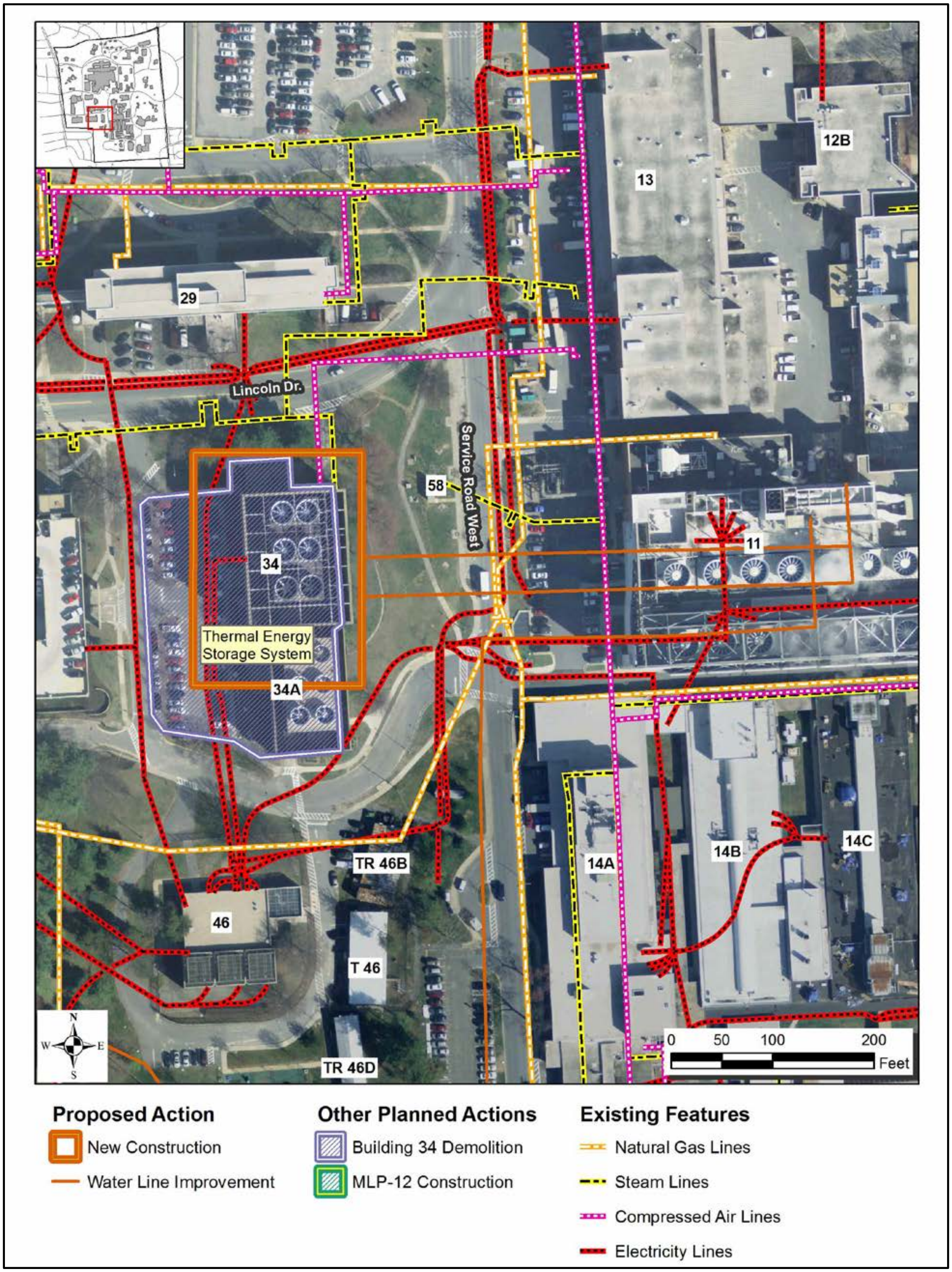


Figure 3-2. Existing Steam, Natural Gas, and Electricity Map, Building 34 Site

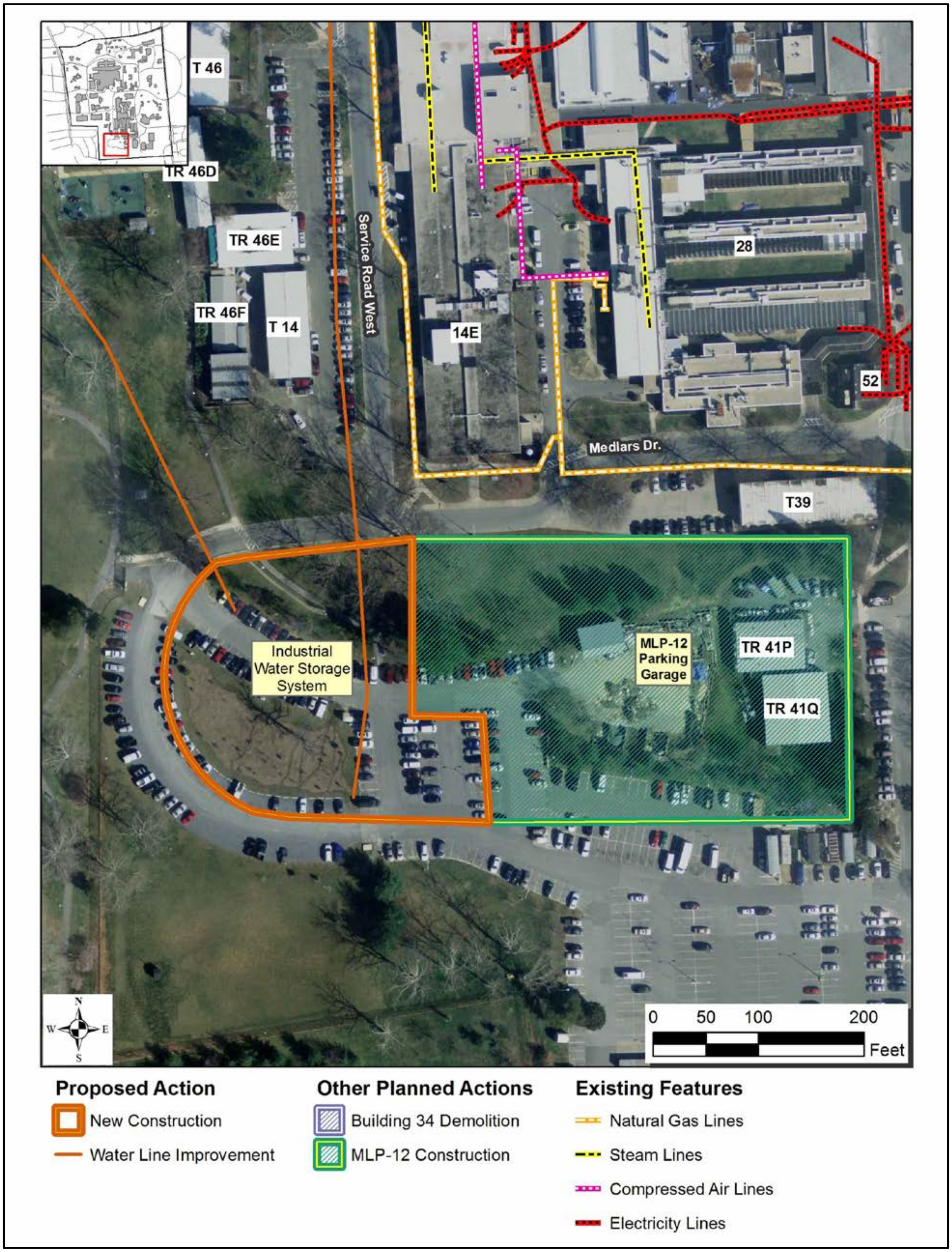


Figure 3-3. Existing Steam, Natural Gas, and Electricity Map, Parking Lot 41 Site

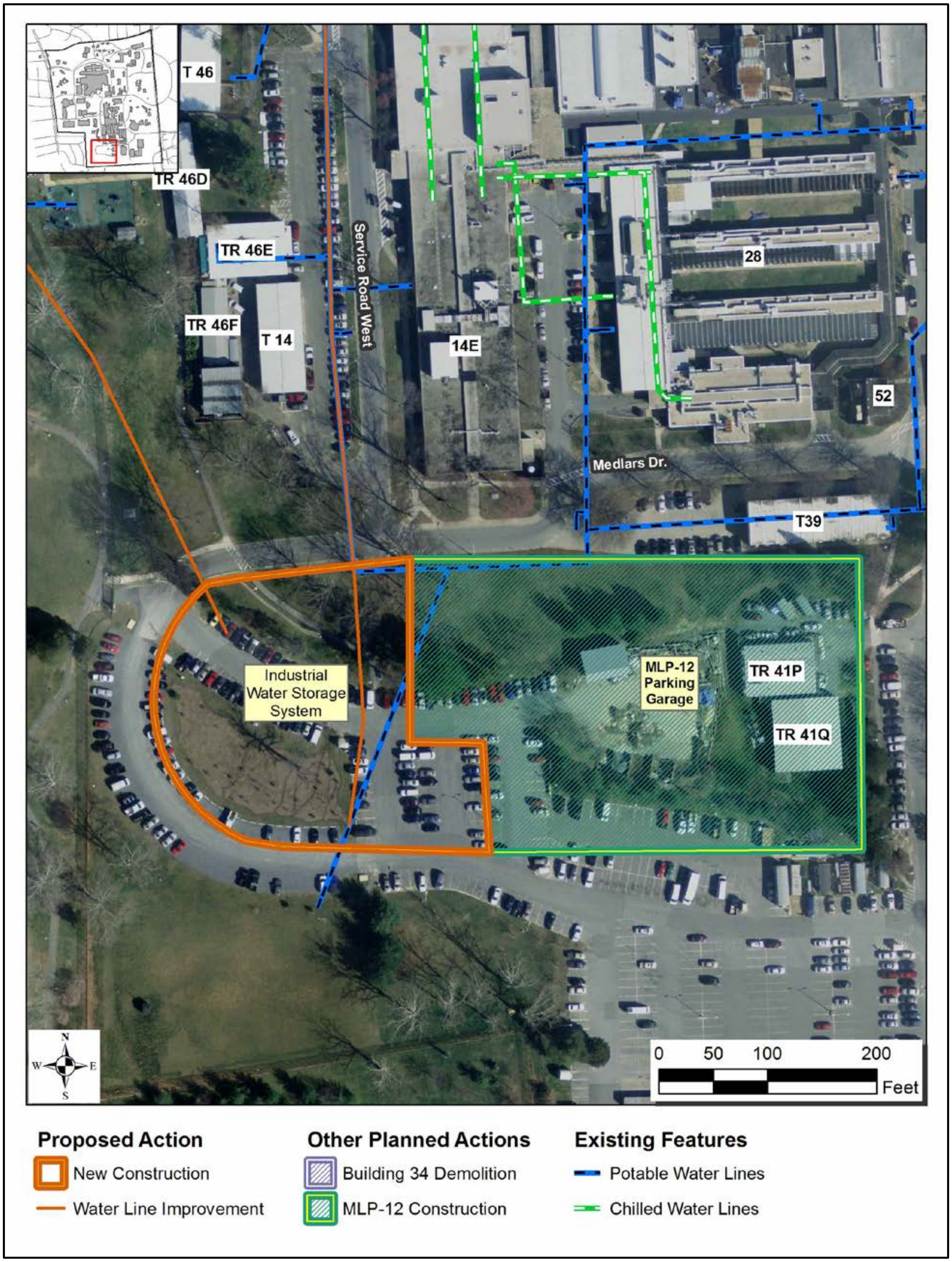


Figure 3-4. Existing Water Lines Map, Parking Lot 41 Site

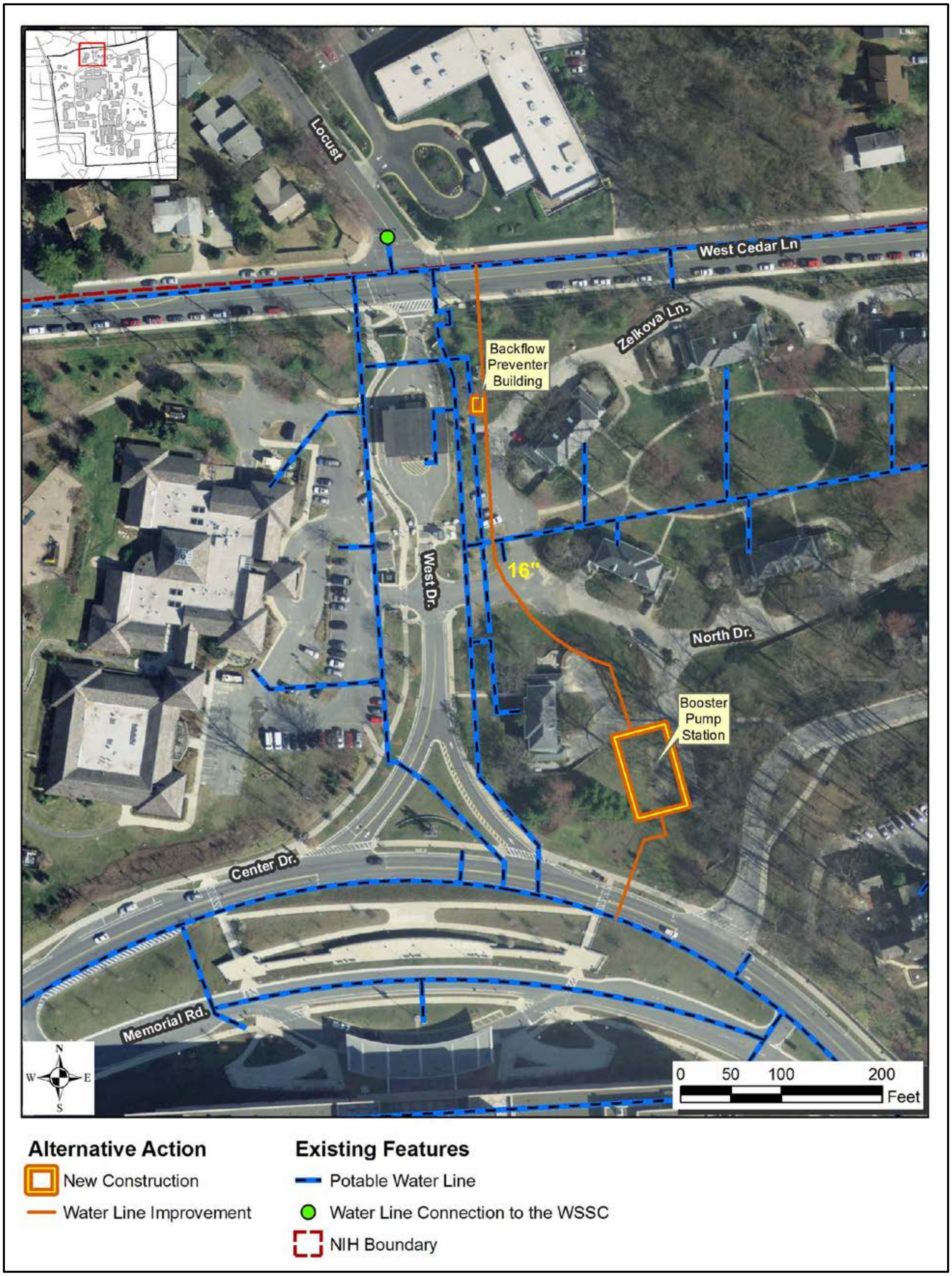


Figure 3-5. Existing Water Lines Map, Site Near North Gate

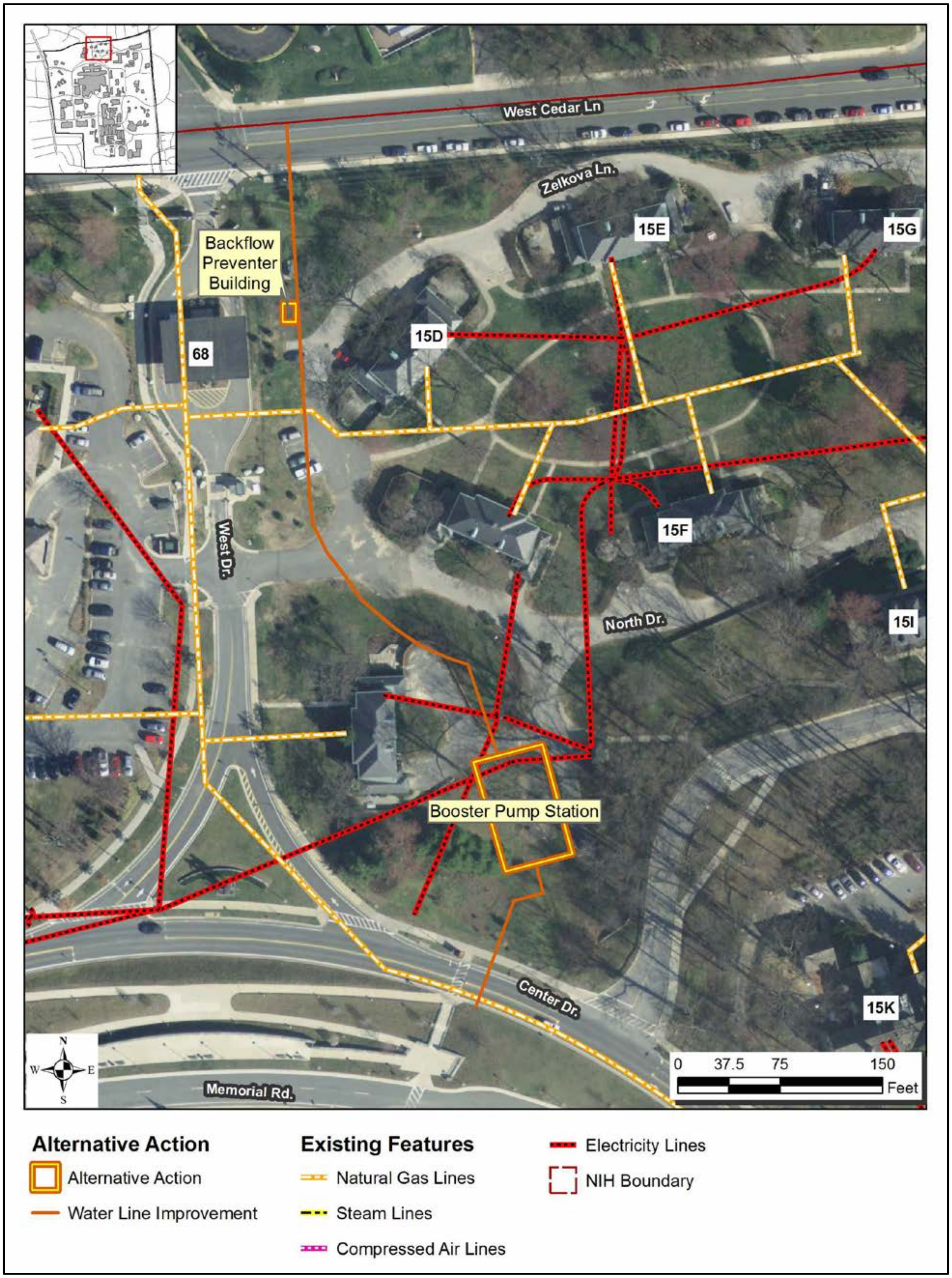


Figure 3-6. Existing Steam, Natural Gas, and Electricity Map, Site Near North Gate

3.2 Sustainable Development

The NIH requires the incorporation of sustainable and high performance design principles in all planning, siting, design, construction, operation, maintenance, and decommissioning in order to promote the health of the public and employees and minimize potential impacts of its mission activities on the environment. The NIH follows the 2011 *HHS Sustainable Buildings Plan* to ensure development meets all federal sustainability requirements, including EO 13514.

EO 13514, issued October 5, 2009, incorporated and expanded on requirements of EO 13423, issued January 4, 2007. EO 13423 included requirements from the Energy Policy Act of 2005 (EPAct 2005) and the Energy Independence and Security Act of 2007 (EISA 2007). EO 13514 requires federal agencies to ensure that all new construction, all major renovations, and 15 percent of existing buildings by FY 2015 meet the Guiding Principles for Federal Leadership in High Performance and Sustainable Buildings (Guiding Principles). The Guiding Principles require buildings to implement or achieve a combination of sustainable requirements such as optimizing energy performance, protecting and conserving water, enhancing the indoor environmental quality, and reducing the environmental impacts of materials. Because construction and operation of buildings represent the largest source of NIH's environmental impacts, meeting this requirement is anticipated to result in significant reductions in Campus energy and water use, material use, waste generation, and GHG emissions.

The *HHS Sustainable Buildings Plan* includes additional requirements related to sustainable development. New construction and major renovation projects at the Campus must also obtain a third party green building certification. In accordance with EO 13514, the *HHS Sustainable Buildings Plan* also requires all new campus planning initiated in FY 2020 or later to be designed, constructed, and operated to achieve zero-net energy levels by 2030. A zero-net energy building must result in no net emissions of GHG while being economically viable. New construction must also be designed to reduce fossil fuel-generated energy consumption by 55 percent by 2010, 65 percent by 2015, 80 percent by 2020, 90 percent by 2025, and 100 percent by 2030, compared to FY 2003. Site development must be conducted in accordance with Technical Guidance on Implementing the Stormwater Runoff Requirements for Federal Projects under Section 438 of EISA 2007.

The NIH has incorporated these various environmental and sustainability requirements into the NIH Design Requirements Manual (DRM). The NIH applies the DRM to all design and construction projects.

To work towards meeting the requirements listed above, the NIH will implement energy and water conservation measures at the Campus, such as:

- Installation of energy monitoring and control systems to provide for night time and off-peak hour energy cutbacks to non-critical areas;
- Sub-metering of steam, chilled water, and electrical distribution systems for evaluation of implemented energy savings measures;
- Computerized control and monitoring of steam and chilled-water production and distribution systems;
- Replacement of existing steam lines as necessary to solve leakage problems;

- Installation of new energy efficient chillers to replace older, less efficient equipment; and

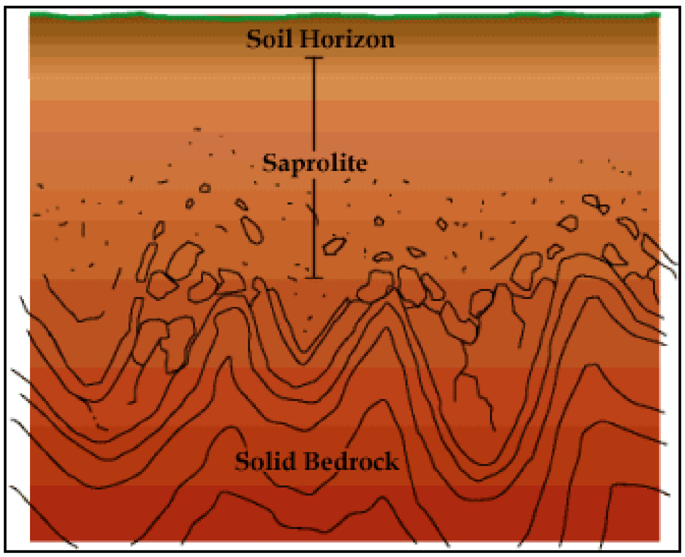
- Efficiency improvements in chilled water distribution temperature differentials.

3.3 Water Resources

3.3.1 *Groundwater*

Background

Groundwater is water found beneath the water table in soils and geological formations. Geological strata (layers) discussed in this section include bedrock, saprolite, and soils. Bedrock is the deepest strata, consisting of solid rock. Saprolite is softer, decomposed and porous rock that lies above bedrock. Soils are loose earth, composed of organic remains, clay, and rock particles. These strata are illustrated below in Figure 3-7.



Source: (William and Mary Department of Geology, 1999).

Figure 3-7. Illustration of Geological Strata

An aquifer is a geological formation, group of formations, or portion of a formation capable of yielding significant quantities of groundwater to wells or springs. Groundwater is the most prevalent source of available freshwater that supports potable, agricultural, and industrial uses, especially in areas that lack access to surface water resources. Groundwater quality is impacted by interactions with soil, sediments, rocks, surface waters, and the atmosphere. Groundwater quality may also be significantly affected by agricultural, industrial, urban, and other human actions.

Campus

Bedrock under the Campus is overlain by about 15 to 40 feet of saprolite subsurface material. In general, groundwater in the saprolite aquifer may be encountered from 10 to 50 feet beneath the natural ground surface, but most frequently occurs 20 to 30 feet below the surface. The saprolite acts as one uniform groundwater storage reservoir. While the aquifer lies deep below the surface, perched water in the soils may be encountered at shallow depths from 1.3 to greater than 6 feet below the surface (NIH, 2014a). Refer to Section 3.10 (Topography, Geology and Soils) for additional discussion of geology within the Campus.

Surface topography is typically an indicator of groundwater flow, with groundwater flowing from higher to lower elevations. Based on the topography of the Campus, groundwater is generally expected to flow to the east and northeast. Surface runoff is also expected to flow to the east and northeast towards intermittent tributaries of Stoney Creek Pond and Rock Creek.

There are no groundwater wells at the Campus.

3.3.2 *Surface Waters*

Background

Surface waters include oceans, lakes, rivers, streams, and estuaries. These resources supply water for domestic use, recreation, transportation, crop irrigation, and power generation. Natural conditions (e.g., interactions with soil, sediments, rocks, groundwater, and the atmosphere) and human activities can impact the quality of surface water by affecting its chemical, physical, and biological characteristics. Human actions that may affect surface water quality include agricultural, industrial, and urban activities.

Stormwater runoff from surrounding watersheds directly impacts surface water quality. As discussed in Section 3.4 (Stormwater Management), stormwater is ideally managed using environmental site design (ESD), or by using traditional structural best management practices (BMPs), when necessary.

Federal surface water regulations, including the Clean Water Act (CWA), Safe Drinking Water Act (SDWA), and the Rivers and Harbors Act, focus on rights to water usage and the protection of water quality. The CWA protects surface water quality, and Section 402 of the CWA establishes the National Pollutant Discharge Elimination System (NPDES) permit program, giving USEPA the authority to limit the discharge of pollutants into navigable waters of the U.S. The SDWA authorizes USEPA to set national health-based standards for drinking water to protect against both naturally occurring and man-made contaminants. The Rivers and Harbors Act prohibits the discharge of refuse or fill material into the navigable waters of the U.S., or any tributary thereof, without a permit from the United States Army Corps of Engineers (USACE). Construction activities within navigable waterways also require a permit from USACE.

Region

Development of the Washington region continues to influence the water quality of the Chesapeake Bay, the largest estuary in the U.S. The primary sources of degradation to the Bay include agricultural practices, wastewater discharge, erosion and runoff exacerbated by construction practices, and air pollution (CBP, 2009). Improving the water quality of the Bay remains an important goal in local, regional and national governments. Policies are in place to help establish LID practices aimed at reducing negative impacts of development on water quality such as providing buffers along wetlands and streams to remove nutrients and sediment before they enter the water system.

The Chesapeake Bay Program (CBP) is a multi-governmental, interstate partnership that includes the states of Virginia, Pennsylvania, and Maryland; Washington; the Chesapeake Bay Commission, a tri-state legislative body; the USEPA, representing the federal government; and participating advisory groups. The Chesapeake Agreements resulting from this partnership set stringent nutrient removal goals, with particular regard to nitrogen and phosphorus loading, to ensure the Bay's restoration and protection for the present and near future. EO 13508, *Chesapeake Bay Protection and Restoration* (May 2009), directs federal facilities to lead the effort to restore and protect the Chesapeake Bay by strengthening SWM practices on Federal lands within the Chesapeake Bay watershed and developing guidelines for stormwater BMPs.

In April 2003, USEPA developed water quality criteria for dissolved oxygen, water clarity, and Chlorophyll A for the Chesapeake Bay and its tidal tributaries. These criteria define the target levels for water quality parameters that, if met, would be expected to render a body of water suitable for its designated use (e.g., contact recreational use such as swimming). The six states within the Bay watershed, along with Washington, agreed to fulfill the requirement to achieve compliance via the Total Maximum Daily Load (TMDL) process by 2010. TMDLs are established to determine the pollutant load reductions needed to achieve and maintain water quality standards. TMDLs define the maximum amounts of pollutants that a specific body of water can receive while meeting water quality criteria. A water quality standard is the combination of a designated use for a particular body of water and the water quality criteria designed to protect that use. The Maryland Department of Environment (MDE) promulgated state-wide water quality criteria in August 2005 and revised these criteria in April 2010 in order to work toward achieving the Chesapeake Bay water quality criteria formerly established by USEPA.

The Potomac River is a major river running through the metropolitan area of Washington. It is a designated American Heritage River and a drinking water source. The Community Action Plan for the Potomac River, designated under the American Heritage Rivers Initiative, has the following three goals: continued improvement of water quality, promotion of the region's historical heritage and recreational opportunities, and public involvement at the local levels. The CBP discussed above provides protection for the Chesapeake Bay watershed, which encompasses the Potomac River that supplies water for more than 80 percent of the four million residents of the Washington area.

No Tier II waters (high quality waters) are present near the Campus (MDE, 2015). The nearest Tier II water is approximately 12 miles to the east of the Campus.

Campus

As illustrated in Figure 3-8, three water courses traverse the Campus: the NIH Stream, the North Branch, and Stoney Creek. These names are used locally by the NIH. USGS maps illustrate all three water courses as intermittent, unnamed tributaries of Rock Creek. The primary function of these water courses is to facilitate stormwater drainage.

Rock Creek and its tributaries are classified as Use I streams. MDE defines Use I streams as being for water contact recreation and protection of non-tidal warm water aquatic life. In order to protect selected wildlife resources during sensitive life stages, in-stream work may not be conducted from March 1 through June 15 (Code of Maryland Regulations (COMAR) 26.08.02.11).

MDE identified the waters of the Rock Creek watershed on the State's 2008 Integrated Report as impaired by phosphorus, sediment, and bacteria. MDE, together with EPA, have established Total Maximum Daily Loads (TMDLs) for phosphorus and sediment. *Total Maximum Daily Load of Sediment in the Rock Creek Watershed, Montgomery County, Maryland* (MDE, 2011a) was approved by the EPA on September 29, 2011, and *Total Maximum Daily Load of Sediment of Phosphorus in the Rock Creek Watershed, Montgomery County, Maryland* (MDE, 2013) was approved by the EPA on September 26, 2013.

The NIH currently holds stormwater discharge permits at both the State (permit number 08-DP-2520) and Federal NPDES (permit MD0025496) level. The permits were issued on June 1, 2012 and expire May 31, 2017. The permits authorize the discharge of non-contact cooling water, discharge associated with maintenance of water distribution systems, and stormwater defined as the exit from an oil\grease trap. This also includes discharge of chilled water system blowdown from Buildings 11 and 34 into NIH streams. The current permit allows an average release of 580,000 gallons per day (GPD) provided that total residual chlorine does not exceed 0.1 mg/L and the temperature of the NIH Stream does not exceed 90 ˚F at the point where it emerges to the northeast of the Center/South Drive intersection.

<u>NIH Stream</u>

The NIH Stream enters the Campus via a buried 42-inch diameter pipe located at the southwest corner. It remains underground for a distance of approximately 2,350 feet at a depth of eight to twenty feet below the surface. The pipe diameter periodically increases to accommodate additional flow from connecting stormwater branch lines. These branch lines convey stormwater from most of the southwest quadrant of the Campus. The buried pipe passes underneath Buildings 12B and 13. Connections carrying chilled water system blowdown effluent join the stream as it passes Building 11.

The transition from buried pipe to aboveground stream occurs at a 96-inch diameter outfall northeast of the Center Drive/South Drive intersection, where it immediately passes through two oil and grease separators. The stream continues to flow in a northeast direction for about 2,000 feet to the northeast corner of the Campus. Once exposed, the stream follows a riffle and pool pattern, ranging from two to twelve feet in width, with average widths of approximately four feet. Sixteen stormwater culverts empty into the stream in its exposed section. After leaving the Campus, the stream ultimately flows into Rock Creek, approximately one mile northeast of the Campus.

The NIH Stream is not gauged and there is no available information about flow rates. It is unknown how much of the flow can be attributed to groundwater or stormwater infiltration versus flow from the headwater spring.

By permit, the NIH is allowed to release up to 300,000 GPD of chilled water blowdown effluent to the NIH Stream. Releases vary with production, which in turn vary with ambient air temperature. Under peak production conditions when the temperature exceeds 90°F, the estimated blowdown release is 0.39 cubic feet per second (CFS) (10,503 gallons per hour). During the winter, the average estimated release is approximately 0.09 CFS (NIH, 2014a).

The Metro tunnel under Rockville Pike is subject to heavy groundwater infiltration. Water is pumped continuously to the surface and deposited to the NIH Stream on the east side of Rockville Pike.

<u>North Branch</u>

The North Branch is a normally dry tributary of the NIH Stream. The North Branch runs along the northern boundary of the Campus and joins the NIH Stream in the northeast corner of the Campus. On the Campus, it is channelized in a concrete ditch for two-thirds of its length. The remaining third of its length passes under an existing parking area to an underground stormwater management facility.

Stoney Creek

Two branches of Stoney Creek join prior to entering the Campus. The stream falls approximately nine feet as it traverses 1,040 feet across the southeast corner of the Campus to Woodmont Avenue. It exits the Campus in twin 66-inch culverts under Woodmont Avenue and joins Rock Creek approximately 0.3 miles downstream from the Campus.

As with the other two surface water courses on the Campus, Stoney Creek has become primarily a stormwater conveyance. The stream follows a riffle and pool sequence, with depths ranging from one to approximately 15 inches. Stream widths vary from six inches to six feet with an average width of approximately three feet.

Sources and volume of natural flow in Stoney Creek are unknown. Much of the flow during dry weather may be attributable to man-made sources in the Bethesda Central Business District (CBD). The dry weather flow is generally less than one CFS. Studies completed for the Stoney Creek Stormwater Management Pond at the southeast corner of the Campus indicated that the 1, 2, 10, and 100-year storm flows at the Woodmont Avenue culvert were 197, 325, 698, and 1,133 CFS, respectively.

Please refer to Section 3.4 (Stormwater Management) for a discussion of campus stormwater outfalls and discharges.

Sites of the Evaluated Alternatives

Portions of the NIH Stream (piped) may lie in the path of planned pipeline improvements under the Proposed Action (Figure 3-8). The piped (underground) portion of the NIH Stream passes by the Building 34 site. Under the Proposed Action, the limit of disturbance at that site would encompass about 60 LF of the NIH stream. The piped portion of the NIH Stream passes under Service Road West in the vicinity of planned water lines to and from the CUP under the Proposed Action. The NIH Stream and the North Branch may potentially coincide with other, not yet identified utilities and infrastructure upgrades such as additional new water lines or buried utilities.

Portions of both North Branch (piped) and the NIH Stream (piped and aboveground) may lie in the path of planned pipeline improvements under the Alternative Action (Figure 3-8). The piped (underground) portion of the NIH Stream passes by the Building 34 site. Under the Alternative Action, the limit of disturbance at that site would encompass about 60 LF of the NIH stream. The piped portion of the NIH Stream passes under Service Road West in the vicinity of planned water lines to and from the CUP under the Alternative Action. The aboveground portion of the NIH Stream passes by the site on the east side of Campus where a new water pipe would connect water pipes near Buildings 6A, 33, and 67 under the Alternative Action. The North Branch, which is piped, intersects with the planned route for the new 16-inch pipe from West Cedar Lane to the Booster Pump Station under the Alternative Action. The NIH Stream and the North Branch may potentially coincide with other, not yet identified utilities and infrastructure upgrades such as additional new water lines or buried utilities.

3.3.3 *Wetlands*

Background

According to Section 404 of the CWA, "wetlands are areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions." USACE provides criteria to identify wetlands and distinguish them from adjacent upland areas; this criteria consists of the presence of hydrophytic vegetation, hydric soils, and wetland hydrology.

Wetlands provide important ecological services including the following:

- Filtering nutrients, sediment, and pollutants from surface and groundwater;
- Absorbing excess floodwater and rainwater;
- Protecting shorelines from erosion; and
- Providing habitat for numerous plants and animals.

Non-tidal wetlands, also known as palustrine or freshwater wetlands, function as transitional areas between uplands and water bodies and are covered with, or saturated by, water for all or part of the year (Critical Area Commission, 2008). Non-tidal wetlands can include the edges of rivers and lakes, freshwater marshes, bogs, wooded or shrub swamps, shallow ponds, and bottomland hardwood forests and can be classified as either open wetlands (less than 50 percent tree cover) or forested wetlands (greater than 50 percent tree cover). Tidal wetlands are vegetated or unvegetated areas that border or exist beneath tidal waters and are subject to regular or periodic tidal action. These systems are usually semi-enclosed by land, but are influenced by varying freshwater flows from adjacent rivers and watercourses (Critical Area Commission, 2008).

Wetlands are federally protected by Section 404 of the CWA, EO 11990 (*Wetland Protection*), Rivers and Harbors Act, and applicable state regulations and permit programs such as the Maryland Non-Tidal Protection Act, Maryland Tidal Wetlands Act, and the Waterway and 100-Year Floodplain Construction Regulations. Section 404 of the CWA prohibits the discharge of dredged or fill material into wetlands or other waters of the U.S. if a practicable alternative exists that is less damaging to the aquatic environment or if the nation's water would be significantly degraded by such discharge. A permit review process administered by the USACE controls regulated activities. Developers must avoid direct impacts to wetlands to the maximum extent possible. EO 11990, implemented in 1977, protects wetlands and their associated ecosystem services. This EO directs each federal agency to avoid undertaking or providing assistance for new construction located in wetlands unless the head of the agency finds that 1) there is no practicable alternative to such construction, and 2) the agency will take all practicable measures to minimize impacts to the wetlands.

To afford additional protection to jurisdictional wetlands (as defined under the CWA), MDE requires maintaining wetland buffers. COMAR 26.23 and COMAR 26.24 established regulations for activities that may disturb or occur within a non-tidal or tidal wetland or surrounding buffer. According to COMAR 26.23.01, the buffer extends 25 feet around the outer edge of a non-tidal wetland. There is an expanded, 100-foot buffer around wetlands of special State concern and wetlands with adjacent areas containing steep slopes or highly erodible soils. MDE requires the action proponent to obtain a Non-tidal Wetlands and Waterways Permit for any activity that alters a non-tidal wetland or its buffer. In addition, the Chesapeake Bay Critical Area Commission requires maintaining a 100-foot buffer around tidal wetlands and streams to improve runoff water quality and reduce the amounts of toxic substances entering tidal waters (Critical Area Commission, 2008).

Campus

National Wetland Inventory maps do not indicate the presence of any wetlands on the Campus (USFWS, 2014).

The Maryland Department of Natural Resources (MDNR) on-line mapping system, however, indicates that potential wetlands are located along the stream valley channels of the NIH Stream and Stoney Creek (Figure 3-8) (MERLIN Online, 2015). A wetland delineation of the Campus was conducted as part of a 1993 investigation of the NIH Stream and Stoney Creek, however, and no wetlands were identified (NIH, 2014a).

Sites of the Evaluated Alternatives

Based on review of available data (1993 campus wetland delineations, MERLIN data, and United States Fish and Wildlife Service (USFWS) online mapper), no known wetlands are located within the currently identified sites of the Proposed Action. A wetland delineation was not conducted as part of this analysis.

Under the Alternative Action, the potential wetland area along the NIH Stream identified in the MDNR online mapper would coincide with the planned route for the new water line that would cross the NIH Stream and connect existing water lines near Buildings 6A and 67. A wetland delineation was not conducted as part of this analysis.

3.3.4 *Floodplains*

Background

A floodplain is the area along or adjacent to a stream or a body of water that is capable of storing or conveying floodwaters. Floodplains perform important natural functions, including moderating peak flows, maintaining water quality, recharging groundwater, and preventing erosion. In addition, floodplains provide wildlife habitat, recreational opportunities, and aesthetic benefits. The 100-year floodplain is an area that is subject to a one-percent or greater chance of flooding in any given year.

To protect floodplains and minimize future flood damage, EO 11988 (as amended by EO 12148) restricts development within the 100-year floodplain. Under EO 11988, all federal agencies must 1) determine if any of their actions would occur within a floodplain, 2) evaluate the potential effects of these actions, and 3) analyze alternatives to these actions.

Utility crossings within a 100-year floodplain are regulated under COMAR 26.17.04.08, which establishes technical requirements for temporary construction activities within a 100-year floodplain. Utility crossings must conform to the technical requirements found in the 1983 Maryland Standards and Specifications for Soil Erosion and Sediment Control. For stream crossings, the pipe or cable and any protective encasement would need to either be buried a minimum of 3 feet below the stream bed, unless a rigid bottomed stream bed exists, or be elevated a minimum of 1 foot above the 100-year frequency flood elevation. Additionally, buried utilities and their appurtenances, except at stream crossings, would need to be located such that a 25-foot wide buffer zone is maintained between the limits of construction and the nearest top of the stream bank.

Campus

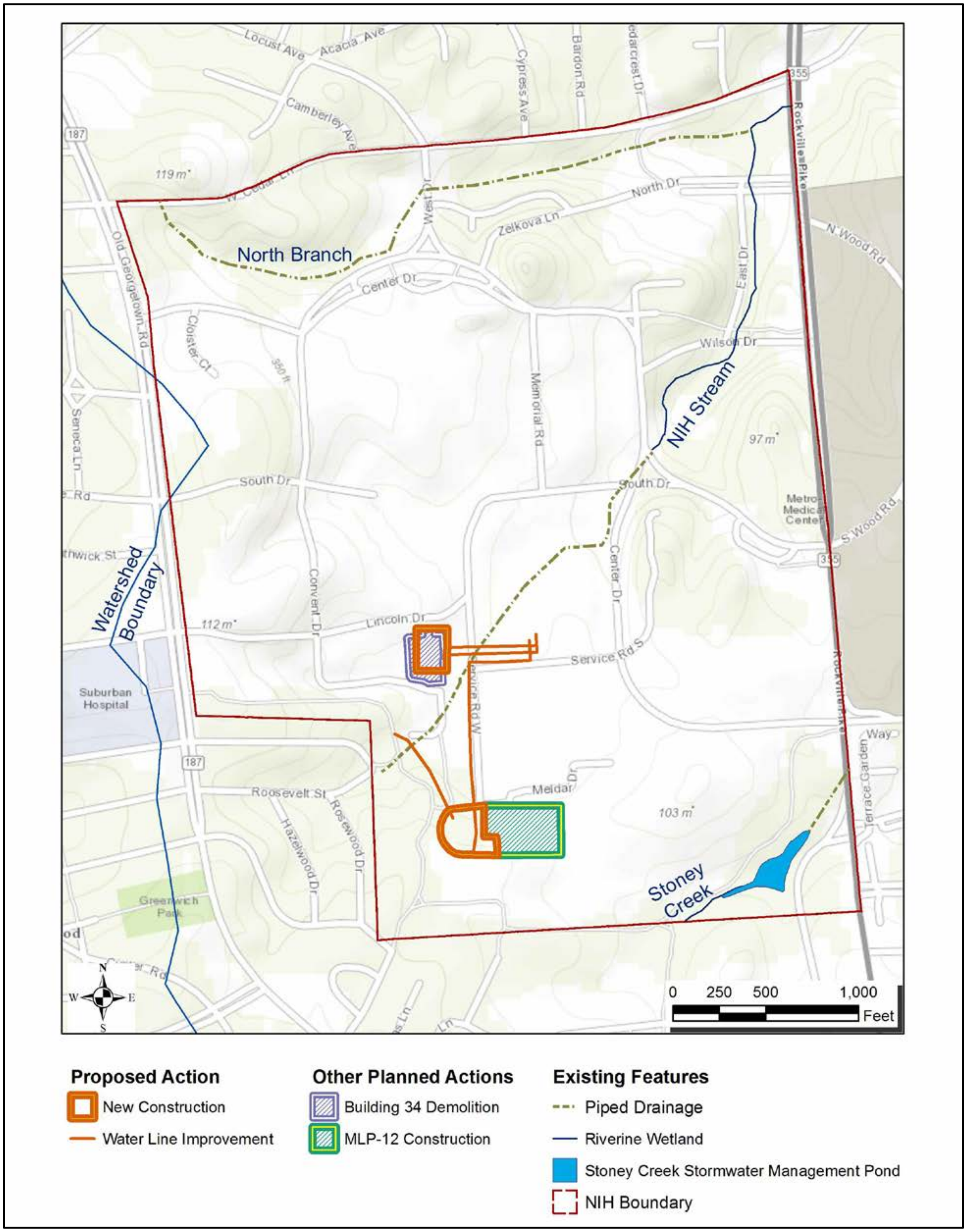
Flood Insurance Rate Maps (FIRMs) 24031C0365D and 24031C0455D, which depict the Campus, do not illustrate any floodplains at the Campus. However, a previous analysis performed as part of the *Campus Master Plan EIS* indicates a 100-year floodplain for the NIH Stream (Figure 3-9). The analysis indicates that the floodplain is narrow, widening only in the vicinity of Building 21. The analysis also indicates a 100-year floodplain on Stoney Creek. Under 100-year flood conditions, floodwater from Stoney Creek would flow to a depth of several feet across Woodmont and Wisconsin Avenues (NIH, 2014a).

Local (i.e., Montgomery County) permitting is likely required for any construction in 100-year floodplains.

Sites of the Evaluated Alternatives

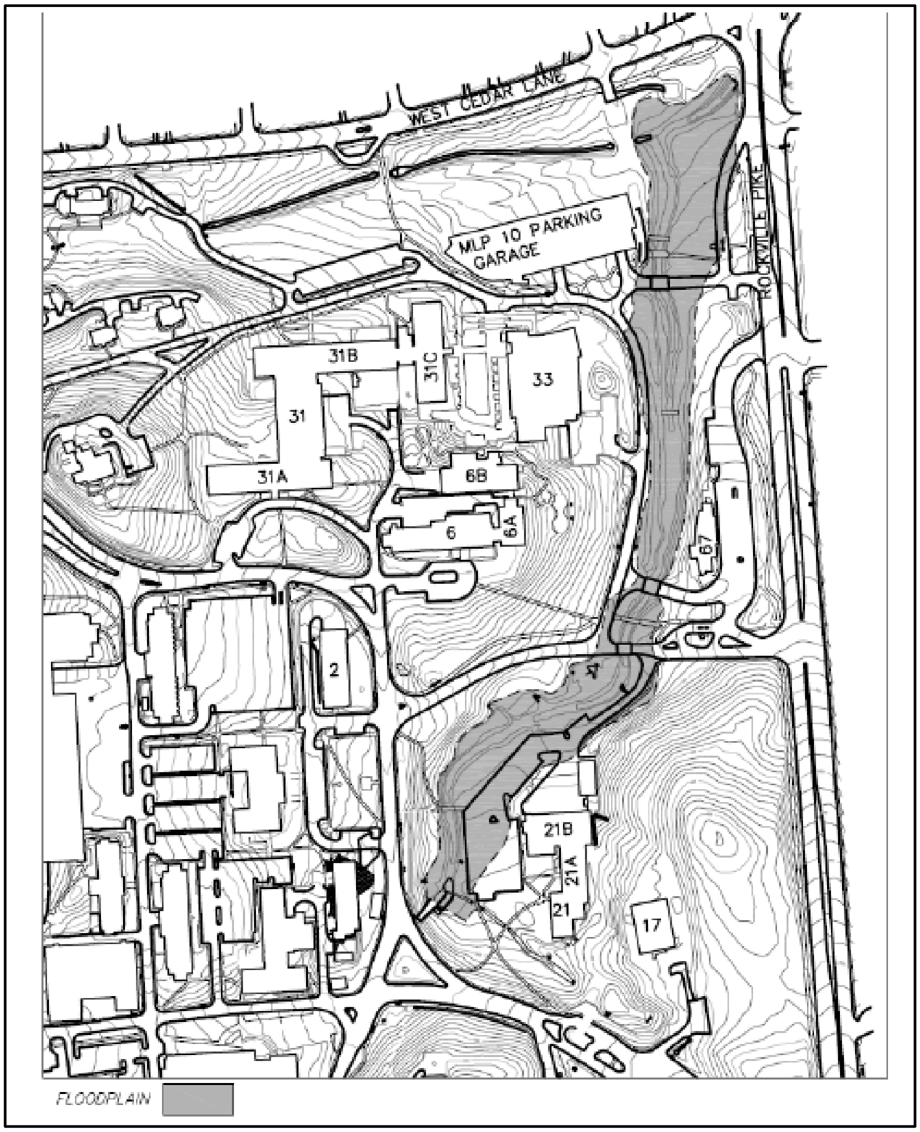
Based on review of available data (FIRMs, Campus Master Plan EIS), no known floodplains are located within the currently identified sites of the Proposed Action.

Under the Alternative Action, a water line improvement is planned for installation between Building 6A and Building 67, in the vicinity of the 100-year floodplain of the NIH Stream. No other currently identified sites of the Alternative Action are located within 100-year floodplains.



Source: Maryland iMAP, Department of Natural Resources.
http://geodata.md.gov/imap/rest/services/Hydrology/MD_Wetlands/MapServer

Figure 3-8. Surface Waters at the Campus



Source: (NIH, 2013).

Figure 3-9. NIH Stream Floodplain

3.4 Stormwater Management

Background

Stormwater is precipitation that falls on the ground surface. Precipitation may infiltrate into the ground, evaporate into the atmosphere, transpire from plants into the atmosphere, or collect as runoff and flow along the ground surface. Development and redevelopment may increase impervious surfaces, which increases runoff by disrupting the natural hydrologic cycle and preventing runoff from infiltrating, evaporating, and transpiring. This disruption of the hydrologic cycle has highly detrimental effects on the environment and surface waters. Runoff can pick up chemicals, dirt, bacteria, and other pollutants, and subsequently flow into storm sewer systems, rivers, lakes, wetlands, and coastal waters, resulting in water pollution and degradation of the natural environment. Excessive runoff can lead to downstream flooding, stream bank erosion, habitat destruction, decreased groundwater recharge, and infrastructure damage.

The NIH is required to comply with state and federal stormwater management (SWM) requirements for land-disturbing projects. Stormwater must be managed during construction to prevent the erosion of earth and the transport of sediment during land-disturbing activities. Construction SWM is regulated by Maryland's Erosion Control Law. The regulations governing Maryland's erosion and sediment control requirements are outlined in COMAR 26.17.01. MDE has established criteria for effective erosion and sediment control in the *2011 Maryland Standards and Specifications for Soil Erosion and Sediment Control*. All construction activity in Maryland disturbing one or more acres must be covered under the MDE 2014 General Permit for Stormwater Associated with Construction Activity (MDE, 2011b).

Stormwater must also be managed after construction activities have ceased. Maryland's *Stormwater Management Act of 2007* requires the post-construction management of stormwater through ESD to the maximum extent practicable (MEP) to reduce stream channel erosion, pollution, siltation, sedimentation, and local flooding, and to use appropriate structural BMPs only when necessary. The *Stormwater Management Act of 2007* defines ESD as "…using small-scale stormwater management practices, nonstructural techniques, and better site planning to mimic natural hydrologic runoff characteristics and minimize the impact of land development on water resources." ESD must be used to the MEP to treat the runoff generated from one inch of rainfall. The regulations governing Maryland's SWM program are outlined in COMAR 26.17.02 (MDE, 2009).

The 2000 *Maryland Stormwater Design Manual* was developed by MDE and outlines the provisions of the Stormwater Management Act and compliance mechanisms. MDE developed the *Environmental Site Design (ESD) Process and Computations* in July 2010 (MDE, 2010a) and the *Maryland Stormwater Management Guidelines for State & Federal Projects* in April 2010 (MDE, 2010b), which provide further guidance on technical procedures and calculations needed to design sites that incorporate ESD to the MEP.

The NIH must comply with Section 438 of EISA 2007. Under EISA 2007, federal agencies must "use site planning, design, construction, and maintenance strategies for the property to maintain or restore, to the maximum extent technically feasible, the predevelopment hydrology of the property with regard to the temperature, rate, volume, and duration of flow" for any project with a footprint greater than 5,000 SF. Guidance on how to meet EISA 2007 is provided in the *Technical Guidance on Implementing the Storm water Runoff Requirements for Federal Projects under Section 438 of the Energy Independence and Security Act* (USEPA, 2009).

The HHS *Sustainable Buildings Plan* dated April 30, 2011 requires compliance with Section 438 of EISA 2007 and USEPA's technical guidance. The NIH is in the process of developing and implementing an Institutional Stormwater Management Plan (ISMP) for the entire Campus. The ISMP looks at overall water quality and quantity treatment across the Campus, but individual projects are still required to meet SWM requirements at the site level.

Campus and Region

The NIH has coverage under a general National Pollutant Discharge Elimination System (NPDES) Phase II Municipal Separate Storm Sewer System (MS4) permit from MDE that allows stormwater to be discharged from the Campus. Permit coverage at the Campus began November 12, 2004, and the permit has been administratively extended until a new Phase II NPDES general permit is issued by MDE (MDE, 2004). The NIH submitted a NOI to file for coverage under the new Phase II NPDES general permit once it is issued.

The entire Campus currently includes 129.2 impervious acres (41.8 percent of the total campus acreage). Runoff is generated at the Campus when precipitation falls and collects on impervious surfaces such as buildings, parking lots, sidewalks, and roadways. Runoff moves through the Campus via overland and piped flow through underground storm sewer lines.

The majority of the Campus is in the Rock Creek Watershed. A small portion of the Campus is in the Cabin John Creek Watershed. The campus is further divided into three sub-watersheds that drain to the North Branch, NIH Stream, and Stony Creek. All three waterways are unnamed tributaries to Rock Creek. The North Branch captures runoff on the north end of the Campus and ultimately flows into the NIH Stream. The NIH Stream captures runoff from the majority of the Campus. It flows northeast and conveys runoff from the Campus via a culvert that crosses under MD Route 355. A small portion of the southern part of the Campus flows to Stoney Creek Pond and ultimately Stoney Creek (NIH, 2013).

After leaving the Campus, the runoff flows northeast to Rock Creek. Runoff from Montgomery County ultimately drains to the Chesapeake Bay (Montgomery County DEP, 2012). Refer to Section 3.3.2 (Surface Waters) for additional information.

Sites of the Evaluated Alternatives

Building 34 Site

Under the Proposed Action, the Thermal Energy Storage System would be located at the Building 34 site. As discussed in Section 1.2.2, the site currently includes Building 34 and Building 34A, which are planned for demolition under a separate action. This document assumes a post-demolition baseline condition – i.e., the area currently occupied by the two buildings and the associated parking lot has been converted to pervious surface. Accounting for other existing impervious surfaces likely to remain (e.g., sidewalks along adjacent streets), the baseline conditions for the site are 4.97 acres and 31 percent impervious. Refer to Figure 2-3 for an illustration of existing pervious and impervious area.

The Building 34 site is located in the NIH Stream sub-watershed. Runoff from the site enters storm drains and flows northeast through a storm sewer pipe. The storm sewer pipe discharges runoff into the NIH Stream.

Under the Alternative Action, the proposed use for the site and existing conditions would be identical to the description above for the Proposed Action.

Parking Lot 41 Site

Under the Proposed Action, the Industrial Water Storage System would be located at the Parking Lot 41 site. The Parking Lot 41 site (3.49 acres) is currently 44 percent impervious surface. Refer to Figure 2-4 for an illustration of existing pervious and impervious area at the site.

Runoff from the site enters storm drains and flows northeast through a storm sewer pipe. The storm sewer pipe discharges runoff into the NIH Stream.

Under the Alternative Action, the proposed use of this site would differ as the NIH would construct the Potable Water Storage System instead of the Industrial Water Storage System. The existing conditions would be identical to the description above for the Proposed Action.

Site Near the North Gate

Under the Proposed Action, the NIH would not construct any project elements at the site near the North Gate.

Under the Alternative Action, a Booster Pump Station would be located at the site near North Gate. The baseline conditions at the site are a combination of pervious turf grass and trees and impervious surfaces including a basketball court and a paved driveway. The baseline conditions for the site are 0.31 acres and 41 percent impervious. Refer to Figure 2-7 for an illustration of existing pervious and impervious area at the site.

This area of the Campus is within the North Branch sub-watershed. Runoff from the site enters a storm drain and flows east through a storm sewer pipe that discharges into a stormwater detention feature north of Building 31. The stormwater detention feature provides water quality and quantity treatment before it discharges runoff to the NIH Stream.

Sites for Other Supporting Infrastructure

Under the Proposed Action, supporting infrastructure, including buried utilities, would be installed around the Campus. The majority of buried piping or utilities would be located under existing streets or sidewalks. Therefore, the baseline conditions are generally impervious surface. The installation of buried piping utilities would generally not result in a net impact to impervious surface as previously impervious areas would remain impervious and previously pervious areas would remain pervious.

Under the Alternative Action, some buried piping or utilities would be located under existing streets or sidewalks and some would be located under pervious surfaces (e.g., the water line along the Bethesda Trolley Trail, the water line from West Cedar Lane to the Booster Pump Station). One new water line would be installed that crosses the NIH Stream. Stormwater runoff from buildings and roads in that area drains to the NIH Stream. As with the Proposed Action, the installation of buried piping utilities would generally not result in a net impact to impervious surface as previously impervious areas would remain impervious and previously pervious areas would remain pervious.

3.5 Visual Impacts

Visual aspects relevant to the Campus include lighting and viewscapes. These aspects should be considered from the viewpoints of both external and internal observers. The surrounding community is the primary external observer. Internal observers include NIH staff and visitors. Interior visual aspects are important to the NIH goal of providing a world-class facility capable of attracting internationally recognized researchers.

3.5.1 *Lighting*

Background

Exterior lighting of parking lots, roads, buildings, and pathways is often used to enhance the safety and security of persons and property. Exterior lighting may also be used to emphasize features of architectural and historic significance, or enhance the enjoyment of outdoor areas.

Excessive and inappropriate exterior lighting, however, can generate light pollution. The International Dark Sky Association (IDA) identifies four main elements of light pollution (IDA, 2014):

- Urban Sky Glow: the brightening of night sky over inhabited areas, reducing the visibility of stars;
- Light Trespass: light falling where it is not intended, wanted, or needed, such as light from a streetlight entering a residential window;
- Glare: excessive brightness that can cause visual discomfort and decreased visibility; and
- Clutter: bright, confusing, and excessive groupings of light sources. Clutter contributes to urban sky glow, light trespass, and glare.

Furthermore, light pollution associated with over-illumination or inefficient fixtures can contribute to excess energy consumption.

Standards and guidelines for designing effective and appropriate exterior lighting systems include the following:

- The IDA and Illuminating Engineering Society (IES) Model Lighting Ordinance and User's Guide (2011) provides recommendations for improving the night sky conditions. The document identifies five lighting zones characterized by development and natural conditions and provides lighting standards appropriate to each zone;
- The IES Lighting Handbook (2011) provides safety and security lighting level recommendations for various uses, including guard booths, walkways, parking lots, and streets;
- The United States Green Building Council (USGBC), LEED Reference Guide for Green Building Design and Construction (2009) provides exterior lighting recommendations for improving both energy efficiency and night sky conditions; and
- The NIH DRM for Biomedical Laboratories and Animal Research Facilities provides guidance for landscape lighting design considerations and exterior lighting design.

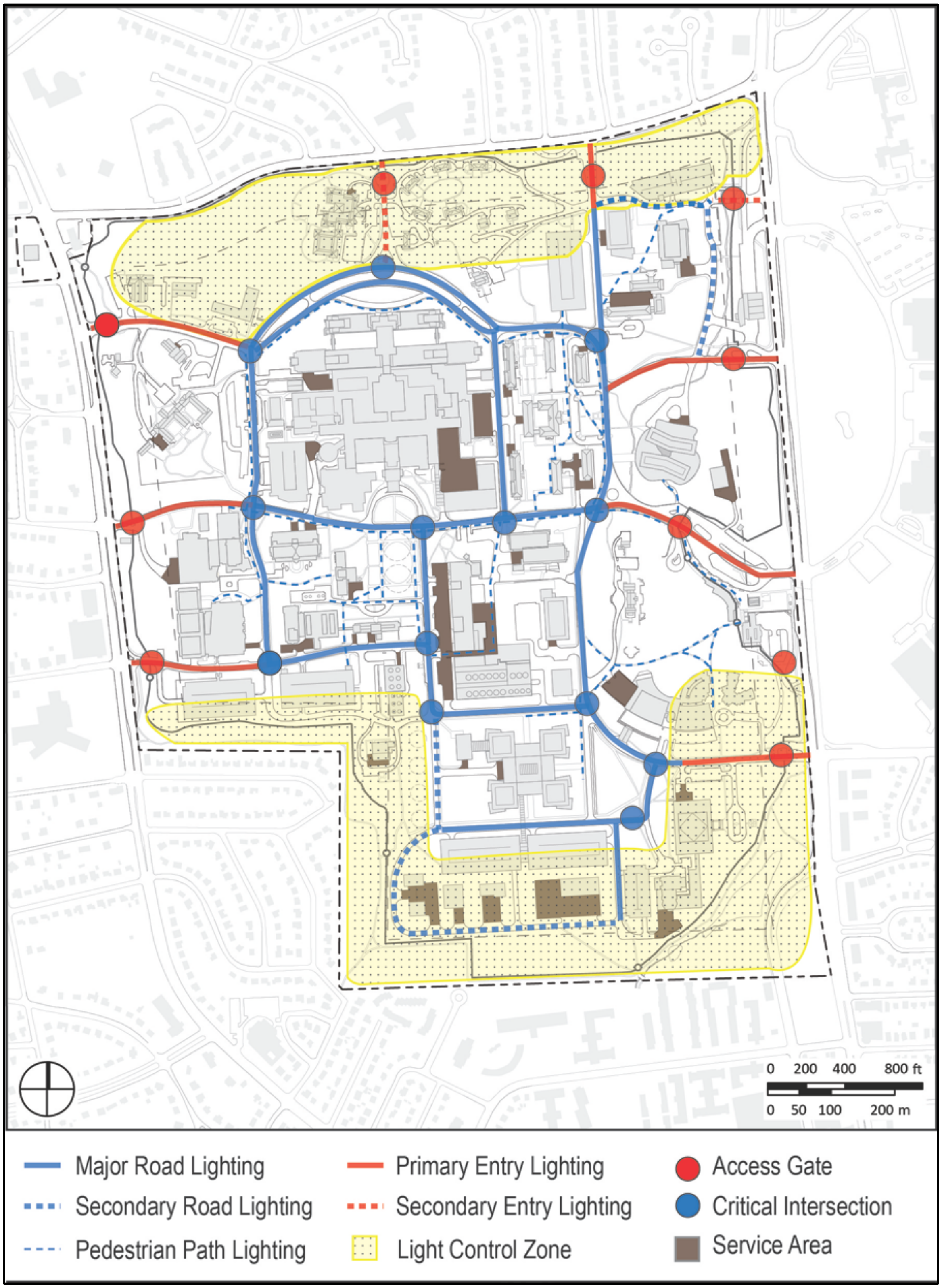
Campus

The *Campus Master Plan* outlines additional guidance for new or replacement lighting, including streets and pedestrian walkways. Figure 3-10 illustrates the lighting concept plan from the *Campus Master Plan*. Key recommendations from this guidance include:

- Lighting should be less intense on secondary streets and walkways;
- Full-cutoff light fixtures, which allow no light to be emitted above a designated horizontal plane, should be used wherever possible;

- Lighting should be less intense at the periphery than at the core; and
- Light levels must meet but not exceed ANSI/ASHRAE/IESNA standards.

The *Campus Master Plan* also identified light control zones at the north and south ends of the Campus (Figure 3-10). In these areas, special attention should be given to avoid spillover lighting into adjacent neighborhoods. Increased landscape screening and special architectural light screens should be considered where necessary. Refer to the *Campus Master Plan* for additional criteria for lighting design.



Source: (NIH, 2013) Note: This figure depicts proposed development as described in the Campus Master Plan.

Figure 3-10. Lighting Guidance from the *Campus Master Plan*

Single family residential neighborhoods, such as those to the north and west of the Campus, are classified by the IDA/IES Model Lighting Ordinance as Lighting Zone LZ-1: Low Ambient Lighting (IDA/IES, 2011). Multi-family residential neighborhoods, such as the apartment buildings to the south of the Campus are classified as LZ-2: Moderate Ambient Lighting. These residential areas are subject to more stringent lighting guidance than commercial or industrial areas.

Existing light sources at the Campus include streetlights, sidewalk illumination, building interior lighting, and security lighting at entrances to the Campus.

Numerous overhead streetlights are installed at the Campus along streets and parking lots for safety and security purposes. The types of streetlights vary due to age or location. Newer streetlights feature fully shielded fixtures with flat, horizontally oriented lenses (Figure 3-11). These fixtures direct light toward the street and greatly reduce potential light trespass from campus lighting. Streetlights that are older or located in areas requiring brighter lighting (e.g., near entrances, along the Bethesda Trolley Trail) direct light downward and horizontally.

Figure 3-11. Example of Newer Streetlight Fixture

Building interior lighting varies in intensity from building to building. Screening is installed on sides of parking garages that are visible to adjacent neighborhoods. This screening mitigates building interior lighting as well as vehicle headlights.

NIH has previously received light pollution complaints from adjacent residential neighborhoods. In response to complaints specific to parking garages MLP-6 and MLP-8, NIH installed louvers to reduce the impacts of vehicle headlights and garage interior lighting.

Sites of the Evaluated Alternatives

<u>Building 34 Site</u>

Under the Proposed Action, the Thermal Energy Storage System would be located at the Building 34 site. Existing lighting at the site is minimal, consistent with surrounding buildings, and presents minimal light trespass to the adjacent residential neighborhood due to intervening topography and vegetation. Approximately three homes have a line of sight to the Building 34 site via small gaps in vegetation. The potential impact of light sources interior to the Campus is somewhat diminished due to the significantly brighter lighting along the Bethesda Trolley Trail.

Under the Alternative Action, the planned use of the Building 34 site and existing lighting conditions would be identical to the description above for the Proposed Action.

Parking Lot 41 Site

Under the Proposed Action, the Industrial Water Storage System would be located to the south end of the Campus, near Parking Lot 41. Existing lighting in and around Parking Lot 41 and Medlars Drive is minimal, consistent with surrounding buildings, and presents minimal light trespass to the adjacent single family homes and residential units (e.g., apartments, condominiums) located on lower floors due to intervening topography and vegetation, as well as the significantly brighter lighting along the Bethesda Trolley Trail. Although residential units on higher floors do not have intervening vegetation or topography, those units are exposed to a wide view with many light sources from within the Campus and the surrounding urban environment.

Under the Alternative Action, the planned use of the Parking Lot 41 site would differ as the Potable Water Storage System would be constructed at that site. The existing lighting conditions would be identical to the description above for the Proposed Action.

Site Near the North Gate

Under the Proposed Action, the NIH would not construct any project elements at the site near North Gate.

Under the Alternative Action, the Booster Pump Station would be located at the north end of the Campus, near the North Gate. The predominant lighting sources in this area include security lighting at the gate and building interior lights (primarily Building 10). Building 10's lighting is visible from the exterior of the Campus due to the height of that building.

Thick evergreen trees along the Campus perimeter mitigate most other ground level light sources internal to the Campus.

Sites for Other Supporting Infrastructure

Under the Proposed Action, supporting infrastructure, including buried utilities, would be installed around the Campus. The majority of these buried utilities would be located under existing streets or sidewalks in various locations around Campus. The existing streets and sidewalks are generally well lit.

Under the Alternative Action, supporting infrastructure, including buried utilities, would be installed around the Campus. The majority of these buried utilities would be located under existing streets or sidewalks in various locations around Campus. One exception is the pipeline that would be installed adjacent to the Bethesda Trolley Trail. The Bethesda Trolley Trail and the existing streets and sidewalks are generally well lit. The Bethesda Trolley Trail in particular is very brightly lit, so as to improve safety and security for those utilizing the trail during nighttime hours.

3.5.2 *Viewscapes*

Background

Viewscapes are views of the Campus from key external or internal vantage points. Viewscapes are affected by physical characteristics including:

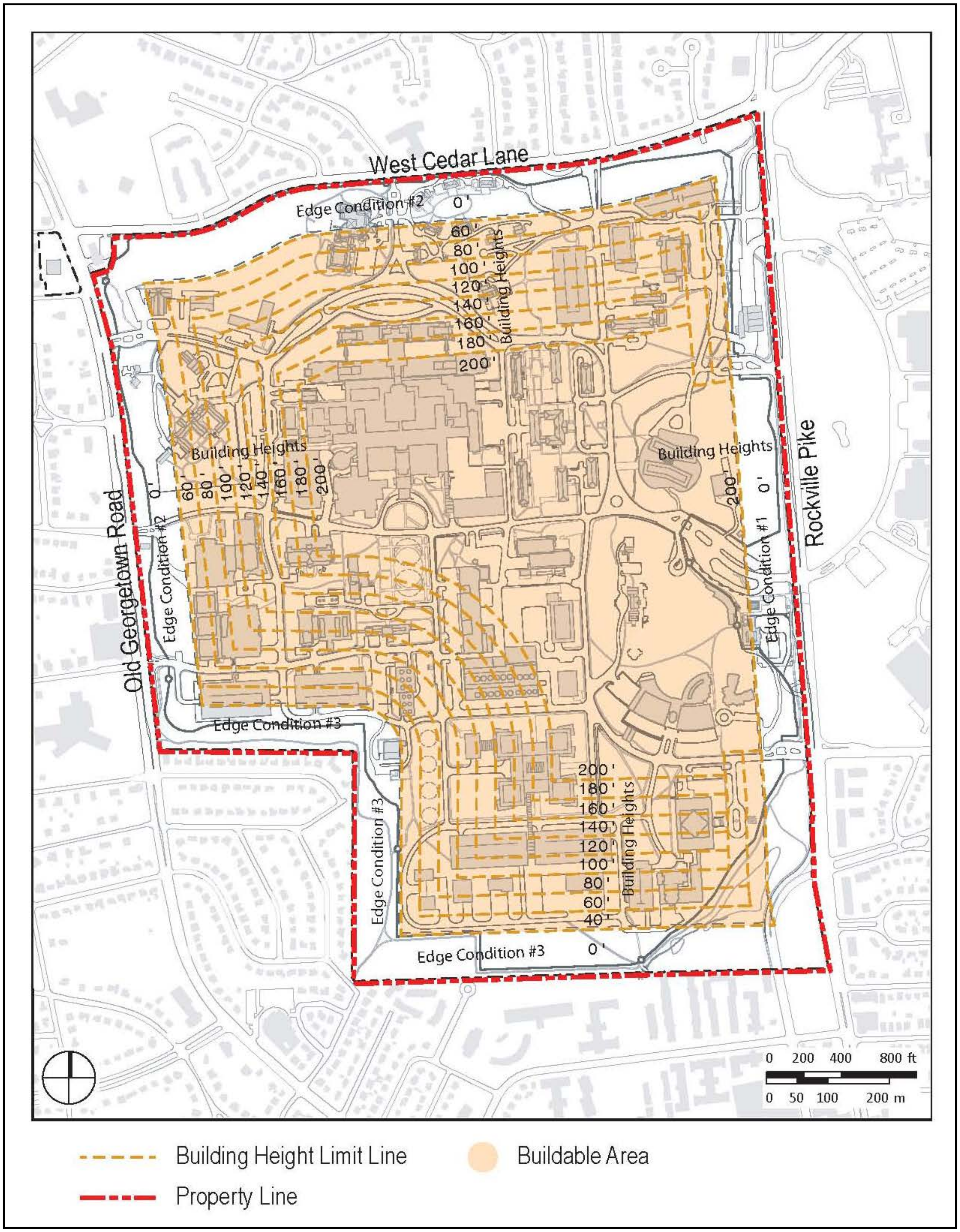
- Vegetation, which may conceal or complement views;
- Building characteristics, including height and architectural features; and
- Topography.

Development projects have the potential to modify viewscapes by changing one or more of these physical characteristics.

Campus

The visual impact of the Campus is important to the adjacent communities, and to occupants of vehicles travelling by on Old Georgetown Road and Rockville Pike (Maryland-NCPPC, 1990). The NIH monitors and maintains the character of views into the Campus from the surrounding streets and community areas. In order to present a pleasing viewscape to external neighborhoods, the NIH has designated a 250 foot deep buffer zone around the Campus perimeter. Vegetative growth is promoted within the buffer where feasible and appropriate and as a result, visibility into the Campus from the outside has gradually decreased. NIH policy prevents new buildings and parking areas in the buffer, which includes about 82 acres or more than one-fourth of the Campus. The *Campus Master Plan* proposes gradual removal of surface parking lots that were constructed prior to the establishment of the current buffer. The *Campus Master Plan* also proposes augmentation of the understory and tree cover along the entire south side of the Campus from the Lincoln Drive entrance around to Stoney Creek at the southeast corner.

The *Campus Master Plan* requires lower building profiles relative to the community by siting future structures into hillsides to manage views and impacts and by setting campus-wide building height restrictions. The height guidance, illustrated in Figure 3-12, is designed to maintain the visual dominance of the Clinical Center (Building 10) as the highest, largest, and most prominent building within the Campus. Relative to the perimeter, taller structures are permitted in the center of the Campus and the area near the Metro station on the east side of the Campus. This approach reduces visual impacts to adjacent residential neighborhoods by allowing both building mass and employees to be concentrated at the designated campus front door, which faces WRNNMC and is away from residential neighborhoods.



Source: NIH Bethesda 2013 Campus Comprehensive Master Plan.

Figure 3-12. Recommended Maximum Building Heights

Sites of the Evaluated Alternatives

Building 34 Site

Under the Proposed Action, the Thermal Energy Storage System would be located at the Building 34 site. Due to adjacent buildings, external views (i.e., views from off-campus) of the Building 34 site are limited to a short section of the Bethesda Trolley Trail and from several homes along McKinley Street (Figure 3-13). The majority of homes along McKinley Street have little or no view of the Building 34 site due to intervening topography and vegetation (Figure 3-14).

Figure 3-13. View of Building 34 from the Bethesda Trolley Trail

Figure 3-14. Intervening Vegetation Between McKinley Street and Building 34

Within the Campus, the Building 34 site may be viewed from a central location on the Campus (in the area of Building 10) as illustrated in Figure 3-15 and from several surrounding occupied buildings, including Buildings 13, 29, and 29A.

Figure 3-15. View of Building 34 from Central Campus (near Building 10)

Parking Lot 41 Site

Under the Proposed Action, the Industrial Water Storage System would be located to the south end of the Campus, near Parking Lot 41. This site currently consists of a portion of Parking Lot 41 and a grassy area that slopes down from Parking Lot 41 to Medlars Drive. Off-campus locations from which this site may be viewed include the Bethesda Trolley Trail (to the west) and upper floors of high-rise residential buildings along Battery Lane (to the south). Views from the Bethesda Trolley Trail and residences to the south (including lower floors of the residential high rises) are all very limited due to intervening topography and vegetation. Although the site can be viewed from the upper floors of the residential high rises, it is quite distant.

On-campus locations from which this site may be viewed include Parking Lot 41 (to the south) and Building 14 (to the north).

Under the Alternative Action, the Potable Water Storage System would be constructed at the Parking Lot 41 site. Refer to the discussion of the Proposed Action above for applicable discussion of existing viewscapes.

Site Near the North Gate

Under the Proposed Action, the NIH would not construct any project elements at the site near North Gate.

Under the Alternative Action, the Booster Pump Station would be located at the north end of the Campus, near the North Gate. This site currently consists of a small basketball court in a low area surrounded by trees. Although the site is close to the residential neighborhood north of West Cedar Lane, off-campus views are minimal due to thick vegetation along the campus perimeter and intervening buildings (Figure 3-16).

Figure 3-16. Blocked Views from West Cedar Lane to the Site Near the North Gate

On-campus locations from which this site may be viewed include the adjacent NIH residences (to the west, east, and north) and Building 10 (to the south). Existing views of the site are limited due to vegetation and topography, although several on-campus residences have relatively unobstructed views.

<u>Sites for Other Supporting Infrastructure</u>

Under the Proposed Action, supporting infrastructure, including buried utilities, would be installed around the Campus. The majority of these buried utilities would be located under existing streets or sidewalks at various locations around the Campus. One exception is the pipeline that would be installed northwest of the Industrial Water Storage System to connect that tank to the existing Campus water infrastructure. This pipeline site is visible from the backyards of several homes along McKinley Street. These views from some, but not all, of these homes are limited due to intervening vegetation.

Under the Alternative Action, supporting infrastructure, including buried utilities, would also be installed around the Campus. The majority of these buried utilities would be located under existing streets or sidewalks at various locations around the Campus. One exception is the pipeline that would be installed adjacent to the Bethesda Trolley Trail. The Bethesda Trolley Trail and the pipeline site are visible from the backyards of multiple homes along McKinley Street. The views from many, but not all, of these homes are limited due to intervening vegetation.

Under the Alternative Action, the planned sites for backflow preventer enclosures at South Drive and near the Bethesda Trolley Trail would each be visible from Old Georgetown Road. The existing site at South Drive is within a highly developed area of Campus, with directly adjacent tall buildings. The existing site near the Bethesda Trolley Trail is currently a vegetated area with grass and trees and no existing structures.

3.6 Transportation and Traffic

Background

Transportation systems include the vehicles and infrastructure necessary to convey passengers and goods from one location to another. Transportation vehicles, including airplanes, cars, trucks, and boats, emit a variety of air pollutants, including carbon monoxide (CO), nitrogen oxides (NO_x), and volatile organic compounds (VOC). Traffic congestion and queuing on roads and highways cause increased pollution from cars and trucks. Refer to Section 3.8 (Air Quality) for discussion of air quality impacts associated with mobile vehicle use. In addition, traffic congestion on local roads and highways can affect the quality of life of employees and neighboring residents.

Region

The major ground transportation artery for the Washington region is the Capital Beltway (Interstate 495, or I-495). This Interstate Highway carries the bulk of the traffic passing through the Washington Region (NIH, 2014a). The Dwight D. Eisenhower Memorial Highway (I-270), also known as the Washington National Pike, is a 35-mile auxiliary interstate highway connecting Frederick, MD to the Beltway.

Regional rail service includes Amtrak, the Maryland Regional Commuter Train Service (MARC), Virginia Railway Express (VRE), and the Metrorail. Metrorail is a rapid transit system, administered by the Washington Metropolitan Area Transit Authority (WMATA), serving Washington and the surrounding suburbs. It is the second busiest rapid transit system in the country. The Metrorail Red Line, operating between Washington and Montgomery County, has 27 stations (NIH, 2013).

Major regional airports include Washington Dulles International Airport (IAD), Baltimore Washington International Airport (BWI), and the Ronald Reagan National Airport (DCA).

Campus

Roads, Transit, and Traffic

The Campus is located south/southeast of the Capital Beltway (I-495) and I-270 spur, which forms the major corridors for east-west and north-south regional traffic movements. The Campus boundaries are Old Georgetown Road (MD Route 187) to the west, Rockville Pike (MD Route 355) to the east and West Cedar Lane to the north. Residential neighborhoods and the Bethesda CBD are to the south of the Campus (NIH, 2014a). The Medical Center station, on the east side of the Campus, is the closest Metrorail stop to the Campus. Local bus services are operated by WMATA (i.e., Metrobus), and the Montgomery County Department of Public Works (i.e., Ride On) (See Figure 3-17). The Campus is served by five Metrobus routes and five Ride On Routes (NIH, 2013; MCDOT, 2014).

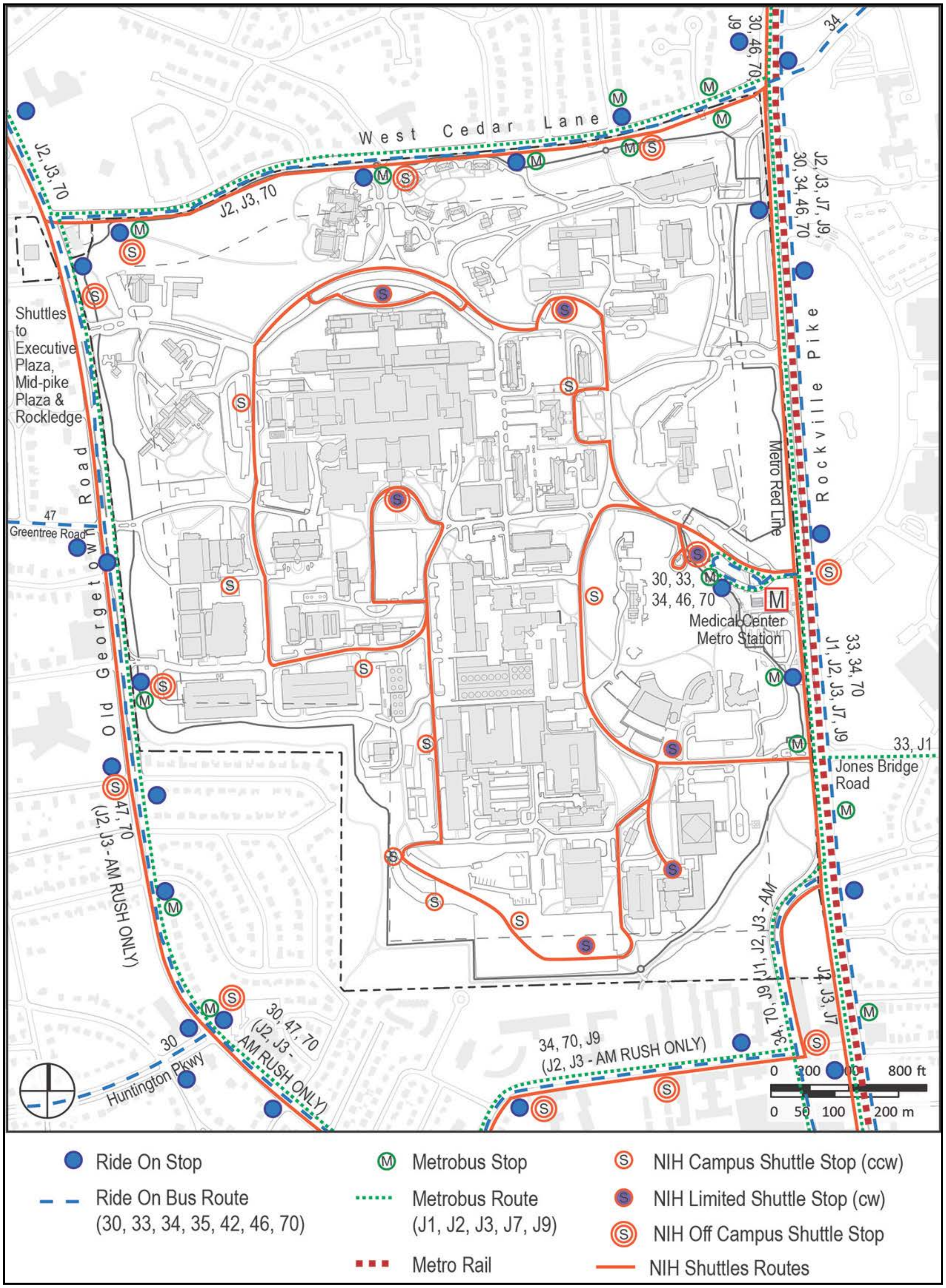
The NIH operates six shuttle bus service routes that circulate throughout the Campus (Figure 3-17). The shuttles provide service between buildings and parking facilities on the Campus, as well as between three locations outside the Campus that connect employees and visitors to Metrorail stations and other employment centers (NIH, 2013).

Three major arterial roads, described below and depicted in Figure 3-18, provide access to the Campus.

- Rockville Pike forms the eastern border of the Campus. There are six vehicle entrances to the Campus from this major artery: one for visitors, one for commercial vehicles which must be inspected, and four employee entrances.

- Connecticut Avenue (MD Route 185), an 8.30-mile state highway, is a major route for north-south commuting and connects the Washington area with residential suburbs. Depending on their origin, vehicles commuting via Connecticut Avenue approach the Campus either via Jones Bridge Road or West Cedar Lane, both of which lead to Rockville Pike.

- Old Georgetown Road (MD Route 187) is a state highway that makes up most of the western border of the Campus. The highway runs between Bethesda and Rockville (NIH, 2013).



Source: (NIH, 2013).

Figure 3-17. Area Bus Routes

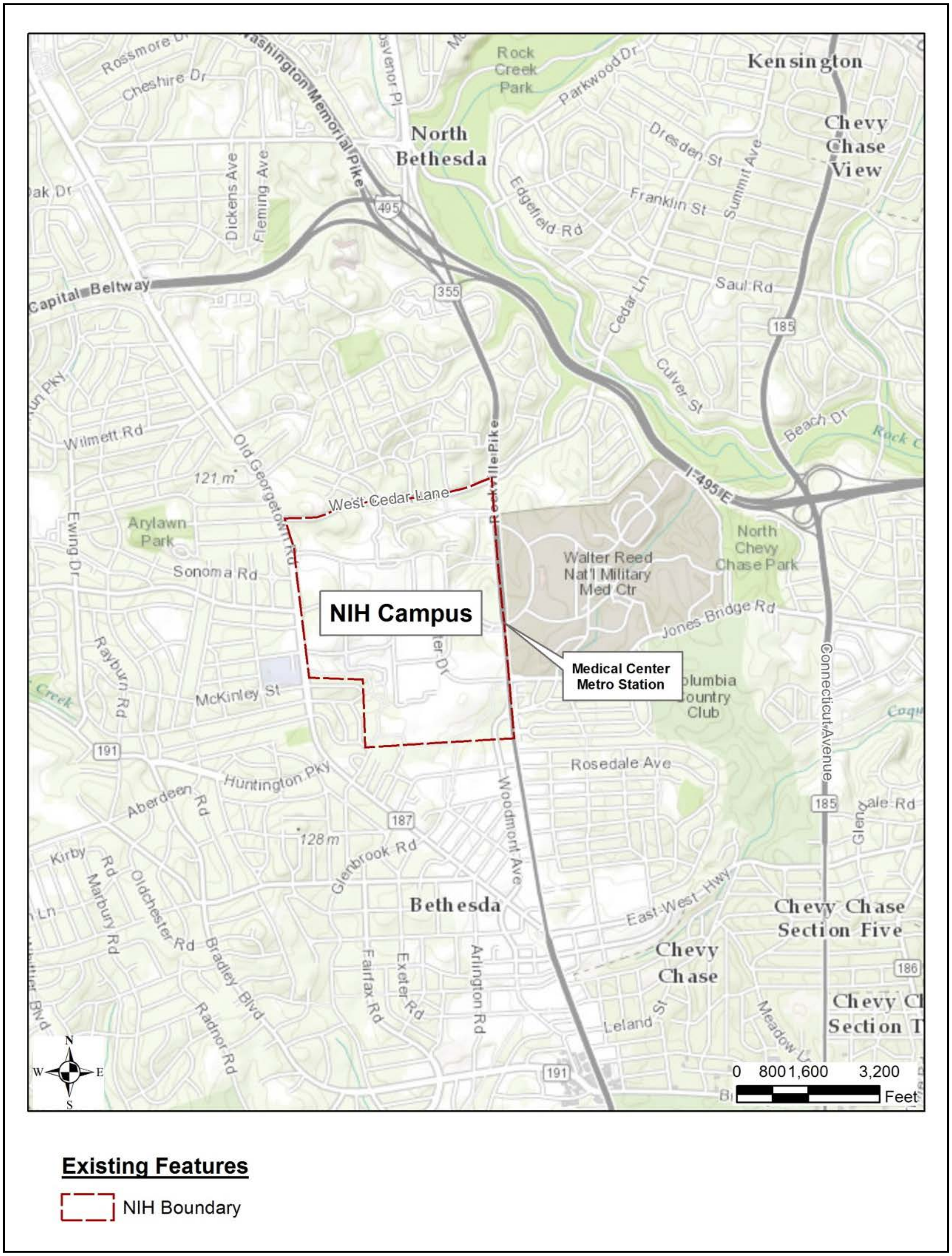


Figure 3-18. Major Approaches to Campus

The Campus currently has ten (10) vehicular access points for employees, visitors, and deliveries (see Figure 3-19). Visitors who arrive to the Campus by vehicle park on the Campus or in a designated parking garage at the Visitors Entrance. If visitors park in the garage, they must be cleared at the NIH Gateway Visitor's Center (Building 66) and proceed to their destination on foot. If visitors park on the Campus, they must have their vehicles inspected at the Commercial Vehicle Inspection Facility (CVIF) (Building 67) and then drive to their destination. All commercial and delivery vehicles must be inspected and cleared at the CVIF. Only patients and their families coming to the Clinical Center typically use the vehicular North Gate Entrance. There is no vehicular access from the south campus boundary (NIH, 2013).

Most roadways on the Campus have one travel lane in each direction, with the exceptions of Center Drive and South Drive (see Figure 3-19). Center Drive is the major internal road, and runs from the northwest to the southeast corners of the Campus. Primary roads within the Campus are Wilson Drive, South Drive to Convent Drive, Convent Drive, and Lincoln Drive to West Service Road to South Drive. Secondary roads include Memorial Drive, West Service Road from Lincoln Drive to South Service Road, and South Road. Peak-hour traffic flows at the Campus occur from 8:00 to 9:00 in the morning and from 4:45 to 5:45 in the evening (NIH, 2013).

The NIH has the highest number of employees who bicycle to work of any employer in the National Capital Region (NCR). Medical Center Station provides 88 bike racks and 38 bike lockers. These bike facilities are fully utilized during the week days. Primary campus bicycle access points are: Old Georgetown Road at Cedar Lane; Rockville Pike at Cedar Lane; Jones Bridge Road at Rockville Pike; along the south campus boundary at Woodmont Avenue, the Spring House building, N. Brook Lane, Maple Ridge Road, and Roosevelt Street; and Green Tree Road at Old Georgetown Road (NIH, 2013).

Figure 3-19 identifies the employee pedestrian entrances. Pedestrian paths are parallel to most roadways on the Campus. Almost all pathways have been upgraded to be a minimum of five feet wide and are paved. Busy pedestrian areas include routes between transit nodes, parking areas and significant buildings. Pedestrians utilize similar access points to those used by bicyclists.

A 2011 traffic generation report indicated that 53 percent of the total vehicles entering the Campus during the morning peak-hour in October 2011 occurred on Rockville Pike, 45 percent on Old Georgetown Road, and 2 percent on West Cedar Lane (NIH, 2013).

The NIH Transportation Management Plan (TMP) is a memorandum of understanding (MOU) among the NIH, the National Capital Planning Commission (NCPC), and Maryland-National Capital Park and Planning Commission (M-NCPPC) implemented on October 4, 1991. The TMP's objective is to reduce the rate of vehicular trip generation per employee so that employment growth does not result in increased vehicular traffic during peak hours. The TMP encourages public transportation, and multiple-occupant vehicles, such as carpools, vanpools, shuttles and HOVs (NIH, 2013).

A traffic safety assessment conducted in 2013 compared the overall traffic safety for the Campus with other similar locations in the state, using traffic data from 2008 through 2010 provided by the Maryland State Highway Administration (SHA) (NIH, 2013). That assessment concluded that average accident rates in the area surrounding the Campus are lower than statewide rates. This includes the sections of Rockville Pike, Old Georgetown Road, and West Cedar Lane that border the Campus (NIH, 2014a).

Parking

Parking within the Campus includes several large surface lots, seven Multi-Level Parking (MLP) garages, and limited on-street parking. Less than half of the parking consists of surface lots (NIH, 2013). The 1991 TMP MOU established that the Campus would not exceed a parking supply ratio of 0.50 spaces per employee (NIH, 2013). The NIH conducted a parking occupancy study in 2014 that verified that the actual parking ratio at that time (0.44) was lower than the established limit of 0.50 spaces per employee (NIH, 2014a). Additional parking for the projected future growth of an estimated 3,000 Bethesda Campus-based employees is being planned for at a ratio of 0.33 spaces per employee (NIH, 2013).

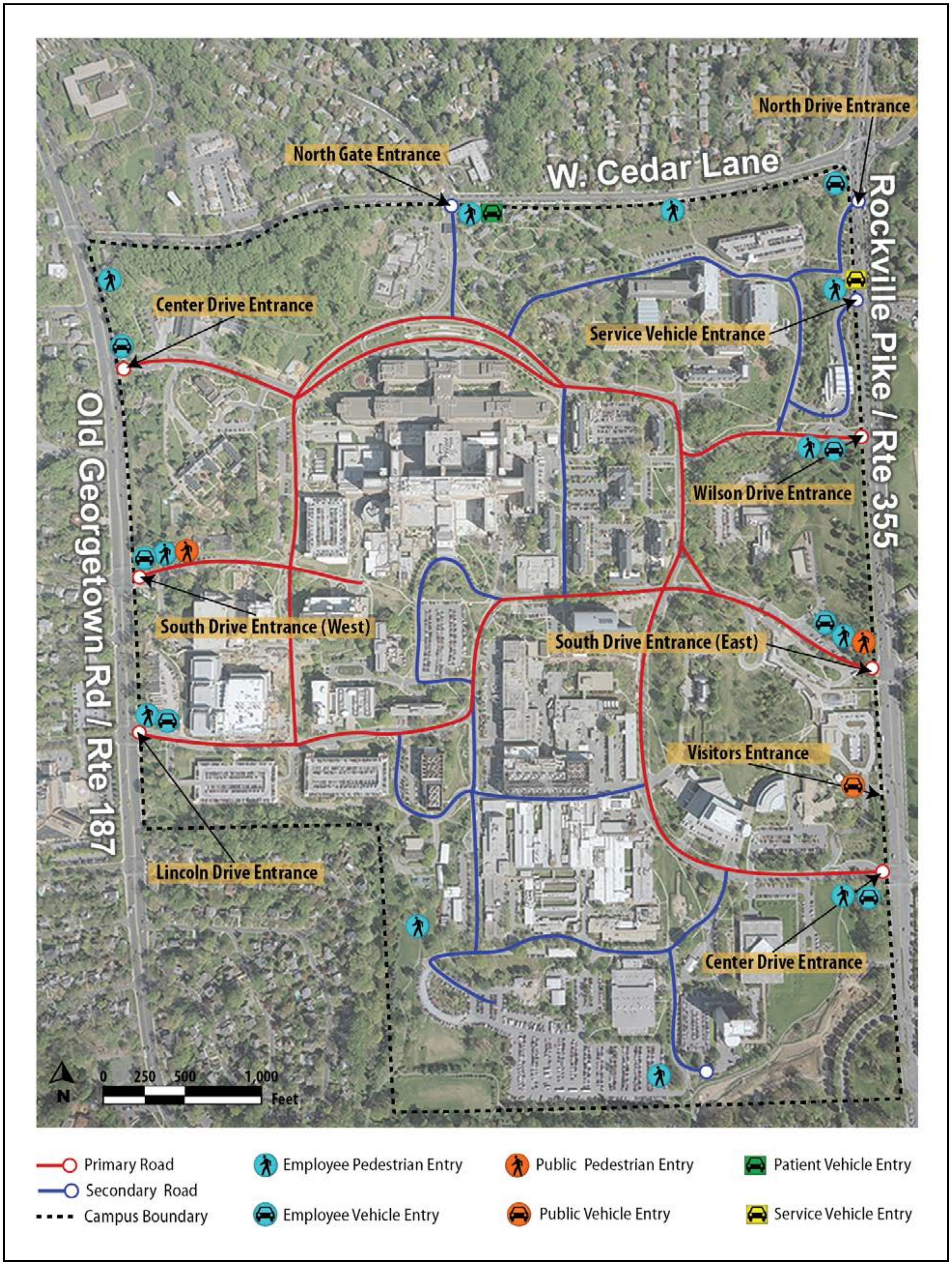


Figure 3-19. Campus - Major Arterial Roadways and Entrances

Sites of the Evaluated Alternatives

Building 34 Site

Under the Proposed Action, the Thermal Energy Storage System would be located at the Building 34 site (see Figure 2-2). As discussed further in Section 2 (Alternatives), the NIH plans to demolish the existing buildings and parking lot as a separate effort prior to the actions analyzed in this EIS. The surface parking lot has approximately 59 parking spaces.

The Lincoln Drive Entrance, off of Old Georgetown Road, is the closest vehicular entrance to the Building 34 site. As discussed above, the three entrances from Old Georgetown Road together comprise 45 percent of vehicular trips entering the Campus during the morning peak-hour. The Building 34 site is close to primary and secondary roads. Lincoln Drive passes directly north of the Building 34 site. Service Road West runs north to south along the east side of the Building 34 site.

The Lincoln Drive Entrance is also the closest pedestrian entrance to the Building 34 site. Both bicycles and pedestrians enter here and proceed along Lincoln Drive.

Two of the NIH shuttle bus routes pass by this site; one route travels along Lincoln Drive and one route travels along Service Road West. There is a shuttle bus stop to the west of the Building 34 site, at Building 8 (NIH, 2014b).

Under the Alternative Action, the proposed use and existing conditions are identical to the discussion above for the Proposed Action.

Parking Lot 41 Site

Under the Proposed Action, the Industrial Water Storage System would be located at the Parking Lot 41 site, which is adjacent to the planned site for MLP-12. The existing site includes open space and some surface parking spaces at Parking Lot 41.

The site is adjacent to Medlars Drive (an existing secondary road), Parking Lot 41, and Service Road West. Medlars Drive is oriented northwest until the western terminus, where it adjoins Service Road West. Beyond the intersection with Service Road West, Medlars Drive curves around, passing through Parking Lot 41. Existing Parking Lot 41 entrances are illustrated in Figure 3-20.

The initial phase of construction of MLP-12 (first level) could necessitate temporary lane closures on Medlars Drive, which could modify traffic or transportation patterns in the vicinity of the Parking Lot 41 site.

There are no campus vehicle entrances in the vicinity of the site. Lincoln Drive Entrance is the closest vehicle entrance.

There are two pedestrian entrances in the vicinity of this site. One entrance is located along the west border, and one is located along the south border. One of the NIH shuttle bus routes travels on Service Road West, through Parking Lot 41 (see Figure 3-17). There are some bus stops in this area to accommodate destinations for the parking lot as well as nearby buildings.

Under the Alternative Action, the proposed use for this site differs, as the NIH would construct the Potable Water Storage System instead of the Industrial Water Storage System. The existing conditions are identical to the discussion above for the Proposed Action.

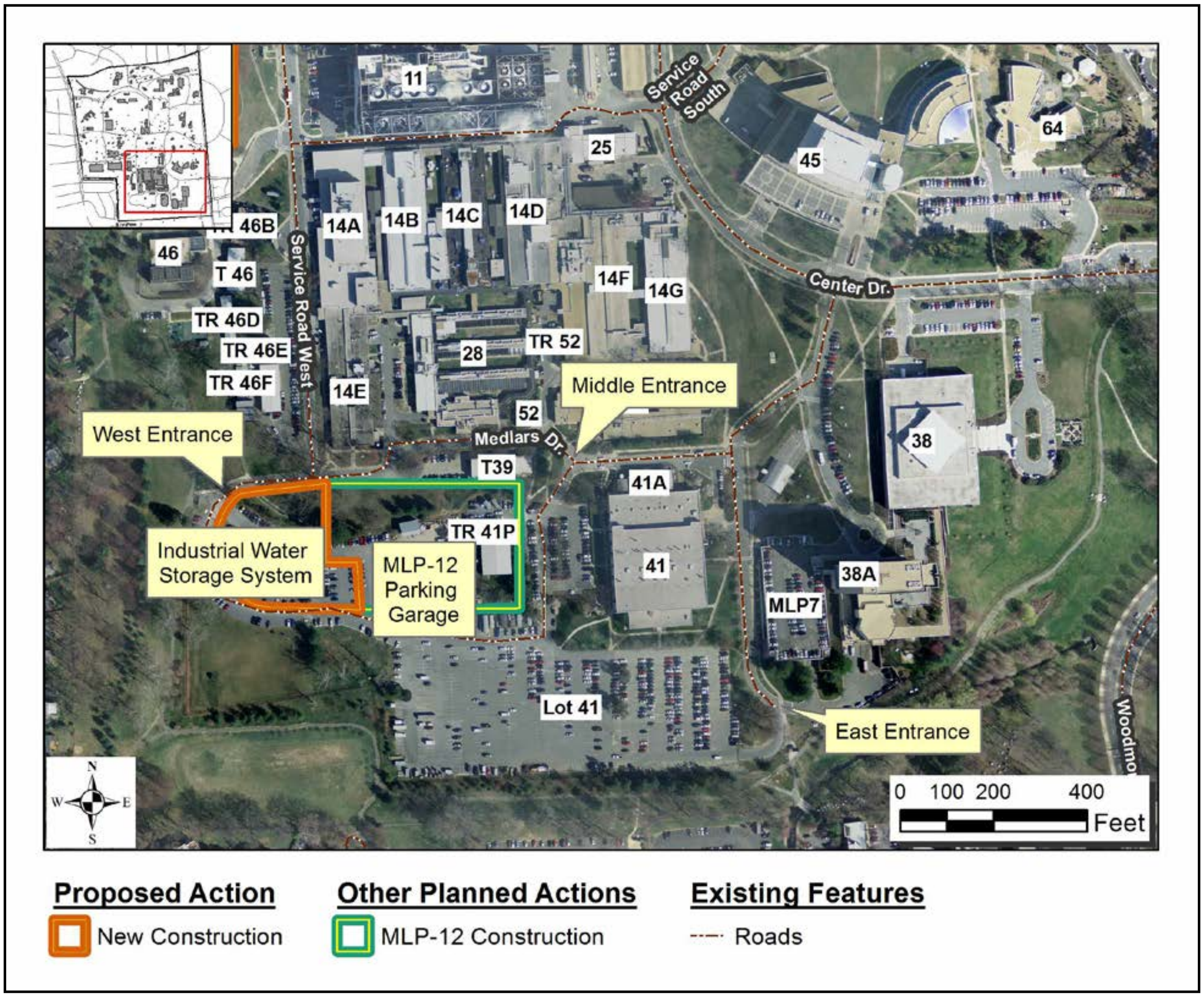


Figure 3-20. Parking Lot 41 Entrances

<u>Site Near the North Gate</u>

Under the Proposed Action, the NIH would not construct any project elements at the site near North Gate.

Under the Alternative Action, the planned Booster Pump Station would be located at the north end of the Campus near the North Gate. The location of the proposed Booster Pump Station is not directly connected to any primary or secondary roads. Center Drive passes south of the site. Two secondary roads are also in the vicinity of the pump station site: West Drive to the west of the site, and North Drive to the east of the site. The site contains a small paved area that is occasionally utilized for parking and has space for several vehicles.

The North Gate Entrance, from West Cedar Lane, is the closest vehicle and pedestrian entrance to the site. Vehicular access is normally limited to patients. Pedestrian access is not restricted.

Bus routes in proximity to the site include a shuttle bus that runs along Center Drive. Metrobus J2 and J3 operate along West Cedar Lane between Rockville Pike and Old Georgetown Road every 10 to 30 minutes throughout weekday daytime hours.

Ride On Route 70 operates along West Cedar Lane weekdays during peak morning hours only (between 4:45 am and 10:00 am) approximately every 12 to 20 minutes.

Sites for Other Supporting Infrastructure

Under the Proposed Action, the NIH would install supporting infrastructure (e.g., piping and electrical lines) in various locations throughout the Campus. The majority of these pipes and utilities would run under or adjacent to roads within the Campus, utilizing existing utility lines where possible. Examples of likely piping routes are detailed in Section 2 (Alternatives). On-campus roads in proximity to these utilities include Lincoln Drive, Service Road West, and Medlars Drive. The Proposed Action is not anticipated to require construction at or near off-campus roads.

Additionally, under the Proposed Action, a 10-inch pipe would supply water from the existing Campus water infrastructure to the Industrial Water Storage System. The route for this pipe would be located in the area of the Bethesda Trolley Trail.

It is possible that the Proposed Action would require piping or other utilities modifications adjacent to roadways in addition to those identified above.

Under the Alternative Action, the NIH would install supporting infrastructure at additional locations throughout the Campus. As with the Proposed Action, the majority of these pipes and utilities would run under or adjacent to roads within the Campus, utilizing existing utility lines where possible. On-campus roads in proximity to these utilities include Center Drive, Lincoln Drive, Service Road West, and Medlars Drive. Off-campus roads in proximity to these utilities include Old Georgetown Road and West Cedar Lane. The locations of existing WSSC-NIH water line connections (Figure 2-2) are under existing off-campus roads, including Old Georgetown Road, West Cedar Lane, and Rockville Pike.

Additionally, under the Alternative Action, a 16-inch pipe would supply water from Old Georgetown Road to the Potable Water Storage System. The route for this pipe would be located in the area of the Bethesda Trolley Trail. This pipeline would run along a larger portion of the Bethesda Trolley Trail relative to the pipe described above for the Proposed Action.

Similar to the Proposed Action, it is possible that the Alternative Action would require piping or other utilities modifications adjacent to roadways in addition to those identified above.

3.7 Noise Levels

Background

High noise levels that occur over a long duration can impact the health of exposed populations and be a nuisance to the surrounding community. The A-weighted decibel scale (dBA) is a logarithmic scale generally used to measure noise levels because it can account for the sensitivity of the human ear across the frequency spectrum. Table 3-1 compares decibel noise levels, common noise sources, and the relative perception of the noise levels.

Ambient noise levels are typically evaluated using the 90th percentile-exceeded noise level, L_{90}, which indicates the single noise level that is exceeded during 90 percent of a measurement period. The L_{90} noise level typically does not include the influence of discrete noises of short duration, such as car horns.

Table 3-1. Perception of Noise

Noise Level (dBA)	Common Noise Source	Subjective Evaluation
70	Outdoors in a commercial area.	Loud
60	Average of normal speech three feet away.	Moderate
50	Open office background noise.	
40	Quiet suburban environment at night.	Faint
30	Quiet rural environment at night.	
20	Concert hall background noise.	Very Faint
10	Human breathing.	
0	Threshold of hearing or audibility.	Inaudible

Source: NIH, 2009.

The Occupational Safety and Health Administration (OSHA) regulates workplace noise with standards for two different types of noise: constant and impulse. The OSHA limit for constant noise is 90 dBA for eight hours; however, the National Institute for Occupational Safety and Health (NIOSH) recommends a constant noise limit of 85 dBA for eight hours to minimize occupational noise induced hearing loss. The OSHA maximum sound level for impulse noise is 140 dBA. In areas where workplace noise exceeds these sound levels, employers must provide workers with personal protective equipment to reduce noise exposure.

State and local government agencies regulate noise within the community. Noise standards set by the state under COMAR 26.02.03 limit the 24-hour average sound levels for residential, commercial, and industrial zones to 55, 64, and 70 dBA, respectively. The Montgomery County Noise Control Ordinance (Chapter 31B of the County Code) established maximum allowable noise levels in the county (Montgomery County, 2014). The Montgomery County noise exposure limits for residential and non-residential properties are summarized in Table 3-2.

Table 3-2. Montgomery County Maximum Allowable Noise

Levels for Receiving Noise Areas	Weekdays Daytime 7:00 am – 9:00 pm	Weekdays Nighttime 9:00 pm – 7:00 am
Residential	65 dBA	55 dBA
Non-Residential	67 dBA	62 dBA

Source: DEP, 2014.

In addition, noise levels from construction activities must not exceed 75 dBA at the source between 7 a.m. and 5 p.m., with higher allowances if the County Department of Environmental Protection (DEP) has approved a noise suppression plan (Montgomery County DEP, 2014).

Region

Traffic on Rockville Pike and Old Georgetown Road is the major source of noise in the region immediately surrounding the Campus. Traffic noise dominates noise levels for about 500 feet at either side of these roadways (NIH, 2013). At the building line adjacent to these roads, noise levels are generally between 68 to 71 dBA (NIH, 2014a). For comparison, noise levels under similar conditions on Jones Bridge Road and West Cedar Lane were 66 and 64 dBA, respectively

(NIH, 2014a). Noise levels generally remain constant throughout weekdays, between 6:00 am and 9:00 pm.

Campus

Typical daytime noise levels throughout the core area of the Campus range from 55 to 60 dBA. Nighttime noise levels range from 45 to 55 dBA (Colin, Gordon, & Associates, 2007). In the immediate area around the Clinical Center, nighttime levels are about 5 dBA higher. During early morning hours (1:00 am to 4:00 am), noise levels are 45-50 dBA along the northern perimeter of the Campus in areas past the reach of traffic noise from Rockville Pike and Old Georgetown Road (NIH, 2014a).

Within the central area of the Campus, overall noise levels are affected by a number of external sources. Exterior traffic noises dominate noise levels from the Campus border to approximately 500 feet into the interior of the Campus. The Campus is bordered by major roads on three sides: Old Georgetown Road to the east, West Cedar Lane to the north and Rockville Pike to the west. Traffic on the Campus, in comparison, is relatively light, especially during the middle of the day, and moves at a low speed (NIH, 2014a).

NIH has conducted several noise studies, including a study in winter 2013. This study confirmed that significant sources of noise on the Campus include building exhaust stacks, air handling units, mechanical rooms, and CUP chillers and cooling towers. The study monitored noise levels at six locations at or near the Campus boundary. The CUP was the highest source of noise for two of the locations; for the other four locations, other noise sources were more significant. The two locations at which the CUP was the major source of noise were located at the south end of the Campus (Colin, Gordon, & Associates, 2014a).

Noise levels generated by the CUP are seasonally dependent. Throughout most of the year, excluding summer months, noise produced by the plant combines with the ambient noise environment and the CUP is not a primary contributor to noise levels. During summer months, when temperatures surpass 90 ˚F, the number of units in service increases, thereby increasing noise generation of the plant. In general, noise levels from chiller and cooling towers are the highest during daytime hours, when space cooling loads are the highest. During daytime hours, noise level from the plant is the same as all other noise sources combined. During nighttime hours, while the plant produces less noise, the overall noise environment is also decreased, which makes the noise from the plant the dominant noise source (NIH, 2014c).

NIH conducted a noise study in 2013, which determined that existing ambient nighttime noise levels at the Campus boundary range from 46 to 54 dBA. These noise levels are consistent with similar measurements made during earlier campus noise studies. No readings exceeded the Montgomery County nighttime residential noise metric of 55 dBA. This study also observed that outdoor noise environments are often impacted by multiple sources such that removing a few major sources may not have a dramatic impact on community noise levels (Colin, Gordon, & Associates, 2014a).

Background noise that contributes to the ambient noise environment includes noise not directly generated from a specific source. Background noise generators on the Campus include daytime campus traffic, electrical and mechanical equipment, the transformer noise from the COGEN/Boiler 6 facility in Building 46, the NIH child care center, birds, insects, aircraft, rescue vehicle sirens, residential air conditioners, barking dogs, lawn mowers and leaf blowers, and human activities including pedestrians (Colin, Gordon, & Associates, 2007).

Sites of the Evaluated Alternatives

Building 34 Site

Under the Proposed Action, the Thermal Energy Storage System would be located at the site of Building 34, a former district refrigeration plant. As discussed further in Section 2 (Alternatives), Building 34 and the parking lot will be demolished under a separate effort. Because this EIS assumes post-demolition conditions as the baseline, there would be no existing noise sources at the site. Other noise sources, such as the chillers at the CUP and traffic on adjacent roadways do, however, generate noise that is audible at the site.

The 2013 noise study results include an L90 nighttime (midnight to 4AM) measurement obtained at the east end of McKinley and Roosevelt Avenues (near the entrance to the Bethesda Trolley Trail). The averaged noise level was 51 to 52 dBA. A similar study in 2014 obtained a measurement of 51 to 54 dBA at the same location. This monitoring location is about 450 feet from Building 34 (Colin, Gordon, & Associates, 2014b).

Under the Alternative Action, the proposed use of the site and existing conditions would be identical to the description above for the Proposed Action.

Parking Lot 41 Site

Under the Proposed Action, the Industrial Water Storage System would be located adjacent to the planned site for MLP-12, a multi-level parking structure at the Parking Lot 41 site. The Parking Lot 41 site is currently being utilized as open space and surface parking. Noise associated with the parking area includes employee vehicles and human activity. Noise from the open space area may include birds and wildlife, and human activity.

If the NIH implements the planned construction of MLP-12, construction noise would temporarily increase the noise levels at the Parking Lot 41 site. Following construction, use of MLP-12 would have a permanent minor impact on vehicle-related noise levels at the Parking Lot 41 site. This impact would be minor due to the relative proximity of other existing vehicle-related noise sources (e.g., Medlars Drive, Parking Lot 41).

The closest measurement location in the 2013 and 2014 noise studies was the same location discussed above for Building 34 site. This monitoring location is about 550 feet from the Parking Lot 41 site (Colin, Gordon, & Associates, 2014b).

Under the Alternative Action, the proposed use for the site differs as the NIH would construct the Potable Water Storage System instead of the Industrial Water Storage System. The existing conditions are identical to those discussed above for the Proposed Action.

Site Near the North Gate

Under the Proposed Action, the NIH would not construct any project elements at the site near North Gate.

Under the Alternative Action, the Booster Pump Station would be located at the north end of the Campus near the North Gate, just north of Center Drive, at the site of an existing basketball court. This site is within a quiet residential area with a park-like setting. Existing noise sources at this site are limited to human activity. Other noise sources, such as vehicles on Center Drive and West Cedar Lane, generate noise that is audible at the site.

The 2013 noise study results include an L90 nighttime (midnight to 4AM) measurement obtained near Building 62, the Children's Inn, which is located southwest of the North Gate. The averaged noise level was 46 to 49 dBA. This monitoring location is about 300 feet from the site near North Gate (Colin, Gordon, & Associates, 2014a).

Sites for Other Supporting Infrastructure

Under the Proposed Action, the NIH would install supporting infrastructure (e.g., piping and electrical lines) in various locations throughout the Campus. Locations where NIH would install some of this infrastructure are illustrated in Figure 2-2 and locations for other items are not yet identified. Existing sources of noise in the vicinity of these areas include vehicular traffic; human activity (i.e. pedestrians and bicyclists); and noise associated with the Bethesda Trolley Trail, including birds and wildlife, and human activity.

Under the Alternative Action, the NIH would install supporting infrastructure at additional locations throughout the Campus. Locations where the NIH would install some of this infrastructure are illustrated in Figure 2-5 and locations for other items are not yet identified. Although additional sites are involved, existing noise sources at the additional sites are similar to those described above for sites of the Proposed Action. One exception is the additional sites near Old Georgetown Road, which experience higher traffic-related noise levels.

3.8 Air Quality

Air quality refers to the degree of pollution in the air, often assessed by measuring concentrations of pollutants and comparing them to health-based limits set by the USEPA. Airborne pollutants originate from a variety of sources including anthropogenic (man-made) or natural (e.g., forest fires). Releases of pollutants can cause a change in air quality that can harm human health, property, and the natural environment. Examples of anthropogenic pollution sources include mobile sources such as cars or construction equipment and stationary sources such as electric generation units (EGUs). Regardless of the source, most anthropogenic airborne emissions arise from fossil fuel combustion. Emissions from fossil fuel combustion also contain GHGs which are likely contributors to observed global climate change (IPCC, 2014).

3.8.1 *Ambient Air Quality*

Background

Federal Regulations

Federal regulations govern air quality for the larger region surrounding Montgomery County, Maryland. The Clean Air Act (CAA) designated USEPA the authority to set National Ambient Air Quality Standards (NAAQS) to limit the concentration of pollutants considered harmful to public health and the environment (40 Code of Federal Regulations [CFR] Part 50). The NAAQS regulate six specific pollutants, commonly referred to as "criteria pollutants" that include ozone (O_3), particulate matter (PM), carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), and lead (Pb) (USEPA, 2010). The NAAQS limit PM levels according to particle size, with separate standards for coarse (PM_{10}) and fine ($PM_{2.5}$) particulate matter. Table 3-3 shows the current NAAQS concentration limits as of December 2014.

Table 3-3. National Ambient Air Quality Standards

Criteria Pollutant	Averaging Time	Level [a]
Ozone (O_3)	8-hour	75 ppb [b]
Particulate Matter ($PM_{2.5}$)	24-hour	35.0 ug/m^3
	Annual Mean	12.0 ug/m^3
Particulate Matter (PM_{10})	24-hour	150 ug/m^3
Carbon Monoxide (CO)	1-hour	35.0 ppm
	8-hour	9.0 ppm
Lead (Pb)	3-month	0.15 ug/m^3
Nitrogen Dioxide (NO_2)	1-hour	100 ppb
	Annual Mean	53 ppb
Sulfur Dioxide (SO_2)	1-hour	75 ppb
	3-hour	0.5 ppm

Notes:

[a] All of the standards are primary standards, which provide public health protection, except for the 3-hour SO_2 limit, which is a secondary standard and provides public welfare protection. Units of measure are parts per million (ppm) by volume, parts per billion (ppb) by volume, and micrograms per cubic meter of air (ug/m^3).

[b] Based on a court ruling and consent decree, USEPA issued a new 8-hour ozone rule on March 12, 2008, which strengthened the NAAQS for ozone from 0.08 ppm to 0.075 ppm. In November 2014, the USEPA proposed a more stringent 8-hour ozone standard in the range of 0.065 to 0.070 ppm (Federal Register, 2014).

If a region's air pollutant concentrations are not in violation of the NAAQS, EPA designates the area to be in *attainment.* For areas USEPA designates as *nonattainment*, there are several categories from *marginal* to *severe* that USEPA could assign depending on the severity of the exceedance. A *nonattainment* designation requires that a region submit a State Implementation Plan (SIP) that addresses how the NAAQS will be met in a future year. USEPA later determines whether the region has met the SIP goals, and if so, USEPA changes the designation from nonattainment area to *maintenance area*. Part of Montgomery County (that includes the Campus) is a CO maintenance area (USEPA, 2014b).

The CAA requires that the USEPA regularly review the NAAQS in the context of the latest science and health studies to determine whether the NAAQS still adequately protect human health and the environment. As such, USEPA has lowered the NAAQS periodically since the program's inception. Designations from previous NAAQS levels still apply until the nonattainment area successfully demonstrates attainment and USEPA agrees to re-designate the area. For this reason, while Montgomery County is in attainment of the current 2012 $PM_{2.5}$ NAAQS, the county continues to carry the "moderate" nonattainment designation for the previous 1997 $PM_{2.5}$ NAAQS. The Metropolitan Washington Air Quality Committee (MWAQC) has petitioned USEPA to remove its nonattainment status for $PM_{2.5}$ (USEPA, 2014c). The USEPA also designated the Metropolitan Washington region, which includes Montgomery County, as a "marginal" nonattainment area for the current ozone standard of 75 ppb and a "moderate" nonattainment for the previous 1997 ozone standard of 80 ppb. As shown below in Table 3-4, Montgomery County is an attainment area for CO, SO_2, NO_2, and lead (40 CFR 81.321).

Table 3-4. Montgomery County Attainment Status and General Conformity Rule *De Minimis* Thresholds

Criteria Pollutant	Classification of Montgomery County	Pollutant or Precursor of Concern	*De Minimis* Emission Rate (tons/yr) [a, b]
Ozone (O_3)	Nonattainment of the 1997 standard (moderate) Nonattainment of the 2008 standard (marginal)	NO_x	100
		VOC	50
Particulate Matter ($PM_{2.5}$) [c]	Nonattainment of the 1997 standard (moderate)	$PM_{2.5}$	100
		NO_x	100
		SO_2	100
Carbon Monoxide (CO)	Attainment (maintenance area)	CO	100
Lead (Pb)	Attainment	Pb	N/A
Nitrogen Dioxide (NO_2)	Attainment	NO_2	N/A
Particulate Matter (PM_{10})	Attainment	PM_{10}	N/A
Sulfur Dioxide (SO_2)	Attainment	SO_2	N/A

Notes:

[a] *De minimis* levels are emission rates specified in 40 CFR 93.153(b), which may not be exceeded by federal actions taking place in nonattainment and maintenance areas. Federal actions in nonattainment areas for $PM_{2.5}$ must also consider the *de minimis* levels for $PM_{2.5}$ precursors, including NOx and SO_2.

[b] N/A designates that Montgomery County is an attainment area for that pollutant and *de minimis* levels are therefore not applicable for that pollutant.

[c] On January 4, 2013, the MWAQC published a draft request for USEPA to redesignate the Washington, D.C.-MD-VA Metropolitan Area from nonattainment to attainment for $PM_{2.5}$, and solicited public comment on the redesignation request and associated maintenance plan (MWAQC, 2013). As of December 9, 2014 USEPA is still evaluating MWAQC's request (USEPA, 2014c).

The CAA General Conformity Rule (GCR) requires that federal actions taking place in nonattainment areas must conform to the region's SIP for reducing airborne concentrations of the nonattainment pollutant(s). Because the Campus is located in an ozone and $PM_{2.5}$ nonattainment area and a CO maintenance area, this EIS includes a review of the emissions that would be expected from the construction and operational activities under the Proposed and Alternative Actions to determine whether they would exceed *de minimis* levels and trigger a SIP conformity determination. The *de minimis* levels for each of Montgomery County's nonattainment criteria pollutants are listed in Table 3-4.

Federal Operating Permit Programs

Title V of the CAA requires all major sources of air pollution to obtain an operating permit known as a Title V permit. For Title V applicability, the major source threshold for emissions of oxides of nitrogen (NO_x) and VOC is 25 tons per year (TPY) (COMAR 26.11.02.01.C). This permit consolidates all State and federal air quality requirements that apply to the source, including emissions limits and monitoring, record keeping, and reporting requirements.

Maryland Air Quality Programs

The state of Maryland requires a permit to construct (PTC) from MDE before construction or modification of an emission source (COMAR 26.11.02.09), including emergency generators and boilers, unless COMAR 26.11.02.10 exempts the source from PTC requirements. For large sources, preconstruction approval may need to be obtained from the New Source Review (NSR) program and/or the Prevention of Significant Deterioration (PSD) program. Small stationary generators with engine output of less than 373 kilowatts (kW) are an example of an exempt source under COMAR 26.11.02.10.

The NSR program is a preconstruction review process established under the CAA to assist in efforts to achieve compliance with the NAAQS (40 CFR 51 Subparts I and P; 40 CFR 52.10). Any proposed new or modified major stationary source that would discharge significant amounts of criteria pollutants must obtain an NSR approval prior to construction. According to COMAR 26.11.02.01(C), a source is considered a major source if it meets any of the following criteria: a) emits, or has the potential to emit, 10 TPY or more of an individual hazardous air pollutant (HAP), or 25 TPY or more of any combination of HAPs; b) emits, or has the potential to emit, 100 TPY or more of any air pollutant (including criteria pollutants in attainment status); or c) emits, or has the potential to emit, criteria pollutants in exceedance of certain thresholds for nonattainment areas. Because Montgomery County is a nonattainment area for ozone, new air pollution sources at the Campus with the potential to emit 25 TPY or more of VOC or NO_X require NSR approval (MDE, 2008a). In Maryland, COMAR 26.11.02 (under *Permits, Approvals, and Registration*) implements the NSR program. Applicants must submit their NSR application with a PTC application that includes additional requirements to demonstrate sufficient emission controls and offsets (MDE, 2008a).

The PSD program is intended to prevent significant deterioration of ambient air quality by limiting the amount of air pollutants released by a new or modified facility located in a NAAQS attainment area. The MDE implements this program under COMAR 26.11.06.14, *Control of PSD Sources*, and it requires all PSD sources to comply with the requirements of 40 CFR 52.21, *Prevention of Significant Deterioration of Air Quality*. The following actions require PSD approval (MDE, 2008b):

1. New air pollution sources that have the potential to emit at least 100 TPY of any regulated pollutant, if the proposed source belongs to one of the 26 source categories listed in COMAR 26.11.01.01B;

2. New air pollution sources that have the potential to emit at least 250 TPY of a regulated pollutant from unlisted source categories; and

3. Major modifications to an existing major facility that would result in a net emissions increase above the levels listed in Table 3-5.

Table 3-5. PSD Criteria Pollutant Emission Thresholds

Pollutant	Significance Level (TPY)
CO	100
NO_x	40
SO_x	40
PM_{10}	15
VOC	40
Lead	0.6

Maryland's air quality program also incorporates federal emissions standards that apply to stationary sources such as National Emission Standards for Hazardous Air Pollutants (NESHAPs), which require the application of technology-based emissions standards known as Maximum Achievable Control Technology (MACT) to control HAPs, and New Source Performance Standards (NSPS), which apply to specific categories of stationary sources. In addition, Maryland's air quality program includes requirements for sources that emit toxic air pollutants (TAPs), as defined in COMAR 26.11.15. These requirements specify that new sources of TAPs must obtain a PTC and that the owner or operator of all new sources and certain existing sources of TAPs must apply the best available control technology for toxics (T-BACT).

Region

Air Quality

The Maryland Ambient Air Monitoring Network consists of 25 air monitoring stations throughout the state that measure ground-level concentrations of criteria and other pollutants (MDE, 2012). In addition, Washington monitors ambient air quality at 5 stations throughout the district (DDOE, 2015). Table 3-6 presents ambient air quality for the three ozone and $PM_{2.5}$ monitoring stations located closest to the Campus while Table 3-7 shows the monitoring data for CO.

Table 3-6. Ozone and $PM_{2.5}$ Ambient Air Monitoring Data from Stations Located Near the Campus

Monitoring Site	Year	Ozone		$PM_{2.5}$	
		8-hour Max (ppb)	8-hour Exceedances	24-hour Max (ug/m^3)	Annual (ug/m^3)
USEPA NAAQS		75	N/A	35	12
Lathrop E. Smith Environmental Education Center 5110 Meadowside Lane Rockville, MD (8 miles N of the Campus)	2013	72	0	—	—
	2012	87	2	—	—
	2011	88	5	—	—
	2010	81	5	18.6	9.1
	2009	74	0	29.2	9.4
2500 1st Street, N.W. Washington, DC (7 miles SE of the Campus)	2013	68	0	27.6, 27.3	9.1, 9.1
	2012	98	11	34.1, 31	9.6, 9.3
	2011	92	11	30.6	10.3
	2010	100	16	34.1	10.5
	2009	85	2	36.6	10.2
350 Stafford Road Calvert, MD (5 miles SE of the Campus)	2013	72	0	*N/A*	
	2012	111	11		
	2011	93	6		
	2010	98	8		
	2009	76	1		
Park Services Office 1100 Ohio Drive Washington, DC (9.5 miles SE of the Campus)	2013	*N/A*		25.7	8.3
	2012			31.2	9.8
	2011			30.7	10.2
	2010			35.1	11
	2009			40.9	10.1

Source: USEPA, 2014d.

Note: Red text highlights the exceedances of ozone and $PM_{2.5}$ NAAQS concentrations.

Table 3-7. CO Ambient Air Monitoring Data from Stations Located Near the Campus

Monitoring Site	Year	CO	
		1-hour Max (ppm)	**8-hour Max (ppm)**
USEPA NAAQS		35	9
Howard University's Beltsville Laboratory, 12003 Old Baltimore Pike Beltsville, MD (12.5 miles E of the Campus)	2013	1	0.9
	2012	1.3	1.2
	2011	1.7	1.1
	2010	1.5	1
	2009	1.1	0.9
Verizon Phone Co. 2055 L St. N.W. Washington, DC (7.5 miles SE of the Campus)	2013	5.8	2.8
	2012	2.5	2
	2011	5	2.2
	2010	2.8	2.4
	2009	2.5	2
2500 1st Street, N.W. Washington, DC (7 miles SE of the Campus)	2013	2.1	1.2
	2012	23.9	4.2
	2011	3.1	2.5
	2010	-	-
	2009	-	-

Source: USEPA, 2014d.

Emissions Sources

In support of the region's SIP, the MWAQC submitted a comprehensive emission inventory of all stationary (point and area) and mobile (on-road and non-road) sources within the Metropolitan Washington region (MWAQC, 2014). MWAQC's comprehensive 2011 base year emission inventory included all local sources of VOC, NO_X, CO, $PM_{2.5}$, SO_2 and ammonia. The pie charts below summarize the annual average tons per day (TPD) of VOC, NO_X, CO, and $PM_{2.5}$ emissions within the region.

Figure 3-21 shows that, in 2011, approximately 50 percent of VOC emissions within the region originated from mobile sources (on-road and non-road combined) with the other half from stationary sources that are mostly minor area sources. The largest contributors to the region's NO_X and CO emissions in 2011 were on-road mobile sources (such as cars, pickups, and heavy-duty trucks) at nearly 195 TPD and 975 TPD, respectively. Area sources were the largest contributors to $PM_{2.5}$ emissions in the region (MWAQC, 2014).

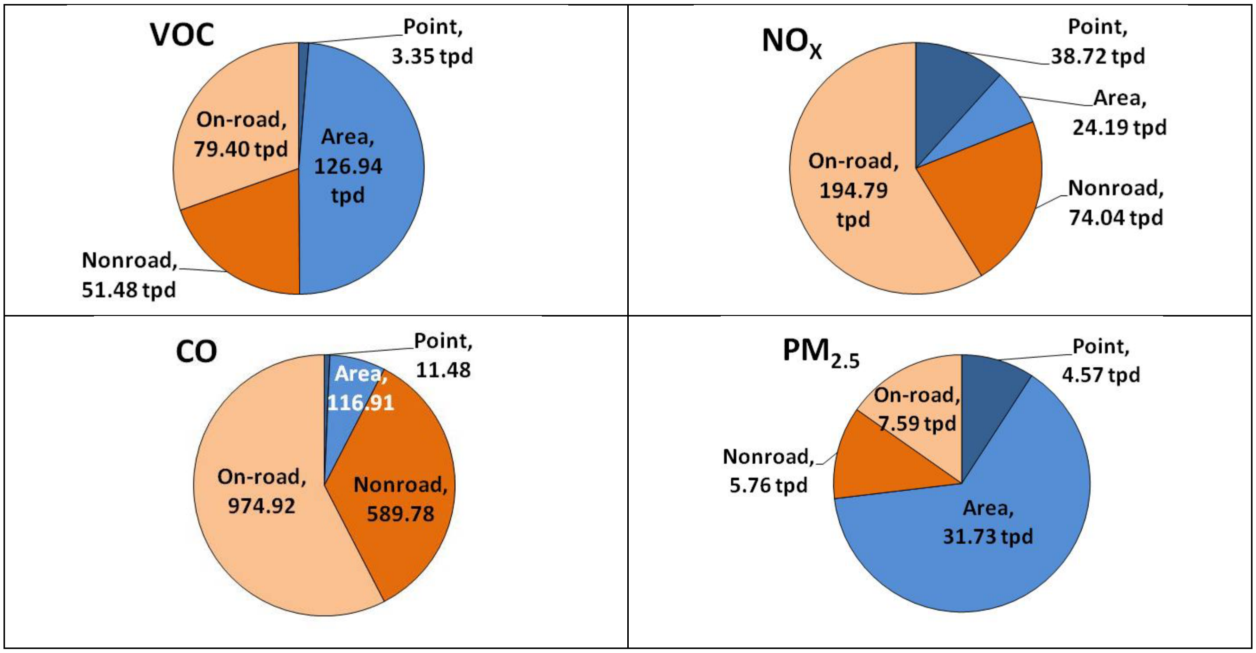


Figure 3-21. 2011 VOC and NO_X Annual Average Daily Emissions in the Washington Nonattainment Area by Sector Category

Campus

Stationary Emissions Sources

The primary source of stationary emissions at the Campus is the CUP housed in Building 11. This plant consists of five boilers and a COGEN boiler that produce steam required by the Campus for heating and laboratory equipment sterilization. Boilers 1 through 5 are dual-fuel and can operate on either natural gas or No. 2 low sulfur content diesel oil. Each boiler has an individual stack diameter of 40 inches, and a central stack encompasses the individual stacks, routing their collective emissions to the atmosphere at a single release point at a height of 117 feet above ground level. The COGEN facility is separate from the boilers, and it has an 8-foot stack diameter and a height of 140 feet above ground level. Title V permit 24-031-00324 currently regulates several emission sources at the Campus including Boilers 1 through 5, the COGEN facility, gasoline storage tanks, and emergency diesel generators with a capacity over 375 kW (NIH, 2014a). The 2011 NO_x emission inventory from the five boilers and COGEN boiler totaled 81.16 tons, which is well below the Title V permitted level of 137.3 tons.

In addition to the five boilers and COGEN boiler, the CUP also contains 12 chillers producing chilled water to air condition laboratories and other buildings. The operation of these chillers fluctuates with the outdoor temperature. During winter, the chillers experience their minimal/baseline requirement. All 12 chillers must operate when outdoor temperatures exceed 95 °F, and they operate at approximately half capacity when outdoor temperatures are 75°F.

Emission units at the Campus also include 18 underground storage tanks (USTs) and 56 aboveground storage tanks (ASTs) that store fuel for powering boilers, generators, or vehicles. There are 63 permanently installed emergency generators at the Campus including the following fuel types: 55 diesel, seven natural gas, and one steam-driven. In addition there are seven portable emergency generators. The combined capacity of the emergency generators is 53,590 kW. Many of these generators have an operational capacity larger than 375 kW and are therefore included in the

Title V permit. Building 59A houses a central emergency generator plant with three 1,500-kW generators. Building 10 has five generators with a combined capacity of 2,635 kW, a mean capacity of 527 kW per unit. Buildings 14 and 28 (the animal care complex) have several emergency power generators that together can support the entire building demand of over 2,000 kW. Building 45 (office space) has a 1,000-kW generator capable of powering the full electrical needs of the building including computers. Other emergency generators throughout the Campus are smaller, only serving critical needs such as emergency lighting during an outage.

Laboratory buildings at the Campus are also stationary sources of air pollutant emissions. The emissions are typically not from combustion, and the types of pollutants released vary from day to day depending on experimental protocols. When required, experiments are performed in laboratories within sealed chambers connected to fume hoods that collect the airborne pollution and vent it to the atmosphere. Experiments with hazardous substances have fume hoods connected to a High Efficiency Particulate Arresting (HEPA) air filter before releasing the outflows. The HEPA filters remove dust, smoke, spores, bacteria, viruses, and other particles down to the 0.1-micron size.

Mobile Emissions Sources

The largest category of mobile source emissions at the Campus includes exhaust emissions from visitor and employee traffic at the Campus, campus shuttle operations, and federal government vehicle fleet emissions. In addition to these fleets, other mobile sources include grounds maintenance vehicles as well as temporary construction equipment activity.

Air quality analysis of traffic often focuses on CO as the reference pollutant because it is the NAAQS standard that would generally be exceeded as a result of vehicle emissions. A dispersion modeling analysis of CO emissions from worst case scenarios of high traffic levels at the Campus found that these mobile source emissions would not cause local exceedances of the CO NAAQS in 2013 (NIH, 2013). Furthermore, vehicle emission rates of CO and other pollutants are projected to decrease in future years due to the introduction of cleaner technologies into fleets, the adoption of which are necessary to meet increasingly stringent federal emissions standards.

3.8.2 *Greenhouse Gas Emissions*

Background

GHGs are gases in the lower atmosphere that absorb infrared radiation emitted from the earth's surface and then radiate most of this energy back to the earth's surface. According to the Intergovernmental Panel on Climate Change (IPCC), anthropogenic (human-generated) GHG emissions include the following: carbon dioxide (CO_2), nitrous oxide (N_2O), methane (CH_4), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6).

EO 13514 requires federal agencies to compile annual GHG emission inventories and set GHG emission reduction targets for FY 2020, relative to FY 2008. EO 13423 requires each federal agency to reduce GHG emissions through the reduction of energy intensity by three percent annually or 30 percent by the end of FY 2015, relative to the agency's energy use in FY 2003.

EPA classifies GHG emissions and reduction targets as Scope 1 (direct emissions), Scope 2 (indirect emissions from purchased energy), or Scope 3 (other indirect emissions). Scope 1 emissions include emissions from direct fossil fuel combustion such as in the operation of boilers, generators, incinerators, and vehicles operated by the organization, as well as fugitive emissions of refrigerants and other GHG gases (e.g., fire suppressants). Scope 2 emissions include upstream emissions from purchased electricity, steam, heating, and cooling. Scope 3 emissions include all other indirect emissions not included in Scope 2, such as emissions from employee commuting, employee business travel, transmission and distribution losses associated with purchased electricity, methane emissions from contracted solid waste disposal, methane and nitrous oxide emissions from contracted wastewater treatment, and upstream emissions associated with purchased products and services.

The HHS has established agency-wide GHG reduction targets to reduce Scope 1 and Scope 2 GHG emissions by 10.3 percent and Scope 3 emissions by 3.3 percent by FY 2020, relative to emission levels in FY 2008. NIH contributes to HHS goals by implementing measures to reduce existing GHG emissions and attempting to minimize GHG emissions associated with new or expanded operations and buildings. The NIH developed its GHG inventory in accordance with the *Federal Greenhouse Gas Accounting and Reporting Guidance Technical Support Document* (TSD), issued by CEQ on 6 October 2010.

Campus

Operations at the Campus produce GHG emissions through a variety of activities, including the following:

1. Operation of Boilers 1-5, the COGEN facility, numerous emergency generators, campus shuttles, and government vehicle fleets (Scope 1).

2. Purchase of electricity (Scope 2).

3. Commuting of employees to the Campus, transmission and distribution losses from purchased electricity, and employee business travel (Scope 3).

These emissions-generating activities provide the baseline to determine any changes in emissions resulting from construction and operation of new facilities under the Proposed and Alternative Actions. NIH has developed a GHG inventory addressing activities at the Campus to satisfy EO 13514 agency-wide GHG reporting requirements. Table 3-8 shows the metric tons (MT) of direct CO_2e GHG emissions at the Campus CUP for years 2010 and 2011. These emissions exceed 25,000 MT CO_2e and are therefore required to be reported under the CAA.

Table 3-8. GHG Facility Emissions at the Campus CUP

GHG Pollutant	Year 2010	Year 2011
Emissions of CO_2 in metric tons of CO_2e	180,560	195,303
Emissions of CH_4 in metric tons of CO_2e	82	87
Emissions of N_2O in metric tons of CO_2e	145	153
Total Facility Emissions of CO2e (excluding Biogenic CO2)	**180,787**	**195,543**

The Campus receives power from PEPCO via three PEPCO-owned substations. Multiple EGUs supply the Campus with electricity, producing GHG emissions from electric generation. Employees and visitors to the Campus arrive by personal vehicle, carpool, Metro, or bus, which combust fossil fuels and produce GHG emissions. Lastly, employee business travel by plane, train, and automobile generates GHG emissions.

3.9 Biological Resources

3.9.1 *Vegetation*

Background

Vegetation performs the following important functions:

- Slows the flow of stormwater runoff, allowing water to soak into the ground to replenish aquifers;
- Helps maintain the water quality of nearby waterways by filtering runoff and removing harmful sediment and pollutants;
- Prevents erosion by reducing the impact of rain on soil and by holding soil in position with roots;
- Shades paved surfaces, reducing heat island effect and stormwater runoff temperatures that affect aquatic habitats; and
- Provides habitat for a variety of organisms.

The federal government is charged with protecting and enhancing vegetation and habitat on its properties. The NCPC has issued the following guidelines in *The Comprehensive Plan for the National Capital* to aid in achieving these goals:

- Incorporate trees and vegetation in all federal developments to moderate temperatures and minimize energy consumption;
- Encourage the use of street trees to enhance visual and aesthetic features;
- Avoid removal of woodland and vegetation from steep slopes and areas with high erosion potential; and
- Preserve existing vegetation, especially large stands of trees to the extent possible.

The Maryland Forest Conservation Act of 1991 along with the Montgomery County Forest Conservation Law (Chapter 22A) established a program for conserving forest and tree resources. Effective July 1, 1992, all applications for subdivision, grading permits, or sediment control permits on tracts of land 40,000 SF or larger, must be accompanied by a Natural Resources Inventory/ Forest Stand Delineation (a detailed summary of existing man-made and natural conditions of a site), and a Forest Conservation Plan or a Tree Save Plan. Exemptions include governmental projects reviewed for forest conservation purposes by the State Department of Natural Resources under the COMAR.

Region

The Campus is located within the city of Bethesda, an urban area consisting of commercial and residential development. The only large tracts within this region that remain natural are parklands used for active recreation or as stream valley parks. Refer to Section 3.14.1 (Social Resources and Sensitive Populations) for discussion of shared and open spaces in the vicinity of the Campus.

Campus

The Campus contains mature trees, broad lawns and extensive areas of ornamental gardens and courts, with shrubs, ground covers and flowers that provide a visually appealing setting. In order to maintain 15 percent tree canopy cover on a campus-wide basis, the NIH implemented a no-net tree loss policy in 1996, which requires the replacement of all trees lost due to construction and natural causes.

The Campus currently contains approximately 4.2 acres that meet the MDNR criteria for forests (i.e., 100 trees or more per acre), due in large part to the establishment of no-mow zones over ten years ago along campus streams and selected perimeter buffer areas. The forested area, designated as “Cedar Lane Woods”, is located in the northwest corner of the Campus, between the Children’s Inn and the NIH Fire Station. In 2005, the NIH prepared a campus-wide *Urban Forest Conservation Plan*, which includes a campus-wide tree inventory, to cover projects planned under the *2003 Campus Master Plan*. The *Urban Forest Conservation Plan* was reviewed and approved by MDNR and meets current state and county requirements. The Forest Conservation Plan is currently being updated to cover projects included in the *2013 Campus Master Plan*.

No-mow areas filter and absorb stormwater runoff, provide wildlife habitat and decrease campus maintenance costs. They have become, and are becoming, naturalized forested areas as natural plant succession occurs and smaller trees and other understory materials grow up. Currently there are approximately 22 acres of ‘no-mow’ areas within the Campus. These areas represent about 12 percent of the 186 acres of open space within the Campus.

In addition to the dense forested area and no-mow areas described above, trees grow sporadically throughout the Campus. The NIH planted a majority of the existing campus trees. They include both exotic and native species. The trees that predate NIH-occupancy are primarily tulip poplars, very large oaks, and maples. These trees are scattered throughout the Campus. The vast majority of the largest trees are located away from developed areas in the perimeter buffer, particularly in the northern half of the Campus, or along the stream valleys. Champion trees are those that have the highest formulaic sum total of tree bole or trunk circumference in inches, height and crown or spread in feet (i.e., larger, older trees). The Campus contains five Montgomery County champion trees. The locations of the champion trees on the Campus are shown in Figure 3-22.

The NIH Grounds Maintenance and Landscaping Section (GMLS) carries out a continuing program for tree inspection and landscape maintenance. Examples of GMLS activities include installation of drip irrigation systems in selected shrub beds and pumping of groundwater that seeps into excavations of ongoing campus construction projects for use for grounds irrigation. GMLS also conducts an extensive annual campus-wide tree inventory to identify all trees with trunks with a diameter at breast height (DBH) of two inches or greater. The inventory process shows that the total number of trees on the Campus has increased each year since 2003 except in 2010, during which there was a net loss of 178 trees. Figure 3-22 shows the most recent Tree Inventory Map.

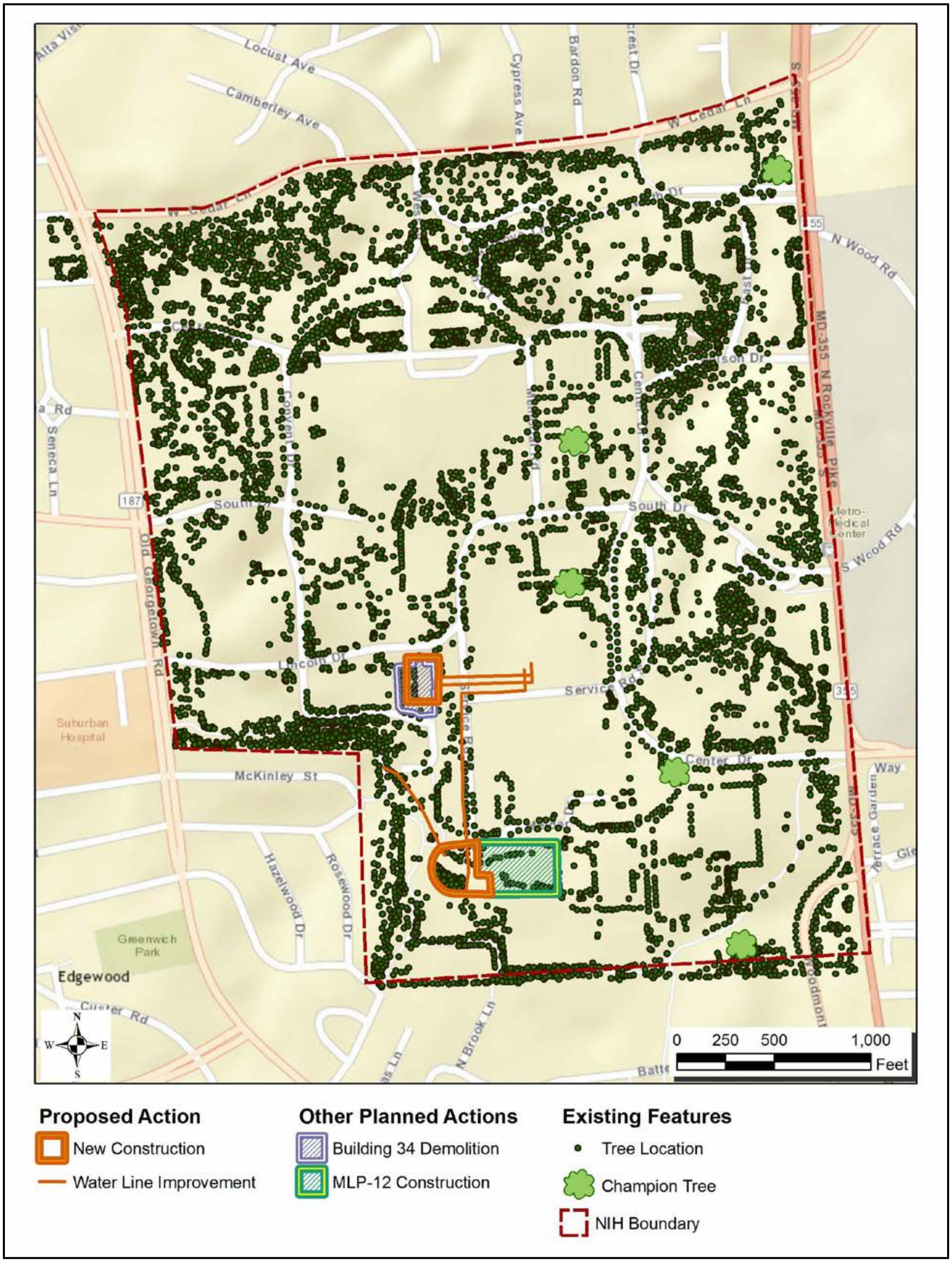


Figure 3-22. Inventory of Trees on the Campus with Champion Tree Locations

Sites of the Evaluated Alternatives

All proposed construction sites contain a mixture of impervious asphalt and vegetation, such as grass and trees. No champion trees are located in the vicinity of any sites of the evaluated alternatives.

Building 34 Site

Under the Proposed Action, the Thermal Energy Storage System would be located at the current site of Building 34, which is planned to be demolished as an effort separate from the actions analyzed in this EIS. As discussed in Section 1.2.2 (Demolition of Building 34 and 34A), the post-demolition state of the site is assumed to be the baseline for analysis in this EIS. It is undetermined whether the post-demolition state of the site would be reseeded with grass or left bare, however, this analysis makes the environmentally protective assumption that the site would be reseeded. The site currently contains approximately seven mature trees, including pin cherry, eastern white pine, willow oak, and common smoketree. Some of these trees help to screen the view of the Building 34 site. The site also contains approximately ten young trees including American hornbeam, Japanese black pine, and dogwood.

Under the Alternative Action, the proposed use of the site and existing conditions would be identical to the description above for the Proposed Action.

Parking Lot 41 Site

Under the Proposed Action, the Industrial Water Storage System would be located at the Parking Lot 41 site. This site currently consists of an impervious parking area and a grassy hillside, which is a designated no-mow area established with approximately nine mature trees, including sycamores, eastern red cedars, a pin oak, and a northern red oak. The site also contains approximately 149 young trees and seedlings.

Under the Alternative Action, the proposed use for the site differs as the NIH would construct the Potable Water Storage System instead of the Industrial Water Storage System. The existing conditions are identical to those discussed above for the Proposed Action.

Site Near the North Gate

Under the Proposed Action, the NIH would not construct any project elements at the site near North Gate.

Under the Alternative Action, the Booster Pump Station would be located at the north end of the Campus, near the North Gate. This site currently consists of a small impervious basketball court and pavement in a low area surrounded on three sides by landscaping vegetation and trees, including three mature black walnut trees, one mature sweet gum tree, one mature eastern hemlock tree, and two young eastern hemlock trees. This site is located in a designated no-mow area.

Sites for Other Supporting Infrastructure

Under the Proposed Action, the NIH would install supporting infrastructure (e.g., piping and electrical lines) in various locations throughout the Campus. Locations where the NIH would install some of this infrastructure are illustrated in Figure 2-2 and locations for other items are not yet identified. Some of the supporting utilities and infrastructure may be installed in currently vegetated areas, including no-mow areas; however, most would be installed under existing streets and sidewalks within the Campus. The 10-inch pipe that would supply water from the campus water infrastructure to the Industrial Water Storage System is one exception. The route for this pipe would be located along the Bethesda Trolley Trail. The current state of this route is vegetated, with grass, bushes, and several mature trees.

Under the Alternative Action, NIH would install supporting infrastructure in additional locations throughout the Campus. Locations where NIH would install some of this infrastructure are illustrated in Figure 2-5 and locations for other items are not yet identified. As with the Proposed Action, some of the supporting infrastructure would be installed under existing streets and sidewalks within the Campus. However, several pipelines would be installed along routes that are currently vegetated, such as the 16-inch pipe that would supply water from Old Georgetown Road to the Potable Water Storage System, the pipeline that would supply water from West Cedar Lane to the Booster Pump Station, and the pipeline that would connect existing water lines near Buildings 6A and 67. The routes for these pipelines would be partially or wholly within areas currently vegetated with grass, bushes, and mature trees. Some of these areas are designated no-mow areas.

3.9.2 *Wildlife*

Background

A diversity of wildlife species is necessary to maintain a functioning habitat or ecosystem. The species within a particular ecosystem may interact or compete with one another for food, shelter, and overall sustenance. Therefore, the loss of a particular species may negatively affect an ecosystem. The Endangered Species Act (ESA) was enacted in 1973 to protect species in danger of extinction. This act requires federal agencies to ensure that their actions will not jeopardize the continued existence of any threatened or endangered species or result in the destruction or adverse modification of the critical habitat associated with these species.

The Fish and Wildlife Conservation Act was enacted in 1980 to authorize financial and technical assistance to the States for the development, revision, and implementation of conservation plans and programs for nongame fish and wildlife. The 1998 amendment to the Fish and Wildlife Conservation Act mandated that the USFWS "identify species, subspecies, and populations of all migratory nongame birds that, without additional conservation actions, are likely to become candidates for listing under the ESA." In response to this mandate, USFWS published the 2008 *Birds of Conservation Concern* report, which includes listings of bird species of conservation concern throughout the Nation, including some that are not otherwise protected under the Migratory Bird Treaty Act of 1918 (USFWS, 2015).

Region

The Campus is located in Bethesda, Maryland, an urban setting of moderate to high intensity development with relatively little wildlife habitat value. Bethesda is located within the larger Potomac River Basin, however, most of which consists forested and agricultural land (Interstate Commission on the Potomac River Basin, 2014).

Campus

The Campus provides habitat for a variety of animal species. The Eastern gray squirrel and other rodents find ideal conditions among the many oak, walnut, and dogwood trees at the Campus, primarily in the buffer area. Avian species also have suitable habitat. A variety of transient and nesting birds are present on the Campus, including those common to a suburban environment in the mid-Atlantic area as well as migratory birds. The NIH has installed eighty-seven bird boxes around the Campus to encourage nesting. The above ground portion of the NIH Stream running through the Campus provides habitat for aquatic species and is used by birds and terrestrial species. In order to protect non-tidal warm water aquatic life, in-stream work on the Campus is prohibited from March 1 through June 15 (COMAR 26.08.02.11). Refer to Section 3.3.2 (Surface Waters) for additional information. The forested area designated as "Cedar Lane Woods", located in the northwest corner of the Campus, provides valuable wildlife habitat. This forested area, however, is not of sufficient size to support Forest Interior Dwelling Species, which are species whose life cycles require forest interior habitat (i.e., habitat that is more than 300 feet from the forest edge) (MDNR, 2014). Mowed and developed areas of the Campus provide little protective cover at ground level and no substantial natural food resources.

The Campus provides habitat for a growing population of approximately 30 to 40 white-tailed deer. Based on expert evaluation, the Campus has the ability to sustain a herd of only 26 deer. In order to effectively and humanely manage the deer population on the Campus, the NIH initiated a four-year program in December 2014 in which trained doctoral deer population control experts, in coordination with NIH veterinary staff, will spay adult female deer in accordance with all local, state, and federal requirements. Over the long term, this program is anticipated to reduce and protect the welfare of the deer population, meanwhile increasing employee safety (NIH, 2014d).

As part of the Master Plan EIS, the NIH consulted with MDNR, and at that time (2012) MDNR found there were no federal or state records for critical habitats or rare, threatened, or endangered species within the Campus (NIH, 2014).

As part of this EIS, the NIH has submitted recent requests to USFWS and MDNR to confirm there are still no federal or state records for critical habitats or rare, threatened, or endangered species within the Campus. The USFWS request was submitted via an online tool, which provides a preliminary response that indicated there are no records of rare, threatened, or endangered species.

The USFWS preliminary response did verify that migratory birds of conservation concern may be present at the Campus. Refer to Appendix C for copies of the correspondence with USFWS and MDNR, as well as the list of migratory bird species potentially present on the Campus.

Sites of the Evaluated Alternatives

Each of the sites of the evaluated alternatives contains some valuable vegetative habitat. Refer to Section 3.9.1 (Vegetation) for further discussion.

3.10 Topography, Geology and Soils

3.10.1 *Topography*

Background

Topography indicates the relative position and elevation of natural and man-made features within an area. Changes to the topography of an area can affect surface and subsurface water pathways and quantities, result in increased sedimentation, impact stormwater runoff, and ultimately affect water quality in nearby waterways and wetlands. Topography can also influence viewscape, landscape, noise trespass, and land use.

Region

The Campus is located on the eastern side of the Piedmont physiographic province, which extends from New York to Georgia and traverses a 30 to 45-mile wide swath through Maryland. The Piedmont physiographic province is generally characterized by rolling hills and low valleys with abundant streams, wetlands, and groundwater. The Piedmont lies between the Atlantic Coastal Plain and the Blue Ridge Province. The Atlantic Coastal Plain begins approximately five miles to the southeast of the Campus within Washington and the Blue Ridge Province begins at Catoctin Mountain about 30 miles to the northwest of the Campus.

Campus

The Campus is situated on the undulating topography of the uppermost stream valleys of two small independent tributaries of Rock Creek, which flow from the southwest to the northeast across the Campus. The highest elevation at the Campus is approximately 384 feet above the mean sea level and is located on the south side of South Drive on the ridgeline. The lowest elevation at the Campus is 232 feet above the mean sea level at the northeast corner of the property where a drainage culvert, located just south of Cedar Lane, crosses under MD Route 355. Topography of the Campus is illustrated in Figure 3-23. Slopes throughout the Campus are mostly 15 percent or less. Areas with steep slopes (i.e., those greater than 15 percent slope) are indicated in Figure 3-23. Percent slope throughout the Campus is indicated in Figure 3-24.

The majority of the Campus is divided into three watersheds that drain to North Branch, the NIH Stream, and Stoney Creek, respectively. These streams are tributaries of the Rock Creek watershed. As discussed in 3.3.2 (Surface Waters), a small portion of the Campus drains westerly towards Old Georgetown Road and the Cabin John Creek watershed.

Sites of the Evaluated Alternatives

Building 34 Site

Under the Proposed Action, the Thermal Energy Storage System would be located at the Building 34 site. The site is mostly level, which makes it conducive to future development. Due to the anticipated demolition of Building 34, the topography under the building site may be slightly lowered to allow for complete removal of the foundation.

Under the Alternative Action, the proposed use of the site and existing conditions would be identical to the description above for the Proposed Action.

Parking Lot 41 Site

Under the Proposed Action, the Industrial Water Storage System would be located to the south end of the Campus, near Parking Lot 41. This site is on a hillside that slopes downward to the northeast from approximately 340 feet to approximately 318 feet above the mean sea level with steeper slopes in the northeastern corner of the site.

As discussed in Section 1.2.1 (2013 Campus Master Plan and Parking Garage MLP-12), construction of MLP-12 is not evaluated in this EIS. Construction of MLP-12 may occur prior to, coincident with, or following the construction that would occur if NIH implements the Proposed or Alternative Action. Construction of MLP-12 would impact topography directly adjacent to the Parking Lot 41 site, as it would result in excavation of the existing hillside which would be stabilized through terraced retaining walls.

Under the Alternative Action, the proposed use for the site differs as the NIH would construct the Potable Water Storage System instead of the Industrial Water Storage System. The existing conditions are identical to those discussed above for the Proposed Action.

Site Near the North Gate

Under the Proposed Action, the NIH would not construct any project elements at the site near North Gate.

Under the Alternative Action, the Booster Pump Station and a backflow preventer would be located at the north end of the Campus, near the North Gate. The site for the Booster Pump Station is nestled in a U-shaped hillside that slopes downward to the northeast from approximately 311 feet to approximately 302 feet above mean sea level.

Sites of Other Supporting Infrastructure

Under the Proposed Action, supporting infrastructure (e.g., piping and electrical lines) would be installed in various locations throughout the Campus. The majority of the buried utilities would be located under existing streets or sidewalks at various elevations around the Campus. These sites, including the route along the Bethesda Trolley Trail, are generally well developed and level or moderately sloped.

Under the Alternative Action, supporting utilities would be installed in additional locations throughout Campus. As with the Proposed Action, much of this infrastructure would be installed in areas that are well developed and level or moderately sloped. One exception is the new water line that would connect existing water lines near Building 6A to existing water lines near Building 67. This site consists of steeply sloped rolling terrain.

Several sites are being considered for backflow preventer buildings that would be constructed under the Alternative Action. The potential site for the backflow preventer building near North Gate (Figure 2-6) slopes upward to the north from approximately 298 feet to approximately 302 feet above mean sea level. The potential sites for the other two backflow preventer buildings (Figure 2-8 and Figure 2-9) are level or mildly graded areas.

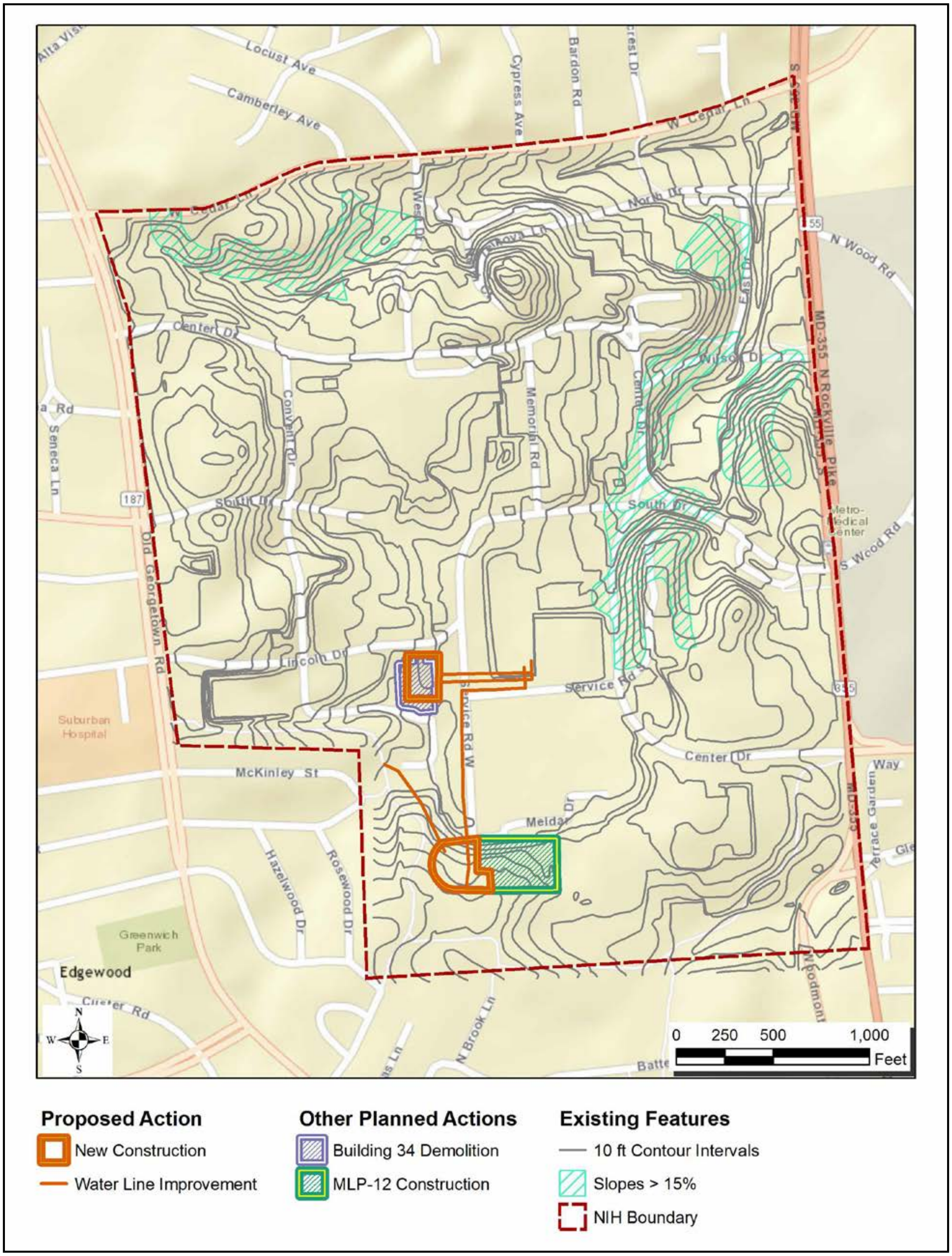


Figure 3-23. Campus Topography

3.10.2 *Geology and Soils*

Background

The geology of an area encompasses characteristic rocks, sediments, and land features and the forces affecting them. Geologic features provide the parent material for overlying soils through weathering and supplying of minerals and nutrients.

Soils are important because of the significant functions they perform, including the following:

- Sustaining biological activity, diversity, and productivity;
- Regulating and partitioning water and solute flow (e.g., sediment);
- Filtering, buffering, degrading, immobilizing, and detoxifying organic and inorganic materials;
- Storing and cycling nutrients and other elements; and
- Supporting socioeconomic structures (e.g., agriculture).

The physical characteristics of soils can affect the suitability of the site for development and dictate the types of precautionary measures that should be implemented to minimize impacts to human health and the environment during earth disturbance. Various physical characteristics of soils make specific soil types more susceptible to high water erosion rates, wind-throw hazards, and emissions of particulate matter and therefore require the establishment of mitigation and precautionary measures. Alterations to the physical makeup of an area can lead to soil contamination and soil erosion. MDE approval of stormwater and SEC plans, which address stormwater runoff and prevention of sediment transport during construction and demolition activities, is required for all project elements with a LOD greater than or equal to 5,000 SF and greater than or equal to 100 cubic yards (CY). The Maryland Stormwater Act of 2007 requires the design and review of SEC and stormwater management plans to be integrated. Additional information regarding the Maryland Stormwater Act of 2007 and stormwater management plans is provided in Section 3.4 (Stormwater Management).

Radon is a naturally occurring radioactive and carcinogenic gas, which comes from the breakdown of uranium in rock, soil, and water. Actual concentrations of radon can be determined only through on-site testing in the structure(s). After development of a new structure, renovation of existing structures, or ventilation system changes or upgrades, radon testing should be performed for new structures and reevaluated for existing structures as pressures within the buildings may have altered due to adjustments or renovations to the foundations or air handling systems.

Campus

Bedrock under the Campus is composed of the Lower Pelitic Schist of the Sykesville Formation, a member of the Glenarm Series of formations. It is composed of interwoven beds of medium to coarse-grained pelitic (originally depositional mud) schist and fine to medium-grained psammatic (originally sand) beds with the latter more predominant near the top of formation. The Lower Pelitic Schist of the Sykesville Formation is estimated to be late Precambrian. It has been intensely folded, dislocated, and metamorphosed. The formation is approximately 5,500 feet thick. Bedrock at the Campus is generally 55 to 65 feet below the surface, but may be only half this depth in the northeast portion of the Campus where the NIH Stream has eroded the surface soils.

The bedrock is overlain by about 15 to 40 feet of weathered residual crystalline rock material (saprolite) from the base formation (refer to Figure 3-7 in Section 3.3.1, Groundwater). Three distinct saprolites are found under the Campus: Saprolite 5B, a predominantly well-drained micaceous schist; Saprolite 5D, a predominantly well drained, silty, bouldery gneiss; and Saprolite 5F, a predominantly poorly drained mafic rock with intermixed clays.

The saprolite at the Campus is overlain by surface soil, the most predominant of which is the "Glenelg" series, which is formed in-situ. Based on the National Cooperative Soil Survey for Montgomery County, Maryland, seven native surface soil series have been identified for the Campus. The native campus soils and percent slopes are indicated in Figure 3-24. The soils are primarily classified as silt loams and urban land with slopes ranging from 0 to 15 percent. The majority of the soils found at the Campus are well-drained upland soils. Because of the relatively good fertility, gently sloping nature, and deep character of these soils, they are well suited to suburban development. The central portion of the Campus has been disturbed by construction of facilities and therefore, surface soils can be a mixture of native, borrow, and fill materials. Due to the development of the Campus, the depth of soils has been altered and information regarding fill materials is not available.

Though campus soil types are classified as exhibiting comparatively low erodability, erosion control measures are necessary when slopes exceed about five percent, and exposure during construction should be minimized. Cut slopes tend to be stable, and steep slopes can be maintained. Surface and subsurface soils within the Campus are reported to have bearing strengths ranging from 4,000 to 8,000 lbs/SF near the surface to 9,000 lbs/SF at greater depths (NIH, 2013).

The Campus is located within an area defined by USEPA as Zone 1 for radon. Zone 1 indicates areas with the highest potential for indoor radon and are predicted to have an average indoor radon screening level greater than 4 pCi/L. In these regions, radon gas tends to accumulate in below grade areas of building where the air circulation is restricted. Radon also dissolves readily in groundwater; therefore, wells have the potential to release radon gas.

Sites of the Evaluated Alternatives

The NIH is in the process of performing geotechnical surveys at the sites of the evaluated alternatives to assess soil characteristics and bearing strengths. Surface soil series at each site are illustrated in Figure 3-24.

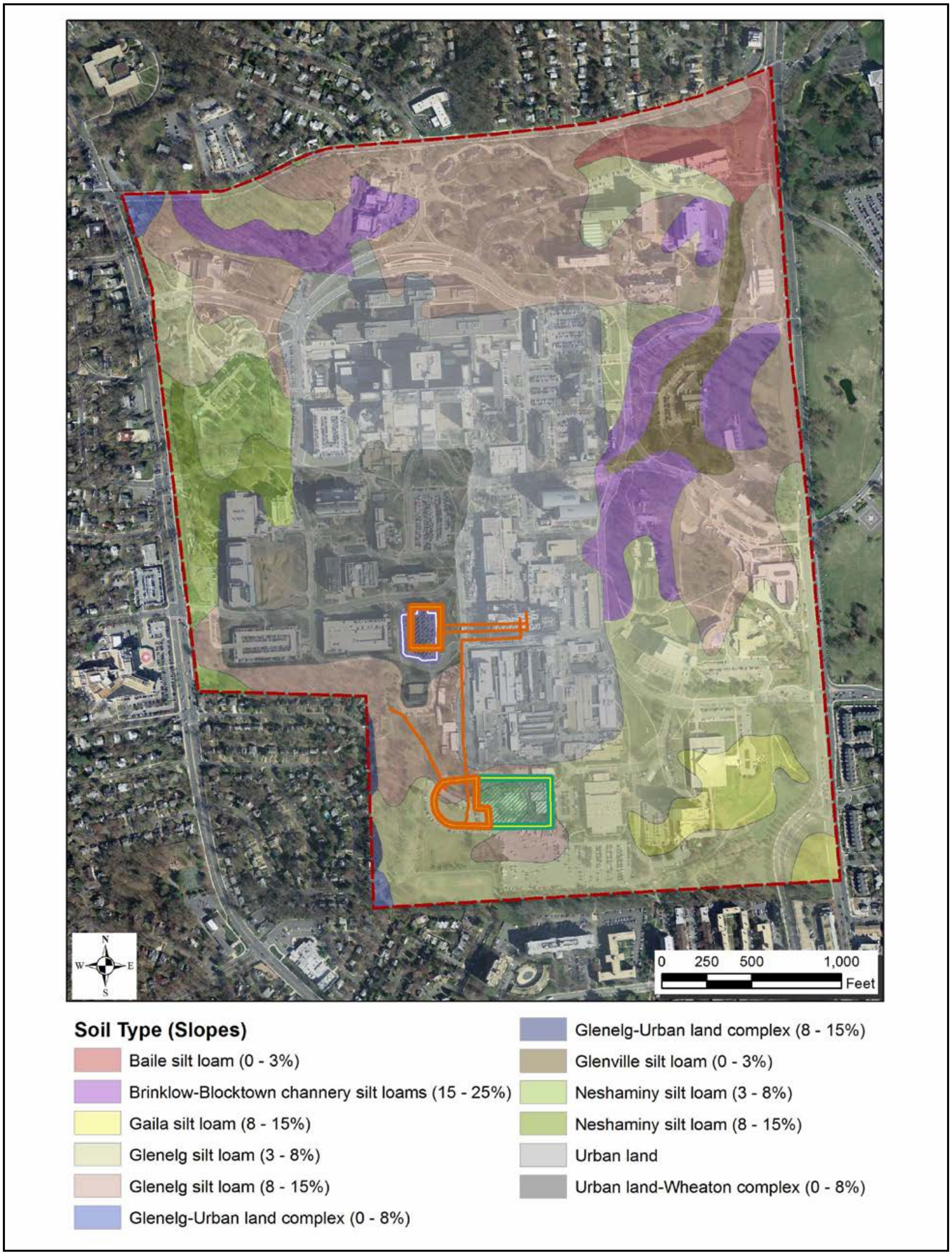


Figure 3-24. Soil Types and Slopes Across Campus

3.11 Wastes

3.11.1 *Non-Hazardous Solid Wastes*

Background

Municipal solid waste (MSW) is any garbage, refuse, sludge, or other discarded material including solid, liquid, semisolid, or contained gaseous material resulting from industrial, commercial, agricultural, or community activities.

Federal agencies are required to manage their facilities in accordance with various federal and state regulations governing MSW disposal. Subtitle D of the Resource Conservation and Recovery Act (RCRA) encourages states to initiate and oversee the implementation of solid waste management plans in order to promote recycling practices. Maryland requires that each county adopt a ten-year solid waste management plan and that MDE review this plan. *The Montgomery County Comprehensive Solid Waste Management Plan for the Years 2009 through 2019*, developed in response to this requirement, lays out the guidelines for the management of solid waste disposal systems, solid waste acceptance facilities, and the collection and disposal of solid waste. Several EOs set goals for the federal government to conduct operations in a manner that is sound in terms of energy efficiency, toxic chemical reduction, recycling, sustainability, and water conservation (e.g., EO 13423, *Strengthening Federal Environmental, Energy, and Transportation Management*; EO 13514, *Federal Leadership in Environmental, Energy, and Economic Performance*; and EO 12873, *Federal Acquisition, Recycling, and Waste Prevention*). In addition, the USEPA's *Guidelines for the Thermal Processing of Solid Wastes* (40 CFR 240) and *Guidelines for the Storage and Collection of Residential, Commercial, and Institutional Solid Waste* (40 CFR 243) provide specifications for the treatment and disposal of MSW.

The Maryland Recycling Act (MRA) requires that all counties recycle 15 to 20 percent of the MSW generated, depending on the population. Maryland County Code provides regulations pertaining to residential and commercial recycling (COMCOR 48.00.03, *Solid Waste and Recycling*). In 2012, Montgomery County announced a new goal of reaching an MSW recycling level of 70 percent by 2020 (Montgomery County, 2012).

In 2012, Americans generated about 251 million tons of trash and recycled or composted almost 87 million tons of this material, equivalent to a 34.5 percent recycling rate. On average, Americans recycled or composted 1.51 pounds out of our individual waste generation rate of 4.38 pounds per person per day. Over the last few decades, the generation, recycling, composting, and disposal of MSW have changed substantially. Solid waste generation per person per day peaked in 2000 while the rate of 4.38 pounds per person per day is the lowest since the 1980's. The recycling rate has increased from less than 10 percent of MSW generated in 1980 to over 34 percent in 2012. Disposal of waste to a landfill has decreased from 89 percent of the amount generated in 1980 to under 54 percent of MSW in 2012 (USEPA, 2014e).

Campus

Solid waste at the Campus includes office waste, disposable paper products, plastics, glass, wood, animal bedding which is not contaminated, cafeteria waste, and a small amount of residential trash. It also includes yard waste and waste from Campus maintenance and construction.

Local, state, and federal regulations and the *NIH Waste Disposal Guide* dictate the handling, storage, and disposal of waste at the Campus. General waste is collected by custodial staff and placed in about 60 dumpsters located throughout the Campus. Yard and construction waste are handled separately by ground maintenance. A private contractor collects the waste and disposes of it at the Montgomery County Transfer Station where fees are paid to the County on a pass-through basis. Approximately 8 to 12 truckloads per weekday are hauled to the transfer station.

The NIH has a proactive recycling program. Items recycled include mixed paper, aluminum, glass, tin, plastic, corrugated cardboard, electronics, Tyvek suits, toner cartridges, fluorescent lamps, batteries, scrap metal, wooden pallets, x-ray films, and yard waste.

3.11.2 *Hazardous Wastes*

Background

A hazardous waste is defined by USEPA as a solid waste that exhibits a characteristic of ignitability, corrosivity, reactivity, or toxicity, or is specifically listed as a hazardous waste. Federal, state, and county laws regulate hazardous wastes. Chemical waste includes discarded non-radioactive chemicals, including hazardous and nonhazardous chemicals. Chemical waste includes items defined as Hazardous Wastes (40 CFR 261), Hazardous Substances (40 CFR 302.4), Hazardous Materials (40 CFR 171.8), and Controlled Hazardous Substances (26 COMAR 13.02.06).

RCRA authorizes USEPA to control hazardous waste from "cradle to grave." This lifecycle includes the generation, transportation, treatment, storage, and disposal of waste. USEPA has delegated the enforcement of RCRA in Maryland to MDE. USEPA also controls toxic chemicals through the Toxic Substances Control Act (TSCA), which addresses chemical substances and mixtures whose manufacture, processing, distribution in commerce, use, or disposal may present an unreasonable risk of injury to health or the environment.

Campus

The NIH handles chemical waste with toxic or hazardous characteristics in accordance with hazardous waste requirements even if the waste does not meet the regulatory definition of hazardous waste. Examples of this type of waste frequently encountered at the Campus include salts, sugars, agar, enzymes, nutrients, saline solutions, and silica. Most of the chemical waste at the Campus consists of used, spent, or surplus chemicals. NIH's generation of chemical waste at the Campus follows no particular pattern. The amount generated can range from 143 to 318 tons per year depending on individual and collective research programs that are underway at any given time.

Multi-hazard waste is an NIH term for a waste that meets the definition and properties of more than one of the restricted wastes (medical-pathological waste, radioactive waste, and chemical waste). Examples of multi-hazard wastes are aqueous radioactive waste with trace levels of chloroform or heavy metals, radioactive methanol/acetic acid solutions from protein precipitations, phenol/chloroform mixtures used to extract DNA from radioactively labeled cells, and chemical or radioactive waste containing blood.

Prior to 1987, the NIH conducted its hazardous waste activities at the Campus under an "interim status" hazardous waste facility authorization from the USEPA. Since that year, the NIH has managed hazardous waste under the terms and conditions established by an agreement with MDE. The NIH has a RCRA hazardous waste management facility operating permit for the Campus. The permit allows the NIH to continue to conduct the following hazardous waste management activities: provide short-term storage of hazardous waste in approved containment until disposal or treatment can be arranged; chemically and physically treat hazardous waste to render it non-hazardous, reduce hazard, or reduce volume; provide longer-term storage of hazardous waste (mixed waste) for which offsite disposal or treatment is currently unavailable; and receive hazardous waste from off-campus NIH facilities for treatment and storage along with campus-generated waste.

Treatment methods used by the NIH include bulking, blending, neutralization, and detoxification using carbon adsorption and ultraviolet peroxidation to reduce the amounts of hazardous waste or make the substances less hazardous. The RCRA permit allows the NIH the capacity to store up to 26,360 gallons of liquid hazardous waste at the Campus for subsequent treatment, transport, and disposal.

Sites of the Evaluated Alternatives

No known hazardous wastes or contamination with hazardous materials are known to be present at the proposed sites.

As discussed in Section 1.2.2 (Demolition of Building 34 and 34A), the Building 34 site is currently occupied by vacant Buildings 34 and 34A. These buildings are contaminated with hazardous materials, including lead, asbestos, PCBs, and mercury. However, NIH will follow federal, state, and local waste management and disposal procedures to ensure that the project site does not become contaminated as a result of demolition activities. Therefore, this EIS assumes that all hazardous materials will have been properly removed from the site prior to the actions analyzed in this EIS.

Waste generation or storage is not currently occurring at any of the sites of the evaluated alternatives.

3.12 Cultural and Historic Resources

Historic properties include prehistoric or historic districts, sites, buildings, structures, or objects that are significant in American history, architecture, archeology, engineering, and culture. Historic properties serve as resources, as they provide valuable information about the history of human life and cultures.

To ensure the protection of historic resources, the United States Congress passed the National Historic Preservation Act (NHPA) in 1966 and subsequently amended the NHPA several times, most recently in 2006. The NHPA established the Advisory Council on Historic Preservation (ACHP) and authorized the creation and maintenance of the National Register of Historic Places ("the National Register"). The National Register is composed of districts, sites, buildings, structures, and objects that are significant in American history, architecture, archeology, engineering, and culture.

Typically, properties considered eligible for inclusion in the National Register are at least 50 years old. A property is eligible for inclusion in the National Register if it: 1) possesses the integrity of location, design, setting, materials, workmanship, feeling, and association, and 2) meets at least one of the following National Register Criteria for Evaluation (USDOI, 2015):

1. It is associated with events that have made a significant contribution to the broad pattern of U.S. history (Criterion A);

2. It is associated with the lives of persons significant in our past (Criterion B);

3. It embodies the distinctive characteristics of a type, period, or method of construction; it represents the work of a master; it possesses high artistic values; or it represents a

significant and distinguishable entity whose components may lack individual distinction (Criterion C); and/or

4. It has yielded or may be likely to yield important information in prehistory or history (Criterion D).

Section 106 of the NHPA, which is implemented under 36 CFR 800, requires federal agencies to consider the effects of undertakings (i.e., actions) on any historic property, and to afford the ACHP a reasonable opportunity to comment on such undertakings. An adverse effect is anything that could alter the historic fabric (i.e., characteristics) that makes the property eligible. Examples of adverse effects may include changes to the property or alterations to landscape, noise levels, visual characteristics, traffic patterns, or land use near the property, depending on how these changes specifically impact the property.

The NHPA also authorized the creation of a State Historic Preservation Officer (SHPO) for each state. The SHPO participates in statewide historic preservation planning and surveying activities; nominates properties for the National Register; provides advice, assistance, training, and public outreach; and participates in Section 106 undertaking reviews. In Maryland, the Maryland Historical Trust (a division of the Maryland Department of Planning) serves as the MD SHPO.

Additionally, the MD SHPO administers its own program for properties that are of significance to American history and culture. The Maryland Inventory of Historic Properties (MIHP) includes all properties from the National Register that are located in Maryland, plus additional properties that are considered significant in Maryland history and culture. Properties listed in the MIHP are protected under the Historic Preservation Ordinance (Chapter 24A of the Montgomery County Code), which provides certain controls regarding alteration, demolition, and maintenance of the property.

Historic properties can be broadly classified into architectural and archeological resources, which are discussed below.

3.12.1 *Architectural Resources*

Background

Pursuant to 36 CFR 800.4, the NIH must determine and document the area of potential effects (APE) for its planned actions and must take the steps necessary to identify historic resources within this area. Historic resources include any district, site, building, structure, or object listed in or eligible for listing in the National Register. This review also considered properties listed in the MIHP.

The APE is defined in 36 CFR 800.16 as "the geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties." The Proposed Action APE was developed to encompass any line-of-sight views of structures that would be constructed if the Proposed Action is implemented. Both ground-level and above-ground (i.e., from upper stories of buildings) views were considered. Where no line-of-sight is present due to topography or intervening structures or vegetation, NIH generally applied a minimum 500-foot buffer.

The Alternative Action APE was developed utilizing an identical approach and, due to differences in proposed structures, differs from the Proposed Action APE in the following ways:

- The Alternative Action APE includes 500-ft buffers around the planned locations for backflow preventer buildings; and

- The Alternative Action APE includes a buffer around the Booster Pump Station. This buffer is less than 500 feet to the southwest, south, and southeast as steep topography would screen views of the Booster Pump Station from those directions.

The NIH did not include proposed utility lines (e.g., buried pipelines, buried electrical lines) in these APEs as the utilities are predominantly buried and the paving or vegetation above will generally be restored to conditions similar to pre-construction condition. Therefore the utility lines would have little potential to permanently alter the character or use of historic properties.

The APEs for the Proposed and Alternative Actions are depicted in Figure 3-25 and Figure 3-26. This section discusses the presence of historic resources within the APE.

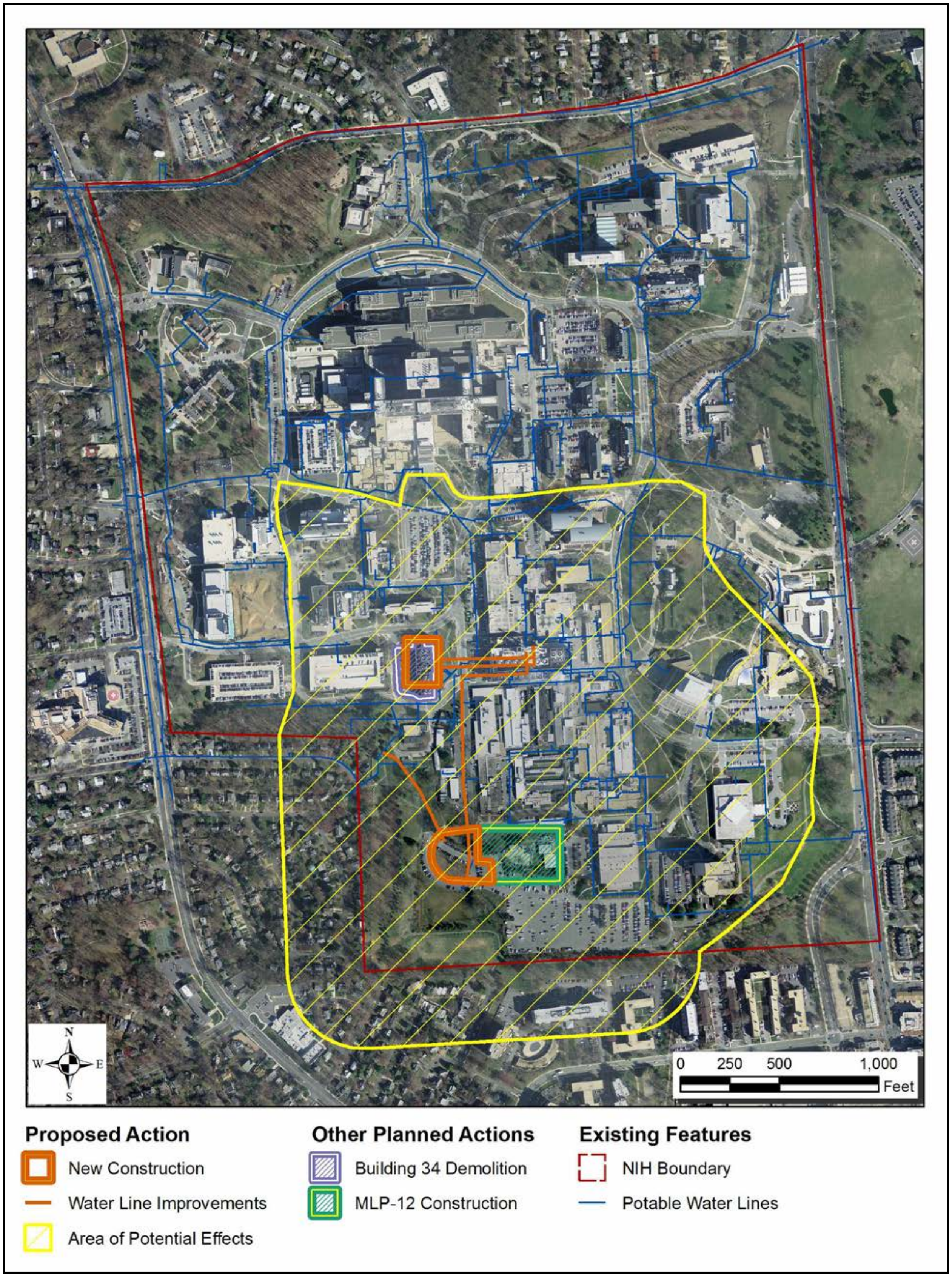


Figure 3-25. Area of Potential Effects for the Proposed Action

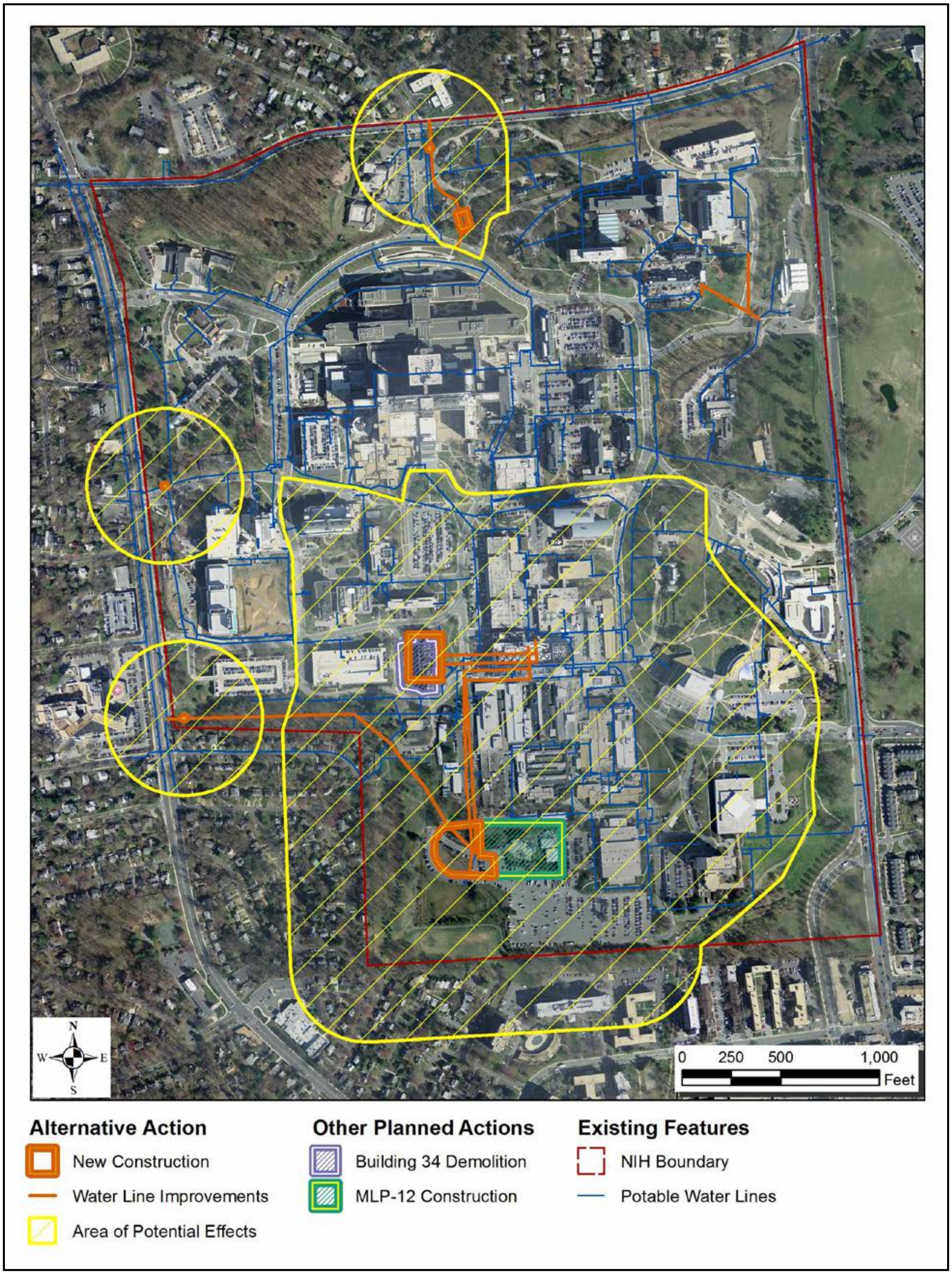


Figure 3-26. Area of Potential Effects for the Alternative Action

Resources outside the Campus

The APE for the Proposed Action does not include any properties outside the Campus that are listed or eligible for listing in the National Register. The APE also does not include any MIHP-listed properties.

The APE for the Alternative Action does not include any properties outside the Campus that are listed or eligible for listing in the National Register. The APE for the Alternative Action does include one MIHP-listed property: the Bethesda Community Store (MIHP Site Number M: 35-43), located at 8804 Old Georgetown Road, is located within viewing distance of the backflow preventer enclosure to be constructed near the South Drive Entrance (West). Built in 1924, this small general store exemplifies the simple, early economic heritage of the community and is very characteristic of the once commonly found commercial architecture of this period. The store itself, the parking area, service delivery area, storage shed, and picnic and lawn areas to the rear of the parcel are protected from alteration under the Montgomery County Historic Preservation Ordinance.

Resources within the Campus

Pursuant to Section 110 of the NHPA, the NIH is responsible for the identification, evaluation, and nomination to the National Register properties under its control or jurisdiction. In fulfillment of this requirement, the NIH sponsored a cultural resources study in 1997 of all buildings located at the Campus over 50 years of age and all buildings that exhibited the likelihood of possessing exceptional significance regardless of age. In this effort, the NIH worked with the MD SHPO to determine which resources at the Campus were eligible for listing in the National Register as individual resources or as contributing resources to a historic district. Since then, the NIH has carried out periodic additional review of their resources to determine their potential eligibility for the National Register.

To date, the following three historic districts (and associated contributing buildings) have been determined eligible for listing in the National Register:

- <u>NIH Historic Core Historic District (M: 35-9-2)</u>: This district forms the foundation of the Campus. It includes six contributing resources (Buildings 1, 2, 3, 4, 5, and 6) and one noncontributing resource (Building 8). Buildings 1-6 are Georgian Revival brick buildings dating from 1936-41, the earliest period of construction of the Campus. These buildings housed the first administration and medical research offices of the Campus and today form the symbolic and visual core of the expanded Campus. Building 1 within the Historic Core has served as the primary administrative facility for the NIH for decades. The historic district is significant for its association with the early functions of the institution and for its design.

- <u>Officer's Quarters Historic District (M: 35-9-7)</u>: This district includes eight brick duplex and detached housing units featuring elements of the Georgian Revival style. Constructed in 1940, the houses (duplex units Buildings 15B1-B2, 15C1-C2, 15 D1-D2, 15E1-E2, 15F1-F2, and 15G1-G2, and detached units Buildings 15H and 15I) represent the only small-scale housing constructed by the NIH. The residential complex exemplifies the Radburn principle, a precursor to modern-day suburban design employed throughout the country in the 1930s and 1940s, with the houses fronting onto a common green, linked by paths and surrounded by an access road. The historic district is significant in the areas of significance of architecture, community planning, politics and government.

- George Freeland Peter Estate Historic District (M: 35-9-1): This district includes two contributing resources – a large stone Colonial Revival house (Building 16), also known as the Stone House, and a small frame caretaker's cottage (Building 16A). George Freeland Peter, a prominent Episcopal clergyman, built the house on a hill overlooking Rockville Pike in 1931. Walter G. Peter, George Peter's brother and a noted Washington architect, designed the estate. The Federal Government purchased the estate in 1949 for the expansion of the Campus. The George Freeland Peter Estate Historic District is significant for its architectural style and for its association with the early twentieth-century development of Rockville Pike.

In addition, the following buildings have been determined individually eligible for listing in the National Register: Memorial Laboratory (Building 7), Tree Tops (Building 15K), the Biologics Standards Laboratory and Annex (Buildings 29 and 29A), the Dental Research Building (Building 30), the National Library of Medicine complex (Buildings 38 and 38A and associated features), and the Convent of the Visitation of Washington (Building 60). Some of these buildings are described in more detail in the following subsection.

Figure 3-27 depicts the historic buildings and districts within the Campus that are eligible for listing in the National Register.

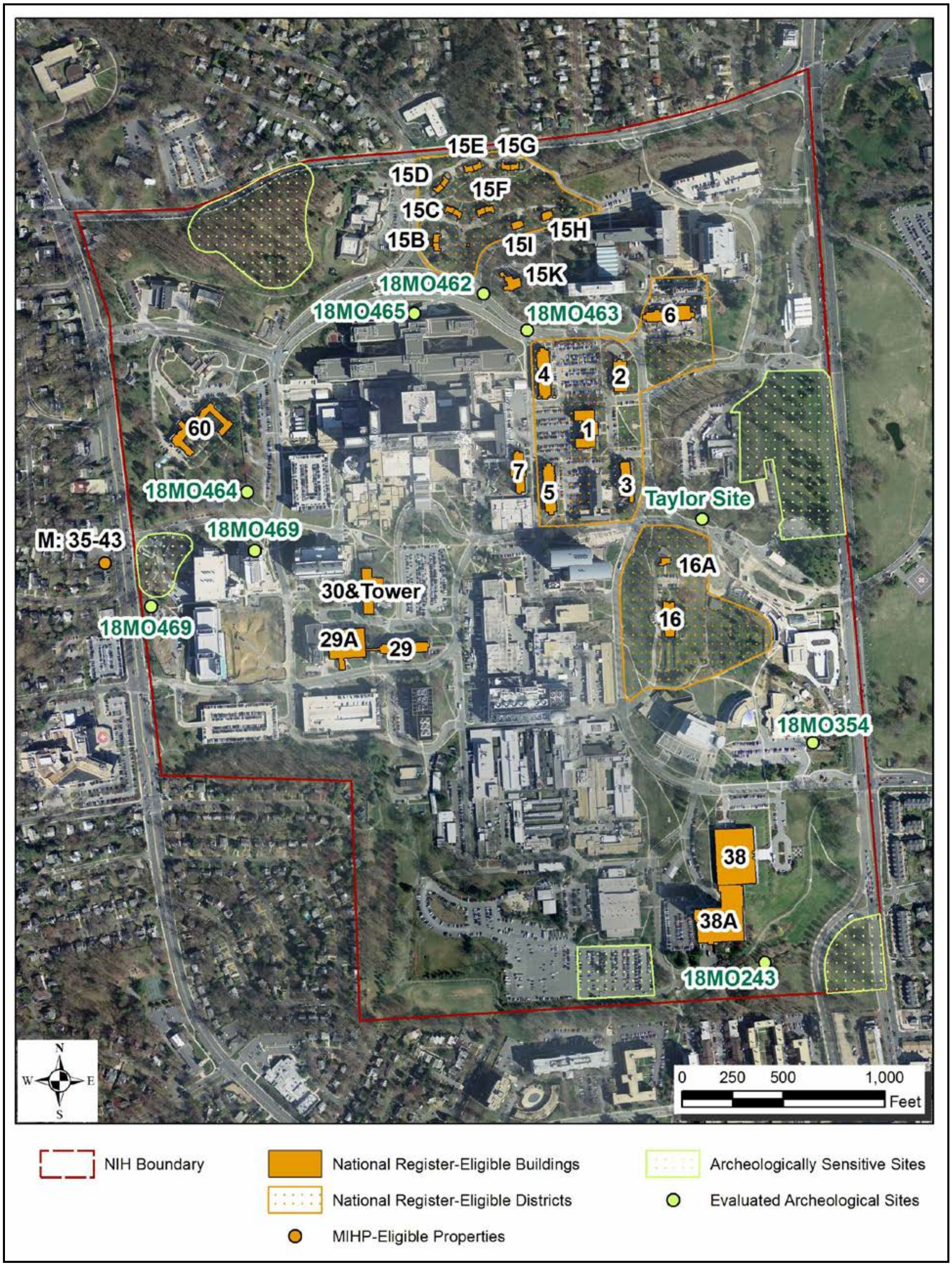


Figure 3-27. Historic Properties and Archeologically Sensitive Areas within the Campus

Sites of the Evaluated Alternatives

Building 34 Site

Under the Proposed Action, the Thermal Energy Storage system would be located at the Building 34 site. The site is located across Lincoln Drive from the historic Biologics Standards Laboratory and Annex (Buildings 29 and 29A). These buildings are significant for their association with the activities and individuals that have made significant and influential scientific contributions to medicine and public health, specifically in the field of biologics regulation.

The Building 34 site is partially visible from the NLM (Building 38) and is fully visible from the upper levels of the Lister Hill National Center for Biomedical Communications (Building 38A) (see Figure 3-28). Building 38, which houses the largest health-science library in the world, displays several areas of exceptional architectural significance including design features thought to protect the building from an atomic bomb blast as well as many progressive features of library design. Building 38A, constructed in 1981 for the purpose of facilitating the international dissemination of biomedical information and imagery, was planned by the same architects as the adjoining NLM and executed in similar materials as a distinctly complementary composition. The MD SHPO determined the National Library of Medicine (Building 38) eligible for the National Register and eligible as a National Historic Landmark in 2000. The MD SHPO expanded this designation in 2014 to cover the entire National Library of Medicine complex, which includes Buildings 38 and 38A, the garage (MLP-7), the courtyard, and associated landscape features.

Under the Alternative Action, the proposed use of the site and existing conditions would be identical to the description above for the Proposed Action.

Figure 3-28. View of the Campus from Building 38A (Looking Northwest)

Parking Lot 41 Site

Under the Proposed Action, the Industrial Water Storage System would be located to the south end of the Campus, near Parking Lot 41. This site is not located within the immediate vicinity of any historic buildings or districts, and is only partially visible from the upper levels of Building 38A within the historic NLM complex (as there are no windows on the west side of Building 38A).

Under the Alternative Action, the proposed use for the site differs as the NIH would construct the Potable Water Storage System instead of the Industrial Water Storage System. The existing conditions are identical to those discussed above for the Proposed Action.

Site Near the North Gate

Under the Proposed Action, the NIH would not construct any project elements at the site near North Gate.

Under the Alternative Action, the Booster Pump Station would be located at the north end of the Campus, near the North Gate. The site is located in the southwest corner of the Officer's Quarters Historic District, approximately 80 feet southeast of Building 15B (a contributing property to the district) at the current site of a basketball court. As depicted in Figure 3-29, the site occupies a low-lying area surrounded on three sides by trees and landscaping vegetation. The new backflow preventer enclosure and underground electrical and water lines associated with the Booster Pump Station would also be located within the western portion of the district. The water line would run north-to-south underneath a portion of the access road that encircles the core of the historic district.

Figure 3-29. Site Near the North Gate (View from North)

Sites for Other Supporting Infrastructure

Under the Proposed Action, the NIH would install supporting infrastructure (e.g., piping and electrical lines) in various locations throughout the Campus. Locations where the NIH would install some of this infrastructure are illustrated in Figure 2-2 and locations for other items are not yet identified. None of the currently identified supporting infrastructure would be located within, or visible from, any properties listed or eligible for listing in the National Register or MIHP.

Under the Alternative Action, a short segment (approximately 50 linear feet) of the new 12" water line near Wilson Drive would pass through a grassy area in the NIH Historic Core Historic District south of historic Building 6. While this location is visible from Building 6, a stand of deciduous and evergreen trees blocks visibility of the site from elsewhere within the district.

As previously discussed, the site of the backflow preventer enclosure to be constructed under the Alternative Action near the South Drive Entrance (West) is located within viewing distance of the MIHP-listed Bethesda Community Store (M: 35-43). The store is across Old Georgetown Road approximately 200 feet southwest of the proposed site for the backflow preventer enclosure.

3.12.2 *Archeological Resources*

Campus

In accordance with the requirements of Section 110 of the NHPA, the NIH has conducted several Phase I and II archeological investigations to evaluate the presence of potentially significant archeological resources within the Campus. These surveys have identified a total of eight archeological sites within the Campus, none of which retain the significance necessary for listing in the National Register. Refer to the *Campus Master Plan EIS* for additional background regarding the historic context and previous archeological investigations within the Campus (NIH, 2014a).

Extensive development and fill throughout the central core of the Campus have extensively altered the ground surface and significantly reduced the potential for encountering archeological resources during earthwork. Figure 3-27 shows the few remaining campus areas that have not been investigated previously and remain relatively undisturbed by modern construction. While these are identified as archeologically sensitive areas based on their potential, this does not imply that they contain cultural materials or soil context. Sites in proximity to where historic structures were located may also hold potential. Prior to conducting earth disturbance within these archeologically sensitive areas, the NIH would perform a Phase I survey of the site to assess the archeological significance and potential eligibility for the National Register. If Phase I surveys indicate that the areas contain materials of potential significance, the NIH would either avoid disturbance within the site or complete an intensive Phase II survey of the site to determine its significance.

Sites of the Evaluated Alternatives

None of the sites to be developed under the Proposed Action are located within the archeologically sensitive areas depicted in Figure 3-27.

As with the Proposed Action, none of the sites to be developed under the Alternative Action are located within the archeologically sensitive areas depicted in Figure 3-27. Under the Alternative Action, the proposed site of the backflow preventer enclosure near the South Drive Entrance (West) is located across South Drive from an identified archeologically sensitive area that is bounded by Old Georgetown Road, South Drive, and Building 37.

3.13 Land Use and Zoning

Background

Land use planning helps determine the best use for each parcel of land in an area. Zoning regulations or other means can then be used to control how the land is used. Zoning designates various parcels of land for certain uses. Land use planning may take into account geological, ecological, economic, health, and sociological factors. Proper land use planning can favorably impact development and sustainment costs, traffic congestion and commute times, air pollution, energy consumption, preservation of open space and habitat, equitable distribution of economic resources, and the sense of community. Community sustainability requires proper land use planning to create and maintain livable environments.

A number of local government entities operate in the region providing planning and development guidance, promoting economic development, administering transportation and infrastructure development, and facilitating intergovernmental cooperation. These include the following:

- The Metropolitan Washington Council of Governments (MWCOG) is an independent, nonprofit association that helps address and solve regional issues, such as those pertaining to the environment, affordable housing, and transportation, through the development of policy and programs. MWCOG comprises 22 units of local government (including Montgomery County), members of the Maryland and Virginia legislatures, and members of the U.S. Congress.

- The NCPC serves as the central planning agency for the federal government in the NCR, which includes Washington and parts of Maryland, Virginia, and West Virginia. NCPC focuses on preserving the region's natural and historic features by developing and updating the *Comprehensive Plan for the National Capital Region* and creating, reviewing, and providing advice on long-range plans, planning policies, and projects that impact the Capital and surrounding areas. NCPC also coordinates the planning efforts of federal agencies within the NCR and provides recommendations for federal public works through the Federal Capital Improvements Program.

- M-NCPPC acquires, develops, maintains, and administers a regional system of parks within Montgomery and Prince George's Counties and provides land use planning for the physical development of the two counties. Within the M-NCPPC, there is a five-member Montgomery County Planning Board, which is responsible for setting land use and protecting parkland resources throughout the county.

Montgomery County is divided into 37 Community-Based Planning Areas. Each planning area has developed a master plan that sets forth guidelines for development and growth in ways that protect existing features, including existing land uses, community facilities, the transportation network, and environmental and historic resources (NIH, 2014a). The Campus is located within Montgomery Planning Area 35, Bethesda-Chevy Chase. The *Bethesda-Chevy Chase Master Plan* was adopted in April 1990 (M-NCPPC, 2014a).

A key goal of the *Bethesda-Chevy Chase Master Plan* is to "…perpetuate and enhance the high quality of life to which the citizens of Bethesda-Chevy Chase are accustomed." It addresses the interrelated issues associated with the various elements affecting the communities: natural resources and environmental values, demographic changes, community needs, employment and housing development policies, public facility needs, transportation, and land use (M-NCPPC, 2014b).

The *Campus Master Plan* was designed to function as a framework for the strategic development of the Campus while retaining and building on the value of existing resources. The purpose of the *Campus Master Plan* is to define the long-term development goals of the Campus, in support of the NIH mission – *Science in pursuit of knowledge to improve human health*. The *Campus Master Plan* prioritizes planned construction or renovation of obsolete facilities to address existing shortcomings and the changing needs of the Campus (NIH, 2013).

Region

Most of the Bethesda-Chevy Chase area (approximately 64 percent) is characterized by single-family detached homes on relatively small lots (one-quarter acre or less). Figure 3-30 exhibits the zoning in the vicinity of the Campus. There are seven principally single-family neighborhoods surrounding the Campus (zoned R-60). Only one neighborhood, Glenwood, adjoins the Campus. The other neighborhoods are detached from the Campus by roadways. The Campus borders the Bethesda CBD to the south. The CBD is zoned as high density, multiple family residential (R-10) and townhouses (RT-12.5) (NIH, 2013).

Directly west of the NIH is the community-based nonprofit Suburban Hospital. Suburban Hospital was established in 1943 and serves the surrounding area and Montgomery County.

Directly east of the Campus is Naval Support Activity (NSA) Bethesda, where Walter Reed National Military Medical Center (WRNMMC) and the Uniformed Services University of the Health Sciences (USU) are located.

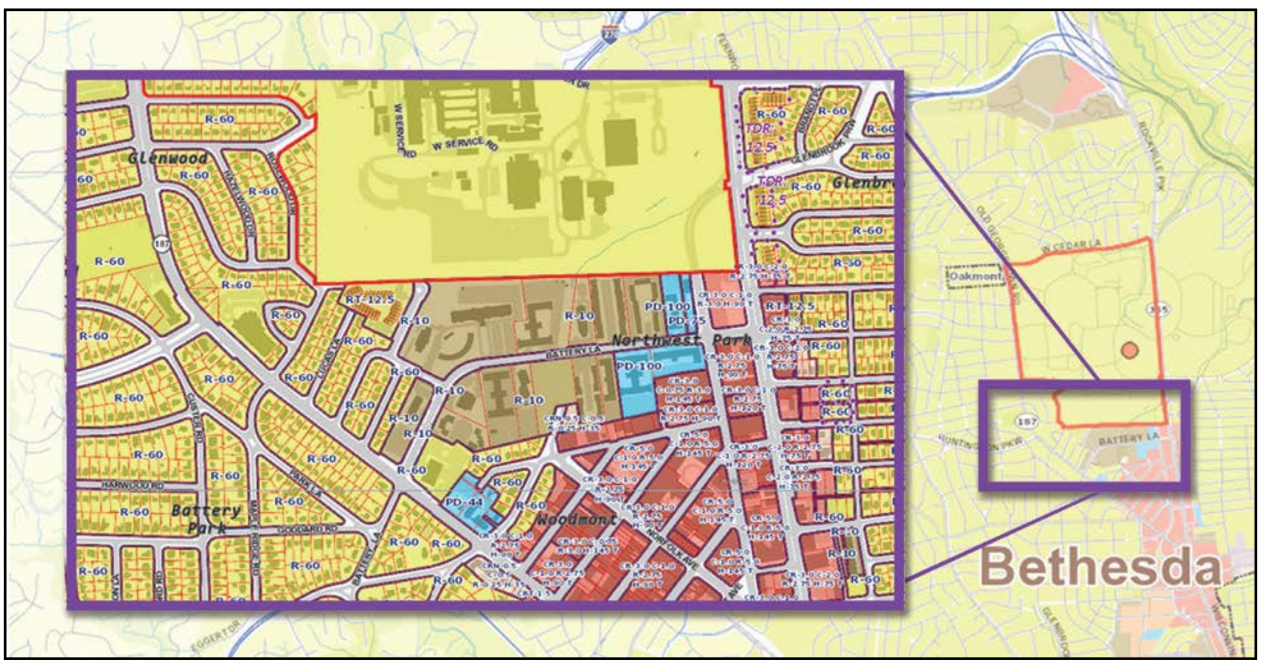


Figure 3-30. Zoning

Campus

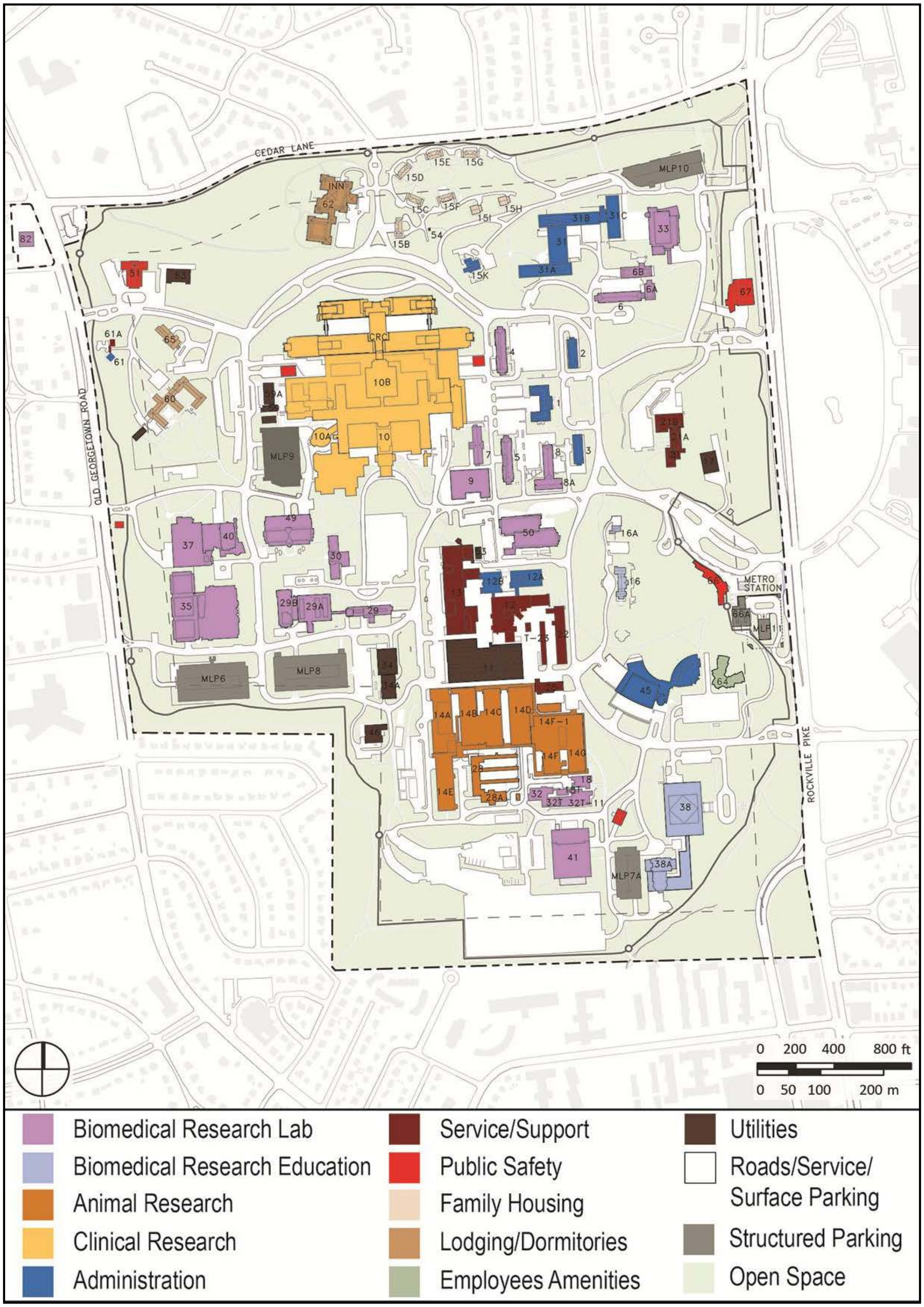
The Campus, owing to its federal ownership, is generally exempt from local regulations and plans. The federal government, however, has instituted the "Good Neighbor Program" through the General Services Administration (GSA) to ensure quality work environments for the employees of the

Federal Government by helping to revitalize the nation's communities. To comply with this GSA initiative, the NIH should consider local plans and requirements to ensure that future development at the Campus is not in conflict with recent regional planning initiatives. In keeping with the GSA initiative, the NIH coordinates project review with NCPC on all planned development projects.

The Campus is classified as institutional land use, primarily supporting research and administrative functions. There are also some limited areas where the predominant land use is residential (e.g., housing near North Gate).

The campus is not divided into regions of specific land use. However, an analysis of building function provides some indication of trends across the Campus (see Figure 3-31Building Functions within the Campus).

An analysis of land cover also illustrates how NIH utilizes the Campus. Three primary categories of land cover account for approximately 98 percent of the Campus: open space (58 percent or 179 acres), roads and vehicle parking (26 percent or 82 acres), and buildings (14 percent or 44 acres) (NIH, 2013).



Source: (NIH, 2013).

Figure 3-31. Building Functions within the Campus

Sites of the Evaluated Alternatives

As noted above, the Campus is not broken into zones or areas of designated land use. Rather, the entire Campus is predominantly utilized for research and administrative functions. The specific sites that would be affected by the Proposed or Alternative Action include open areas, parking areas, and residential areas, as discussed throughout Section 3 (Affected Environment).

3.14 Socioeconomics

Socioeconomics examines the social impact of economic change. Factors considered include population, housing, economics, and recreational activities.

A subset of socioeconomics is environmental justice. Environmental justice strives to ensure negative socioeconomic impacts do not disproportionately impact sensitive populations, such as children, minorities, and low-income communities.

3.14.1 *Social Resources and Sensitive Populations*

Background

Social resources consist of elements of the environment integral to personal and community dynamics, including population, housing, education, and open spaces. Access to these resources is essential to maintaining sustainable communities.

Sensitive populations are identified in two executive orders:

- EO 12898, *Federal Actions to Address Environmental Justice in Minority and Low-Income Populations* (Federal Register, 1994), serves to avoid the disproportionate placement of adverse environmental, economic, social, or health impacts from federal actions and policies on minority and low-income populations.

- EO 13045, *Protection of Children from Environmental Health Risks and Safety Risks* (Federal Register, 1997), states that federal agencies will identify and address environmental health and safety risks from their activities, policies, or programs that may disproportionately affect children.

Campus and Region

According to the 2010 U.S. Census, Montgomery County has a population of 971,777. Overall population trends and demographic characteristics in Montgomery County show that the local population is increasing, but the rate of increase is slowing based on census data and Maryland Department of Planning projections.

Sensitive populations, such as low-income families, minorities, and children are present within Montgomery County. Prevalence is lower in Bethesda than in Montgomery County as a whole. Detailed census data indicates, however, that several areas adjacent to the north and west sides of the Campus have higher percentages of minority populations (30 to 35 percent) relative to Bethesda as a whole (about 22 percent). Population distribution and trends in Bethesda, Montgomery County, and Maryland are shown in Table 3-9.

Residential housing includes single-family homes, apartments, condominiums, and townhouses. The 2010 Census reported a total of 375,905 housing units within Montgomery County with only a

5 percent vacancy rate, which is lower than the state vacancy rate of 9.3 percent. Reflecting current population trends, housing in Montgomery County is increasing, but the rate of increase is slowing. According to the 2010 Census, median housing values are considerably higher in Bethesda than in Montgomery County (76 percent higher) and Maryland as a whole (154 percent higher). Housing occupancy and trends in Montgomery County are shown in Table 3-10.

Educational resources in the area surrounding the Campus include public schools, the Uniformed Services University of the Health Sciences (located on NSA Bethesda), and the Foundation for Advanced Education in the Sciences (located at 9109 Old Georgetown Road). Public schools near the Campus include three high schools, five middle schools, and nineteen elementary schools (NIH, 2013). Refer to the *Campus Master Plan* for additional detail on adjacent educational resources.

Shared and open spaces in the vicinity of the Campus include the Bethesda Trolley Trail, which is a four-mile long path between North Bethesda and Bethesda used for commuting and recreation. Part of the trail occupies the abandoned right-of-way of the Tennallytown and Rockville Railroad streetcar line. Other portions of the trail are along streets. The southern terminus of the trail connects to the Capital Crescent Trail, which leads to Washington. A portion (about one-half mile) of the trail transits along the south end of the Campus, leading from Old Georgetown Road to the west end of Stoney Creek Pond, where the trail turns to the south and away from the Campus. Trees and open spaces along this portion of the trail create a park atmosphere that is well utilized.

Table 3-9. Population Statistics, Including Sensitive Populations (2000 and 2010)

	Year 2000						Year 2010					
	Bethesda CDP[a]		Montgomery County		Maryland		Bethesda CDP[a]		Montgomery County		Maryland	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Total Population	55,277	100.0	873,341	100.0	5,296,486	100.0	60,858	100.0	971,777	100.0	5,773,552	100.0
Under 5 years	3,148	5.7	60,173	6.9	353,393	6.7	3,356	5.5	63,732	6.6	364,488	6.3
Under 18 years	12,112	21.9	221,758	25.4	1,356,172	25.6	14,122	23.2	233,530	24.0	1,352,964	23.4
White [b]	45,210	81.8	519,318	59.5	3,286,547	62.1	47,327	77.8	478,765	49.3	3,157,958	54.7
Minority	10,067	18.2	354,023	40.5	2,009,939	37.9	13,531	22.2	493,012	50.7	2,615,594	45.3
Percent Low-Income [c]	1,828	3.3	47,024	5.4	438,676	8.5	-	2.8	-	6.8	-	9.1

Source: U.S. Census Bureau, 2014. (Note: 2000 and 2010 data, downloaded in 2014.)

[a] A Census-Designated Place (CDP) is a concentration of population identified by the United States Census Bureau for statistical purposes, and does not necessarily align with city limits.

[b] Data used are representative of the white population alone.

[c] 2010 data for "Low-Income" are reported in American Community Surveys as 'population for whom poverty status is determined'. 2000 data for "Percent Low-Income" are reported in 2000 Census as percentage of individuals below poverty level.

Table 3-10. Housing Statistics (2000 and 2010)

	Year 2000						Year 2010					
	Bethesda CDP		Montgomery County		Maryland		Bethesda CDP[a]		Montgomery County		Maryland	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Total Housing Units	24,368	100.0	334,632	100.0	2,145,283	100.0	27,470	100.0	375,905	100.0	2,378,814	100.0
Occupied Units	23,659	97.1	324,565	97.0	1,980,859	92.3	25,512	92.9	357,086	95.0	2,156,411	90.7
Vacant Units	709	2.9	10,067	3.0	164,424	7.7	1,958	7.1	18,819	5.0	222,403	9.3
Median Value, Owner-Occupied ($)	396,400	-	221,800	-	146,000	-	814,600	-	463,200	-	321,400	-

Source: U.S. Census Bureau, 2014. (Note: Census data from 2000 and 2010, downloaded in 2014.)

[a] 2010 data obtained from American Community Surveys, Table DP04, Selected Housing Characteristics, 2008-2010 (three year estimates).

3.14.2 *Economics*

Background

Economics analyzes the production, distribution, and consumption of goods and services. Economic drivers are industries, such as manufacturing and biomedical research, which direct and push the economy by providing jobs, goods, and services. Economic indicators allow analysis of economic performance and predictions for future performance. Common economic indicators include income, poverty rate, and employment rate.

Socioeconomic analyses consider the impacts of projected or actual change to economic indicators on the social resources, including those discussed in Section 3.14.1 (Social Resources and Sensitive Populations).

Campus and Region

Several major economic drivers in Montgomery County support a viable economy. Due to the county's proximity to Washington, the federal government provides a number of employment and economic opportunities to the area through a variety of governmental agencies, such as the NIH, the Food and Drug Administration, and the National Institute of Standards and Technology. Other industry sectors include information technology, communications and satellites, cyber security, and clean energy (Montgomery County DED, 2014). The number of jobs in Montgomery County is expected to increase from by about six percent by 2020 or ten percent by 2030 relative to projected 2015 employment levels (Montgomery County Planning Department, 2014). Employment by industry in Montgomery County is shown in Table 3-11.

Table 3-11. Montgomery County Employment by Industry (2013)

Industry	Civilian Employed Population	
	Number	Percent
Educational Services, and Health Care and Social Assistance	118,051	21.6
Professional, Scientific, and Management, and Administrative and Waste Management Services	113,958	20.9
Public Administration	60,061	11.0
Arts, Entertainment, and Recreation, and Accommodation and Food Services	47,874	8.8
Other Services, Except Public Administration	41,475	7.6
Retail Trade	41,329	7.6
Finance and Insurance, and Real Estate and Rental Leasing	38,887	7.1
Construction	30,151	5.5
Manufacturing	16,442	3.0
Information	14,297	2.6
Transportation and Warehousing, and Utilities	14,205	2.6
Wholesale Trade	8,566	1.6
Agriculture, Forestry, Fishing and Hunting, and Mining	654	0.1

Source: U.S. Census Bureau, 2014. (Note: Data from 2013, downloaded in 2014.)

As shown in Table 3-11, the leading industries in Montgomery County are professional, scientific, and management services and educational services, health care and social assistance. This is in large part due to the presence of NIH and more than 500 biotechnology and science companies, which has allowed Maryland to emerge as one of the "core biotechnology" development centers in the nation (Maryland Biotechnology Center, 2014). The NIH employs approximately 20,000 personnel at the Campus, providing direct economic benefits to surrounding communities. The NIH has provided more than $1.7 billion in research grants and contract awards to Maryland universities. The biotechnology sector, including the NIH, directly supports six percent of jobs in Maryland and generates six percent of the state's gross domestic product. Indirectly, the bioscience sector supports other local businesses when employees working in the biotechnology sector (including NIH staff), visitors, and local residents patronize area hotels, restaurants and retailers during biotechnology-related conferences in their free time (Maryland Biotechnology Center, 2015).

Economic indicators suggest an overall healthy economy in Montgomery County and in the area surrounding the Campus. According to 2013 Census bureau estimates, the median income is nearly $100,000 in Montgomery County, which is nearly double the national estimate. Further, the median income is nearly $150,000 in Bethesda. The 2013 poverty rate in Montgomery County was about seven percent and the rate in Bethesda was about three percent. Both rates are among the lowest in the nation. The estimated unemployment rate in Montgomery County was 4.5 percent in 2013, which was lower than the state unemployment rate of 5.1 percent. Employment data for Bethesda, Montgomery County, Maryland and the nation are shown in Table 3-12.

Table 3-12. Economic Characteristics for Bethesda, Montgomery County, Maryland, and U.S. (2013)

Economic Characteristic	Bethesda CDP		Montgomery County		Maryland		US	
	Number	Percent [a]	Number	Percent[a]	Number	Percent[a]	Number	Percent[a]
Total labor Force (Civilian)	35,461	66.8	581,742	72.4	3,223,300	68.0	158,498,347	63.2
Employed in Labor Force	34,147	64.3	545,950	67.9	2,983,367	62.9	145,128,676	57.9
Unemployed in Labor Force	1,314	2.5	35,792	4.5	239,933	5.1	13,369,671	5.3
Median Household Income ($)	$149,932	--	98,326	--	72,483	--	52,250	--
Individuals Below Poverty Level	--	2.8	--	6.9	--	10.1	--	15.8

Source: U.S. Census, 2014.

[a] Percent of total population.

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4. ENVIRONMENTAL CONSEQUENCES

4.1 Utilities

4.1.1 *Potable Water*

Proposed Action

Implementation of the Proposed Action would result in one modification to potable water infrastructure – installation of a new potable water line within the Campus to supply the Industrial Water Storage System. This change is described in Section 2.1 (Proposed Action).

The Proposed Action would not involve any modification of off-campus potable water infrastructure, and therefore would have no temporary construction-related impacts on potable water quality or availability to off-campus users.

The Proposed Action could result in temporary minor impacts on quality or availability of potable water to on-campus users during construction activities. The new piping would be located in such a way as to minimize the impact to existing utility networks. Precautions would be taken during demolition and construction to ensure that existing utility lines are not damaged and service impacts are minimized. For example, the NIH anticipates that when feasible, potable water line modifications would be accomplished via night work in order to minimize the potential impact to nearby buildings.

The Proposed Action would have no impact on the quality of potable water to the surrounding community or to Campus.

Following construction, the Proposed Action would not impact the NIH's consumption of potable water. Occasionally (e.g., once every five years), the NIH may draw down the water level in one of the water tanks to purge the water or conduct maintenance inside the tank. During draw down, the rate of water addition to the tank would stop or slow, resulting in a below-normal withdrawal rate from the WSSC distribution network. During filling of the tank, the rate of water addition to the tank would be increased, resulting in an above-normal withdrawal rate from the WSSC distribution network. While this would result in temporary fluctuations in the withdrawal rates, the overall water consumption would not be impacted.

The Proposed Action would not improve the reliability of the Campus potable water supply. The campus potable water supply would continue to be vulnerable to WSSC outages caused by natural disasters, terrorism, or other emergencies. During outages, mandatory evacuations of the facility would be required due to a lack of water to supply fire sprinklers and fire protection equipment.

The Proposed Action would not impact the NIH's ongoing efforts to reduce water intensity in accordance with EO 13514.

Alternative Action

The Alternative Action would implement multiple modifications to potable water infrastructure as detailed in Section 2.1 (Alternative Action). The majority of these infrastructure modifications would occur within the campus perimeter.

The Alternative Action would result in a major benefit to the potable water supply on-campus due to increased reliability. The Potable Water Storage System would hold enough water to meet campus potable water needs for at least two days. This would ensure continued operations during a water emergency and prevent the need to evacuate campus buildings due to a lack of water to supply fire protection systems.

Unlike the Proposed Action, the Alternative Action could result in temporary minor impacts on quality or availability of potable water to off-campus users during construction activities, including severing existing WSSC connections and constructing new WSSC connections. These impacts are assumed to be minor as WSSC replaces over 55 miles of pipeline each year while maintaining service to customers in affected areas. Precautions would be taken during demolition and construction to ensure that the utility lines are not damaged and service impacts are minimized. The new piping would be located in such a way as to minimize the impact to existing utility networks.

As discussed for the Proposed Action, the Alternative Action could result in temporary minor impacts on quality or availability of potable water to on-campus users during construction activities. This potential would be somewhat greater relative to the Proposed Action as the NIH would implement more numerous modifications to the potable water lines. However, the impact would still be minor as the NIH would implement similar mitigation to that described above for the Proposed Action.

The Alternative Action would have no impact on the quality of potable water to the surrounding community. The Alternative Action would not be expected to cause adverse impacts to water quality at the Campus, and the NIH would mitigate any potential for the Campus to influence outside water quality by installing backflow preventers at all active WSSC connections.

Following construction, the Alternative Action is not expected to impact the consumption of potable water. Occasionally (e.g., once every five years), the NIH may draw down the water level in one of the water tanks to purge the water or conduct maintenance inside the tank. As with the Proposed Action, this draw down would result in fluctuations of daily water withdrawal from WSSC, but the overall water consumption would not be impacted.

The Alternative Action would not impact the NIH's ongoing efforts to reduce water intensity in accordance with EO 13514.

No-Action Alternative

The No-Action Alternative would not change the campus utilities infrastructure. The campus potable water supply would continue to be vulnerable to WSSC outages caused by natural disasters, terrorism, or other emergencies. During outages, mandatory evacuations of the facility would be required due to a lack of water to supply fire sprinklers and fire protection equipment.

4.1.2 *Chilled Water*

Proposed Action

The Proposed Action would implement multiple modifications to chilled water infrastructure as detailed in Section 2.1 (Proposed Action). All of these modifications would occur within the campus perimeter.

The Proposed Action would result in a major benefit to the reliability of chilled water supply. The Thermal Energy Storage System would hold enough water to meet campus chilled water needs for at least two days. The Industrial Water Storage System would hold enough water to permit the CUP to generate chilled water to meet campus needs for an additional two days.

The Proposed Action would not result in any change in daily or peak chilled water demand, or any change in peak chilled water capacity. However, the Proposed Action would result in a moderate increase in the NIH's daily capacity of chilled water, by permitting chilled water to be generated at night and stored for use the following day. This increase in daily capacity would offset potential decreases in chiller efficiency (which reduces peak capacity) associated with planned substitution of Class II ODS refrigerants in the chillers (as discussed in Section 1.3.1). This would ensure the CUP has adequate capacity to meet the present and projected cooling demand at the Campus, and would help the NIH to defer the need to purchase and install additional chillers. Refer to Section 4.2 (Energy and Sustainability) for additional discussion of how nighttime operations impact energy demand.

The Proposed Action could result in temporary minor impacts on availability of chilled water within the campus during construction. Precautions would be taken during demolition and construction to ensure that the utility lines are not damaged and service impacts are minimized. For example, the NIH would construct chilled water lines during periods of the year when chilled water is not required for cooling buildings (e.g., spring or fall). The new piping would be located and installed in such a way as to minimize the impact to existing utility networks.

The Proposed Action would have no impact on the water quality of the chilled water supply.

Alternative Action

The Alternative Action would implement multiple modifications to chilled water infrastructure as detailed in Section 2.2 (Alternative Action). The anticipated impacts of these modifications on chilled water quality and availability would be identical to the impacts discussed above for the Proposed Action.

No Action

The No-Action Alternative would not change the campus chilled water infrastructure. The Campus would continue to be vulnerable to WSSC outages caused by natural disasters, terrorism, or other emergencies. The Campus would continue to be vulnerable to CUP outages caused by unplanned maintenance, natural disasters, or other emergencies. The loss of chilled water during outages would result in severe consequences on patient care, research animal welfare, and biomedical research activities.

Under the No-Action Alternative, the NIH would also be required to find and implement an alternative approach to comply with Class II ODS phase-out requirements (as discussed in Section 1.3.1) and meet existing and projected chilled water demand.

4.1.3 *Other Campus Utilities*

Proposed Action

The Proposed Action would result in construction activities as detailed in Section 2.1 (Proposed Action). As illustrated in Section 3.1 (Utilities), these construction activities would potentially displace existing components of the steam, electricity, and natural gas distribution networks within the limit of disturbance of each project site. This displacement would be a minor impact as these existing components are generally secondary lines, with the exception of a 30 inch chilled water line in the area of the Building 34 site, which is not currently in use. As needed, displaced utilities would be re-routed to ensure continued availability where needed. Precautions would be taken prior to and/or during demolition and construction to minimize service impacts. For example, the NIH could re-route electrical service to buildings prior to demolition or construction activities that would otherwise disturb or displace the electrical line that services those buildings. Any new utilities infrastructure would be located and installed in such a way as to minimize the impact to existing utility networks.

The Proposed Action would construct the Thermal Energy Storage System at the Building 34 site, which is adjacent to two existing underground tanks used for fuel oil storage. The NIH would ensure the construction contractor does not disturb, impact, or damage these existing underground tanks during construction activities. Refer to Section 4.15 (Tank Failure) for additional discussion of potential impacts to these oil tanks due to a leak or failure of the Thermal Energy Storage System.

The Proposed Action would increase the number of emergency generators at the Campus. While this would increase the backup power capacity, it would not result in a tangible benefit to existing buildings as the generators would be dedicated to the equipment installed under the Proposed Action.

The Proposed Action would not impact the demand for most other utilities (e.g., fuel oil, natural gas, steam, compressed air). Refer to Section 4.2 (Energy and Sustainability) for applicable discussion of energy demand.

Alternative Action

The Alternative Action would result in construction activities as detailed in Section 2.2 (Alternative Action). The anticipated impacts of these changes on other campus utilities (e.g., steam, electricity, natural gas) at the Building 34 site, Parking Lot 41 site, and along West Service Road would be identical to the impacts for the Proposed Action. The Alternative Action would impact other campus utilities in areas that the Proposed Action would not impact, such as the site near North Gate, the route of the water line that would connect existing water lines at Buildings 6A and 67, and the route of the water line that would convey potable water from Old Georgetown Road to the Potable Water Storage System.

No Action

Under the No-Action Alternative, there would be no change to campus infrastructure. No components of steam, electricity, natural gas, fuel oil, or compressed air infrastructure would be displaced. The No-Action Alternative would not impact demand for these other utilities.

4.2 Energy and Sustainability

Proposed Action

The Proposed Action would result in no impact on energy demand.

As discussed in Section 4.1.1 (Potable Water), implementation of the Proposed Action would result in improved efficiency in chilled water operations. This would be achieved because the NIH could operate the chillers at night, when ambient temperatures are lower which increases the efficiency of the equipment. These operational efficiencies would reduce the energy required to chill each unit of water. An additional benefit of nighttime operations would be a shift of a major source of electrical demand away from peak daytime hours. This shift in electricity demand allows the local utility to reduce use of peaker plants, which are typically more expensive, less efficient, and operate using higher polluting fuels. Limiting the use of these peaker plants lowers the price of electricity and decreases pollutant emissions in the region.

Operation of the new pumps (e.g., pumps associated with Thermal Energy Storage System and Industrial Water Storage System) and other supporting equipment is expected to result in a small increase to electricity use. This increase would offset the potential electricity savings discussed above, resulting in a negligible net increase to energy demand.

Because there would be a negligible impact on energy demand, the Proposed Action would not detract from the NIH's efforts to reduce energy intensity under EO 13423.

The Proposed Action would construct several small buildings, including the pump house at the Thermal Energy Storage System, the pump house at the Industrial Water Storage System, and possibly additional minor structures to house elements of other supporting infrastructure. During design and construction of these buildings, the NIH would implement all applicable sustainability requirements, including those from the DRM.

For additional discussions relevant to sustainability impacts of the Proposed Action, refer to Section 4.4 (Stormwater) and Section 4.11 (Wastes).

Alternative Action

Implementation of the Alternative Action would result in a minor increase in energy use due to additional pumps at the Booster Pump Station, and more pumping capacity at the Potable Water Storage System relative to the pumping capacity of the Industrial Water Storage System.

This net increase in energy demand would not support the NIH's efforts to reduce energy intensity under EO 13423. However, the increase in energy demand would be minor and therefore would not be expected to significantly detract from the NIH's overall progress toward reducing energy intensity.

The Alternative Action would also construct more small buildings relative to the Proposed Action. Additional buildings that would be constructed include the Booster Pump Station and two to three buildings to house the backflow preventers. As with the Proposed Action, the NIH would mitigate energy demand associated with these additional structures by incorporating all applicable sustainability requirements into the building design, including those requirements from the DRM.

For additional discussions relevant to sustainability impacts of the Alternative Action, refer to Section 4.4 (Stormwater) and Section 4.11 (Wastes).

No Action

The No-Action Alternative would not result in any changes to campus infrastructure. The NIH energy demand at the Campus would not change. The sustainable stormwater design features discussed in Section 4.4 (Stormwater) would not be implemented.

4.3 Water Resources

4.3.1 *Groundwater*

Proposed Action

Because groundwater is likely to be encountered at a depth of one to greater than six feet, construction activities associated with implementation of the Proposed Action would have the potential to impact groundwater. The NIH would implement appropriate pollution prevention measures to avoid spills and exposure of groundwater to contamination. These measures could include using booms or pigs during fuel transfer, protecting the excavation during fuel transfer and use, and stormwater management controls during construction as discussed in Section 4.4 (Stormwater).

The Proposed Action would not impact groundwater consumption. As discussed in Section 4.1.1 (Potable Water), The Proposed Action would not result in an increase in potable water consumption. As discussed in Section 3.1 (Utilities), WSSC supplies the NIH with treated water from the Potomac River.

Alternative Action

Implementation of the Alternative Action would result in similar impacts to groundwater as discussed above for the Proposed Action, except that due to the additional construction sites associated with the Alternative Action, there would be increased potential to directly impact groundwater. The NIH would implement similar mitigation as discussed above for the Proposed Action.

No-Action Alternative

The No-Action Alternative would not involve modifications to the water infrastructure and would not increase groundwater consumption. Therefore, there would be no potential impacts to groundwater.

4.3.2 *Surface Water*

Proposed Action

Implementation of the Proposed Action would result in minor indirect impacts to the NIH Stream due to runoff from construction sites, which could enter stormwater sewer drains that lead to the piped portion of that stream.

Impacts to surface waters resulting from the construction projects described above are likely to be minor due to compliance with state and federal regulations and mitigation measures. Mitigation measures include development of SEC plans, stormwater management plans, and implementation of pollution prevention measures to ensure that petroleum products and other contaminants do not migrate to the stream during construction. Refer to Section 4.4 (Stormwater) for additional discussion of stormwater runoff mitigation that would be utilized during construction activities.

No direct impacts to surface waters are anticipated due to implementation of the Proposed Action, as implementation of the Proposed Action would not result in any construction in or near surface waters (streams). The NIH would install new buried utilities along routes that intersect with existing buried (piped) streams. The NIH would ensure that excavation would not impact the stream by routing new buried utilities over or under the existing piped stream. The Proposed Action would not result in any direct or indirect impacts to Stoney Creek or Stoney Creek Stormwater Management Pond.

The NIH does not anticipate that the Proposed Action would modify the chiller blowdown discharge rate or require discharges from the Thermal Energy Storage System or the Industrial Water Storage System. If it is later determined that chiller blowdown discharge rate would increase, or the water tanks would result in additional (new) discharges to the NIH Stream, the NIH would likely need to apply for a new NPDES permit through MDE. They are currently permitted to discharge 580,000 gallons of chiller blowdown to the NIH Stream per day through their existing permit, set to expire in 2017.

The Proposed Action would not impact any Tier II waters as the closest Tier II waters are 12 miles east of the Campus.

Construction of either the Proposed or Alternative Action would have the potential to benefit the Campus' MS4 TMDL requirements. The NIH would implement beneficial stormwater management features (discussed in Section 3.4, Stormwater Management), which in turn would help to meet the Campus' TMDL nutrient and sediment load reduction requirements.

Alternative Action

Implementation of the Alternative Action would result in identical impacts to surface waters as the Proposed Action except for the following four differences.

The potential for minor indirect impacts due to runoff from construction sites to streams would be increased relative to the Proposed Action as the Alternative Action would have additional construction sites. The NIH would implement similar mitigation at those sites to that described above for the Proposed Action.

Unlike the Proposed Action, which would involve sites in the NIH Stream watershed only, the Alternative Action would involve sites in the NIH Stream and North Branch watersheds.

Additionally, implementation of the Alternative Action could result in a direct impact to the NIH stream during construction of the water line that will cross the NIH Stream in the area of Buildings 6A and 67. The NIH would likely avoid direct impacts by either: 1) constructing a pipe bridge with bridge footings placed on either side of the narrow stream bed or 2) installing the water pipe under the NIH Stream using directional drilling at a sufficient depth to ensure the stream bed is not disturbed. If a direct impact to the NIH Stream is later determined to be unavoidable (e.g., the pipe bridge requires a footing in or very near to the stream bed), the NIH would obtain all applicable permits, certifications, and reviews from federal and state authorities before construction of the proposed pipeline improvements in the vicinity of these stream crossings. Permits, certifications, and reviews may include the following:

- Joint USACE, MDNR Permit for Alteration of Floodplain, Waterway, Tidal or Non-tidal Wetland – as required by Section 404 of the CWA (33 U.S.C. 1344) and COMAR 08.05.04 and COMAR 08.05.07;
- MDE Water Quality Certification – as required by Section 401 of the CWA and COMAR 10.05.01;

- NPDES General Permit for Non-point Sources – as required by MDNR and COMAR 08.05.011.; and
- Maryland General Waterway Construction Permit – as required by MDNR and COMAR 08.05.11.

Finally, implementation of the Alternative Action could include water treatment if required under applicable drinking water regulations. Although a treatment process has not yet been identified, this may involve the periodic addition of a chlorine-based additive to the Potable Water Storage System, which could increase the residual chlorine present in the chiller blowdown water discharged from the CUP to the NIH Stream. This change in operations is not expected to exceed the chlorine threshold established under the NIH's current NPDES permit as discussed in Section 3.3.2 (Surface Waters). NIH would work with MDE to revise the NPDES permit as needed.

No-Action Alternative

The No-Action Alternative would have no direct or indirect impact on surface waters.

4.3.3 *Wetlands*

Proposed Action

As discussed in Section 3.3.3 (Wetlands), there are no known wetlands in the vicinity of the potential construction sites. Implementation of the Proposed Action would result in no direct or indirect impact on identified wetlands.

Alternative Action

Implementation of the Alternative Action would potentially result in a direct impact on wetlands.

As discussed in Section 3.3.3 (Wetlands), there is an area of potential wetlands along the NIH Stream. That area would be impacted by construction of the water line in the area of Buildings 6A and 67. Although a 1993 wetland delineation indicated there were no wetlands present, the NIH would conduct a wetland delineation prior to implementing the Alternative Action to determine whether wetlands are currently present. The NIH would comply with all applicable regulations if the delineation determined that wetlands are present.

No-Action Alternative

The No-Action Alternative would have no direct or indirect impact on wetlands.

4.3.4 *Floodplains*

Proposed Action

Implementation of the Proposed Action would result in no impact to floodplains. As discussed in Section 3.3.4 (Floodplains), there are no 100-year floodplains at the potential construction sites.

Alternative Action

Implementation of the Alternative Action would result in a minor impact to floodplains during construction of the new potable water line that would cross the NIH Stream in the area of Buildings 6A and 67.

The NIH would ensure that this new potable water line would meet all requirements for utility crossings within a 100-year floodplain, as regulated under COMAR 26.17.04.08 and as discussed in Section 3.3.4 (Floodplains). The NIH would submit an application for the crossing to MDE for review and approval.

No-Action Alternative

The No-Active Alternative would have no impact on the 100-year floodplain.

4.4 Stormwater

Proposed Action

Temporary Construction Impacts

Implementation of the Proposed Action would result in minor temporary impacts to stormwater quantity and quality due to earth disturbances during construction activities. The LOD for the Proposed Action would be approximately 467,000 SF of earth during construction activities. The areas of earth disturbance for the Thermal Energy Storage System and Industrial Water Storage System are illustrated in Figure 4-1 and Figure 4-2 respectively.

Potential erosion and sediment runoff impacts would be mitigated through stormwater management, including the development of an erosion and sediment control plan that is approved by MDE. The construction of the Thermal Energy Storage System and Industrial Water Storage System would each disturb more than one acre and therefore would obtain coverage under the MDE 2014 General Permit for Stormwater Associated with Construction Activity (MDE, 2011b). As a result, construction activities under the Proposed Action would have a minor impact on stormwater quality.

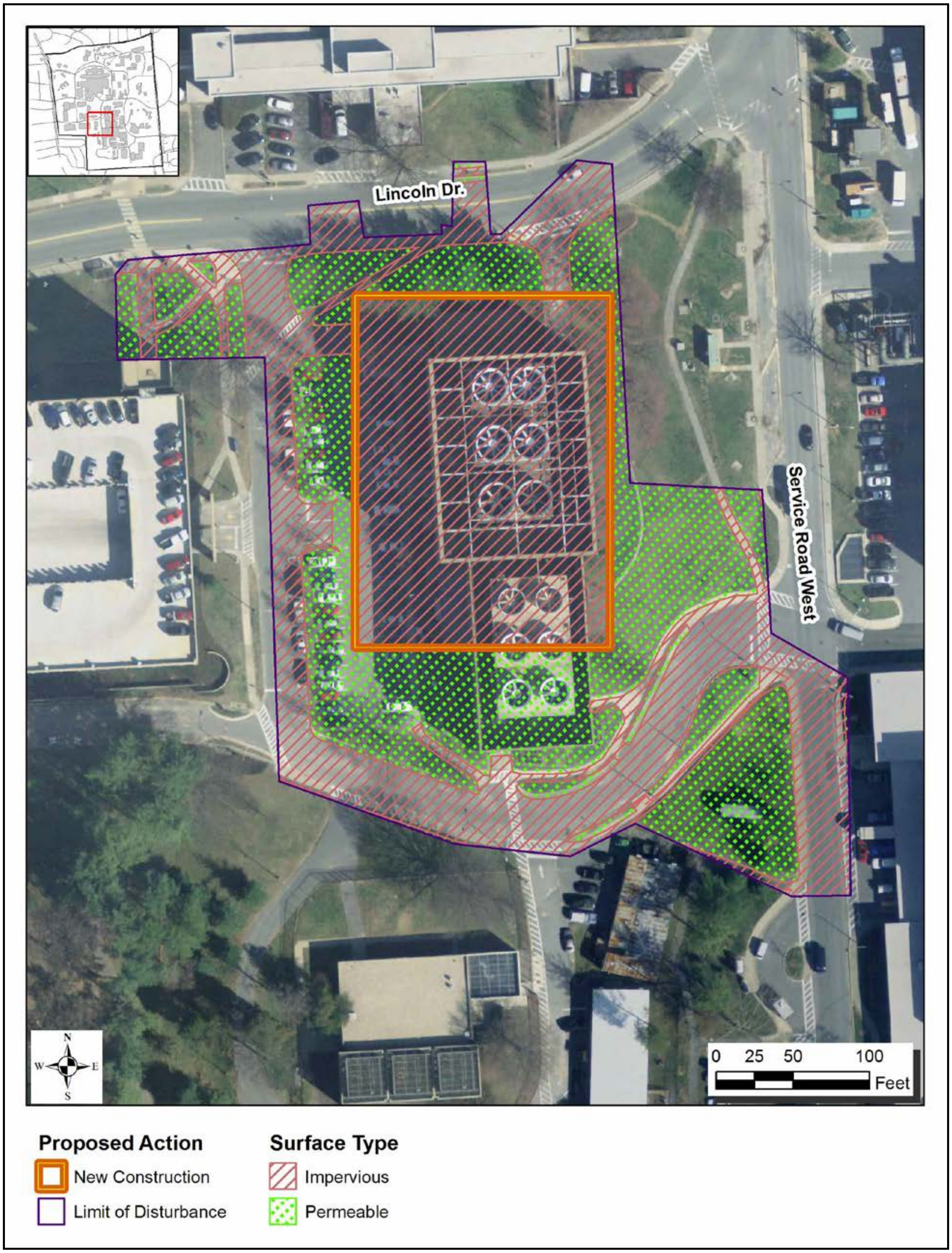

Figure 4-1. Thermal Energy Storage System Limit of Disturbance, Proposed Action

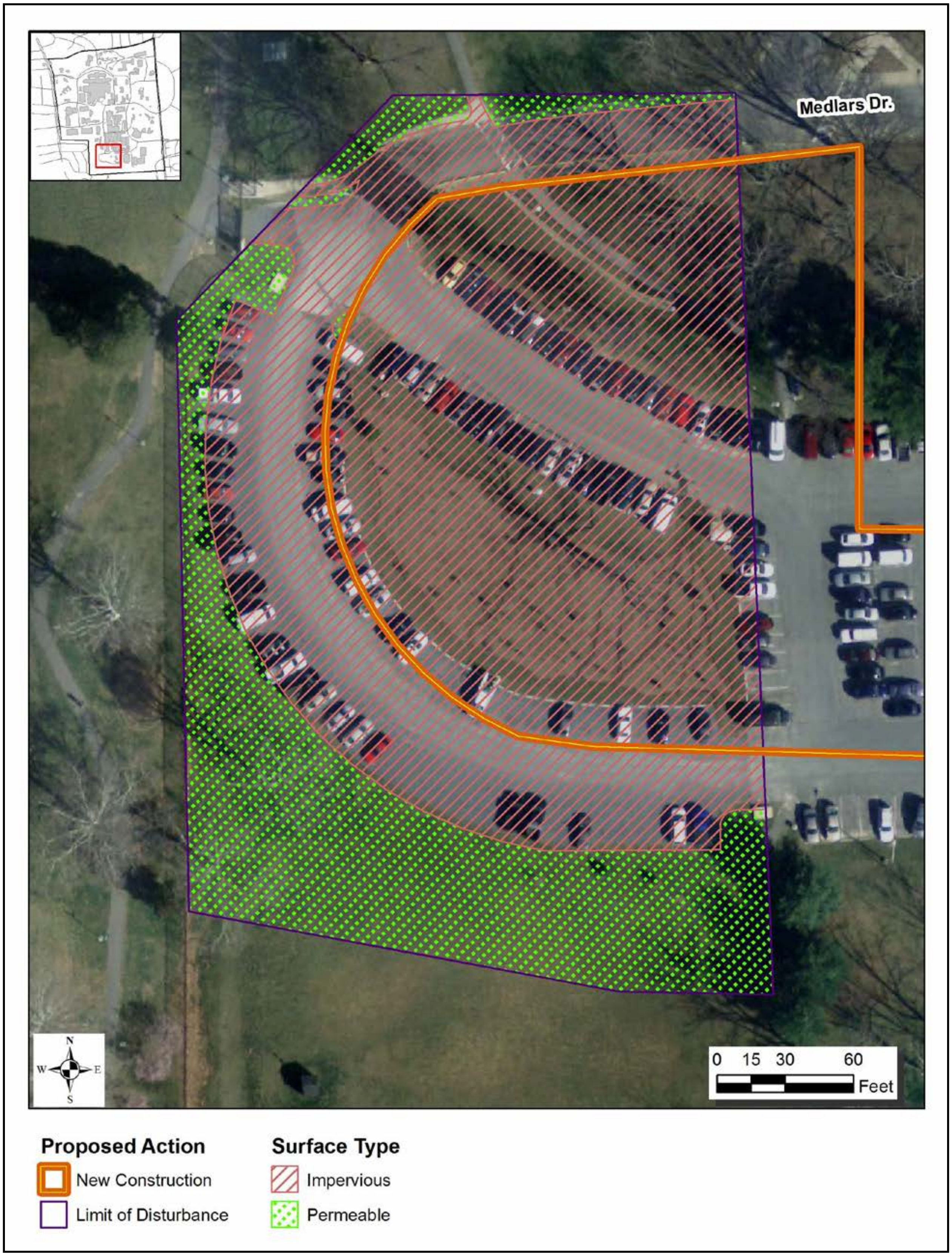

Figure 4-2. Industrial Water Storage System Limit of Disturbance, Proposed Action

Long-Term Stormwater Management

Implementation of the Proposed Action would result in minor long-term stormwater management impacts. The Proposed Action would increase impervious surface at the Campus by approximately 153,000 SF, which would increase runoff within the Rock Creek Watershed relative to baseline conditions. However, the construction of the Thermal Energy Storage System and Industrial Water Storage System would each disturb greater than 5,000 SF, and therefore site design would be required to meet EISA 2007 Section 438 requirements to restore each site to predevelopment conditions. This requirement would minimize hydrologic impacts resulting from increased stormwater runoff volumes, such as damage to storm sewer infrastructure, increased likelihood of flooding, and increased erosion. See Table 4-1 below for a summary of the net change in impervious area for the Proposed Action.

The Proposed Action would require permanent site stormwater management to control runoff and provide water quality treatment per federal and Maryland stormwater regulations. Long-term stormwater management facilities would be designed and installed per an MDE approved stormwater management plan. The NIH would incorporate appropriate and feasible ESD practices into the project designs to restore the predevelopment hydrology to the maximum extent technically feasible. Overall, these ESD practices would reduce runoff volume and rate, disperse flow, remove pollutants, and provide for groundwater recharge by facilitating infiltration into the soil.

Construction of the Industrial Water Storage System and Thermal Energy Storage System would likely incorporate bioretention areas including stormwater planter boxes.
These vegetated areas would infiltrate runoff from impervious surfaces at the site, reducing the quantity of stormwater runoff and improving the water quality.

The Proposed Action would not impact coverage under the Campus's MS4 permit.

Table 4-1. Net Change in Impervious Area, Proposed Action

Project Site	Total Area within LOD	Baseline		Proposed Action		Net Change in Impervious Area
		Impervious Area	Pervious Area	Impervious Area	Pervious Area	
Thermal Energy Storage System	217,000	68,000	149,000	155,000	62,000	87,000
Industrial Water Storage System	152,000	67,000	85,000	133,000	19,000	66,000
Other Supporting Infrastructure	98,000	45,000	53,000	45,000	33,000	0
Total	**467,000**	**180,000**	**287,000**	**333,000**	**134,000**	**153,000**

Notes:

[a] All numbers are in units of SF.

[b] All numbers have been rounded.

[c] Baseline areas assume that Buildings 34, 34A, and associated parking have been demolished.

[d] The graphical figures illustrating impervious area are conceptual and subject to change during project design. The Proposed Action impervious area values in this table conservatively assume 20% greater impervious surface than what is illustrated in the figures to allow for potential changes during design. Similarly, the estimated Total Area within LOD value associated with Other Supporting Infrastructure (e.g., pipeline improvements) in this table conservatively assumes 50% greater area than the preliminary engineering design drawings estimate.

Alternative Action

The Alternative Action would result in minor stormwater management impacts. These impacts would be similar to those impacts discussed above for the Proposed Action, with the following differences.

Temporary Construction Impacts

Implementation of the Alternative Action would result in minor temporary impacts to stormwater quantity and quality due to earth disturbances during construction activities. The Alternative Action would result in more numerous earth disturbances due to additional construction sites, including the Booster Pump Station, Backflow Preventer Buildings, the water line to convey water from Old Georgetown Road to the Potable Water Storage Tank, the water line to convey water from West Cedar Lane to the Booster Pump Station, and the water line in the area of Buildings 6A and 67. The LOD for the Alternative Action would be approximately 552,000 SF. The area of earth disturbance for the Booster Pump Station is illustrated in Figure 4-3. The NIH would implement similar mitigation to that discussed for the Proposed Action: development of an erosion and sediment control plan that is approved by MDE, and coverage under the MDE 2014 General Permit for Stormwater Associated with Construction Activity (MDE, 2011b). As a result, construction activities under the Alternative Action would have a minor impact on stormwater quality.

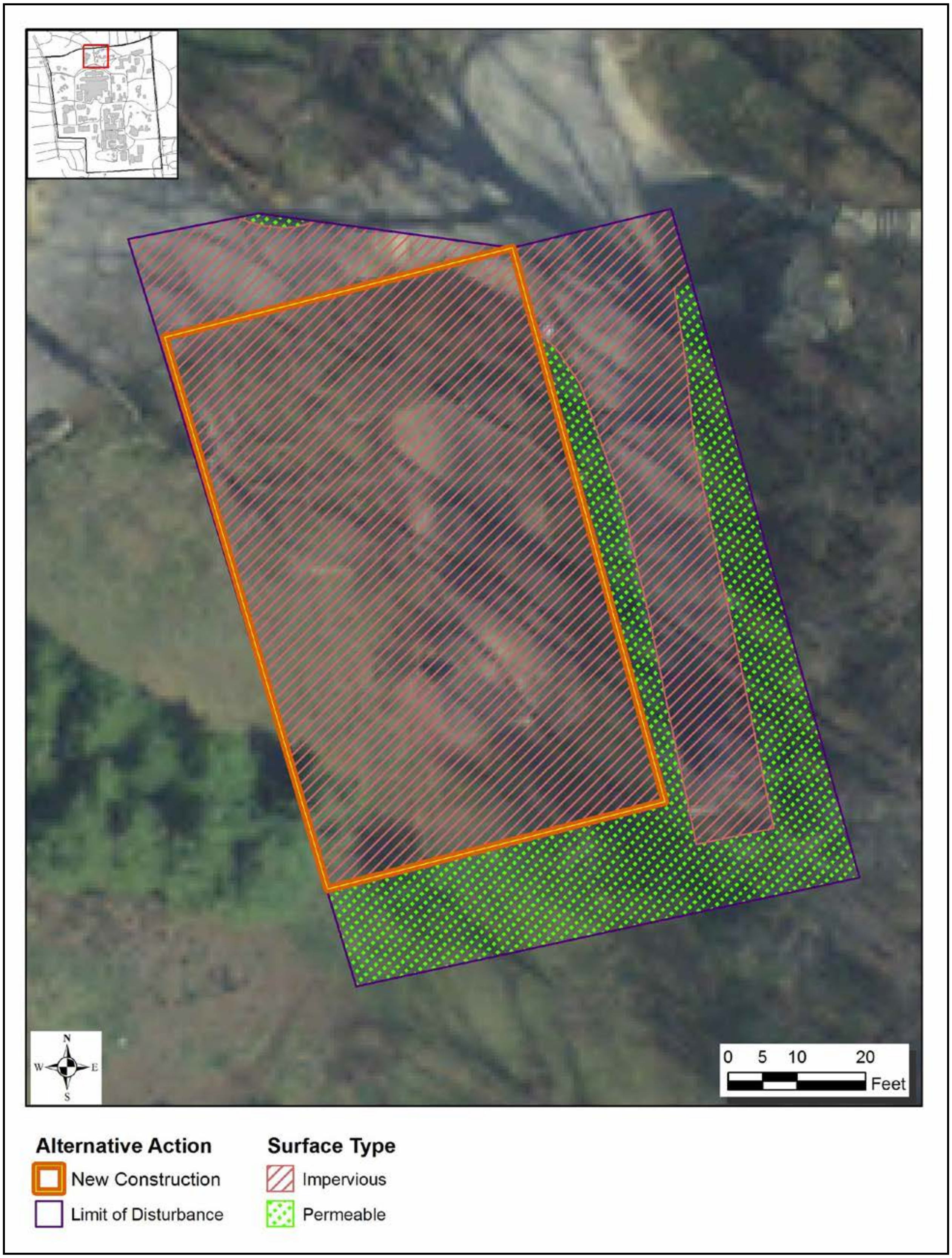

Figure 4-3. Booster Pump Station System Limit of Disturbance, Alternative Action

Long-Term Stormwater Management

Implementation of the Alternative Action would result in minor long-term stormwater management impacts. The Alternative Action would increase impervious surface at the Campus by approximately 160,000 SF, which would increase runoff within the Rock Creek Watershed relative to baseline conditions. The NIH would implement a site design that would meet EISA 2007 Section 438 requirements to restore each site to predevelopment conditions. See Table 4-2 below for a summary of the net change in impervious area for the Alternative Action.

The NIH would implement similar mitigation to that discussed for the Proposed Action: development of a stormwater plan that is approved by MDE and incorporation of appropriate and feasible ESD practices into the project designs to restore the predevelopment hydrology to the maximum extent technically feasible. The Alternative Action would use similar stormwater management features to the Proposed Action. The site design would likely incorporate bioretention areas and planter boxes to manage stormwater at the Thermal Energy Storage System and the Potable Water Storage System.

The existing stormwater detention feature north of Building 31, introduced in Section 3.4 (Stormwater Management), would likely adequately address runoff from the sites of the Booster Pump Station and backflow preventer building under the Alternative Action. Additional stormwater management features would be incorporated into the site design as needed to comply with all federal and state regulations.

Table 4-2. Net Change in Alternative Action Impervious Area

Project Site	Total Area (SF) within LOD	Baseline		Alternative Action		Net Change in Impervious Area
		Impervious Area	Pervious Area	Impervious Area	Pervious Area	
Booster Pump Station	14,000	6,000	8,000	12,000	2,000	6,000
Thermal Energy Storage System	217,000	68,000	149,000	155,000	62,000	87,000
Potable Water Storage System	152,000	67,000	85,000	133,000	19,000	66,000
Backflow Preventer Buildings	1,000	0	1,000	1,000	0	1,000
Other Supporting Infrastructure	168,000	54,000	114,000	54,000	114,000	0
Total	**552,000**	**195,000**	**357,000**	**355,000**	**197,000**	**160,000**

Notes:

[a] All numbers are in units of SF.

[b] All numbers have been rounded.

[c] Baseline conditions assume that Buildings 34, 34A, and associated parking have been demolished.

[d] The graphical figures illustrating impervious area are conceptual and subject to change during project design. The Alternative Action impervious area values in this table conservatively assume 20% greater impervious surface than what is illustrated in the figures to allow for potential changes during design. Similarly, the estimated Total Area within LOD value associated with Other Supporting Infrastructure (e.g., pipeline improvements) in this table conservatively assumes 50% greater area than the preliminary engineering design drawings estimate.

No-Action Alternative

The No-Action Alternative would not result in any changes to impervious or pervious areas or associated impacts to stormwater quality or quantity. Land use conditions would remain the same and additional stormwater quantity or quality management would not be required.

4.5 Visual Impacts

4.5.1 *Lighting Impacts*

Proposed Action

The Proposed Action would result in minor temporary impacts to light trespass due to use of supplemental lighting (e.g., temporary portable lighting) during construction activities. The NIH would conduct the majority of construction activities during daylight hours, primarily to limit noise during off hours. Temporary construction lighting would be used to illuminate work areas during the limited nighttime construction work and to ensure safety and security at unoccupied work sites. The NIH would mitigate this temporary lighting by ensuring construction contractors direct lighting away from the campus boundary whenever feasible.

The Proposed Action would result in minor long-term impacts to light trespass due to new permanent lighting. The Thermal Energy Storage System and Industrial Water Storage System would each require modest area lighting to ensure safety and security and to facilitate occasional evening maintenance activities.

This new lighting would be adjacent to residential neighborhoods and therefore would be a potential new source of light trespass to external neighborhoods. As discussed in Section 3.5 (Visual Impacts) existing off-campus views of the Building 34 site and the site near the North Gate are very limited, and it is not anticipated that the construction would impact intervening topography or vegetation at those sites.

Existing off-campus views of Parking Lot 41 are limited to a portion of the Bethesda Trolley Trail and the upper floors of high-rise residential buildings along Battery Lane. The NIH would mitigate the impact of new lighting as viewed from those locations by installing lighting systems directed and sized appropriately.

If lighting would be used to illuminate the exterior of structures (e.g., water tanks), the NIH would minimize the impact to off-campus groups by not illuminating the sides that face the campus perimeter. To further mitigate impacts, streetlights would utilize full cut-off luminaries that direct light downward. These new lighting systems would be designed in accordance with IES and IDA guidance, the NIH DRM, and the *Campus Master Plan*. Increased landscape screening and/or architectural light screens would also be utilized as needed to mitigate new lighting in the Lighting Control Zones. For example, architectural screens will likely be utilized at the Industrial Water Storage System as described in Section 2.1 (Proposed Action). Due to these mitigating factors, the new lighting would have a minor impact on off-campus groups.

The new lighting would have a minor impact to on-campus users. The lighting characteristics mentioned above would mitigate the potential impacts. The new lighting would be consistent with other recent lighting around the Campus, and therefore would not significantly modify the Campus relative to existing conditions.

Alternative Action

Implementation of the Alternative Action would result in minor temporary changes to light trespass similar to those discussed above for the Proposed Action. One difference relative to the Proposed Action is that construction would occur at a number of additional sites, including the site near North Gate, along the Bethesda Trolley Trail, near the South Drive Entrance, and in the vicinity of Buildings 6A and 67. As a result, the temporary lighting impacts of the Alternative Action would be somewhat greater than the Proposed Action.

Implementation of the Alternative Action would result in long-term changes to light trespass similar to those discussed above for the Proposed Action. There might be small differences in the number of lights installed at the site near Parking Lot 41 due to the larger size of the Potable Water Storage System relative to the Industrial Water Storage System. Also, some lighting might be required at the backflow preventer buildings and the Booster Pump Station, but it is anticipated this lighting would be minimal and could be directed away from the Campus boundary.

As with the Proposed Action, new lighting systems would be designed in accordance with IES and IDA guidance, the NIH DRM, and the *Campus Master Plan*. Increased landscape screening and/or architectural light screens would also be utilized as needed to mitigate new lighting in the Lighting Control Zones.

No-Action Alternative

The No-Action Alternative would not impact lighting at the Campus.

4.5.2 *Viewscapes*

Proposed Action

The Proposed Action would result in minor adverse impacts to external viewscapes. Existing topographical features and vegetation that largely block many potential views from adjacent neighborhoods would not be significantly altered as a result of the Proposed Action.

The Proposed Action would result in minor to moderate adverse impacts to internal viewscapes. The construction of the Industrial Water Storage System would require removal of a grassy area with trees. This would result in a minor negative impact to the visual character of that area of the Campus. The construction of the Thermal Energy Storage System would have a moderate adverse impact, as the associated tank would be viewable from the central part of the Campus. Also, implementation of the Proposed Action could result in removal of existing trees and vegetation from the Building 34 site that currently reduces views from the north. The scale of this potential impact is somewhat tempered as the tank would be adjacent to a parking garage and the CUP, so it would not be entirely out of character with surrounding structures.

Under the Proposed Action, all structures would be constructed to a height that does not exceed the Master Plan building height guidance. Construction of the Industrial Water Storage System into the hillside slope near Parking Lot 41 would be consistent with Master Plan guidance for minimizing the visual impact of new construction.

Refer to Section 4.12.1 (Architectural Resources) for discussion of the potential visual impacts to historic properties.

Alternative Action

Implementation of the Alternative Action would result in minor adverse impacts to external viewscapes and minor to moderate adverse impacts to internal viewscapes. These impacts would be similar to those discussed for the Proposed Action, but would differ in the following ways.

Implementation of the Alternative Action would result in construction of a larger tank at the Parking Lot 41 site. As discussed in Section 2, the Potable Water Storage System that would be constructed under the Alternative Action includes a tank that would be about 90 feet in height. By comparison, the Proposed Action would construct the Industrial Water Storage System at the same site, which includes a tank that would be about 50 feet in height.

Implementation of the Alternative Action also would result in additional construction, including the backflow preventer buildings and the Booster Pump Station. The backflow preventer buildings would be visible from Old Georgetown Road and West Cedar Lane. The structure near the South Drive Entrance would be adjacent to significantly larger structures. The structure near West Cedar Lane would likely be constructed of brick similar to the nearby houses and would largely be concealed by vegetation. In both cases, the visual impacts of these small structures would be minor. The backflow preventer building located near the Bethesda Trolley Trail would be constructed in a vegetated area. Construction of this structure would temporarily result in a minor adverse impact to visual character. The NIH would mitigate this impact by minimizing any disturbance of existing vegetation and installing plantings that in time, would serve to reduce views of the structure.

The construction of the Booster Pump Station would temporarily result in a minor adverse impact to visual character. The NIH would mitigate this impact by constructing the structure of similar materials to those used in adjacent historic structures (e.g., brick). Also, in the long run, plantings would fill in around the pump station and minimize views from adjacent on-campus roads and NIH buildings.

As with the Proposed Action, all structures would be constructed to a height that does not exceed the Master Plan building height guidance. Construction of the Potable Water Storage System into the hillside slope near Parking Lot 41 would be consistent with Master Plan guidance for minimizing the visual impact of new construction.

No Action Alternative

The No-Action Alternative would not impact external viewscapes of the Campus.

4.6 Transportation and Traffic

4.6.1 *Roads, Transit, and Traffic*

Implementation of the Proposed Action would result in minor temporary impacts to off-campus roads, transit, and traffic due to construction activities. This would include additional traffic due to construction vehicles as well as shifts in employee traffic patterns.

Construction vehicles would generally utilize the service vehicle entrance on Rockville Pike (see Figure 3-19). The NIH would avoid a backup on Rockville Pike on peak days by temporarily designating an alternate construction entrance at one of the entrances normally designated for employee use. This would permit construction vehicles to temporarily use two entrances, providing additional space for queuing within the Campus boundary. The overall impact to off-campus roads would be minor as the number of construction vehicles would be minimal (<100 vehicles per day) relative to existing traffic counts (e.g., peak morning traffic at Rockville Pike and Wilson Drive, which is just south of the service vehicle entrance, is 2,800 cars southbound on Rockville Pike and 1,100 cars northbound on Rockville Pike).

During construction, some traffic patterns would temporarily shift as drivers select alternative entrances to the Campus, either to avoid construction work or due to changes in destination, such as vehicles displaced from parking at Lot 41 (see 4.6.2, Parking). However, it is anticipated that this impact on traffic patterns outside the Campus would be minor as closure of entrances is not anticipated and drivers typically utilize all entrances.

Implementation of the Proposed Action would result in minor to moderate impacts to on-campus roads, transit, and traffic during construction activities. During construction, campus roads in the vicinity of the project would be obstructed intermittently. The NIH would minimize these impacts by communicating any roadwork to employees and establishing alternate routes as needed. The existing road network within and outside the Campus has capacity to adequately handle these potential shifts and the changes in traffic patterns or volume would be minor relative to typical patterns and volume.

As noted in Section 3.6 (Transportation and Traffic), the NIH Shuttle Bus system has routes in the vicinity of the planned sites for the Thermal Energy Storage System and the Industrial Water Storage System, including along Lincoln Drive, Service Road West, through Parking Lot 41, and along Medlars Drive. During construction, traffic delays or road diversions would be expected in these areas, particularly during peak traffic times. Select bus stops might be closed and passengers would be required to use alternate stops (existing or temporary). The NIH would minimize these impacts by communicating any planned alterations to shuttle routes, stops, or schedules to employees. Once construction is complete, shuttle bus traffic would be expected to return to the permanent routes and would not experience any delays due to the Proposed Action.

On-campus pedestrian and bicycle routes could experience temporary closures during construction activities. The NIH would mitigate these impacts by communicating any temporary closures to employees, and ensuring that alternate routes are available as needed. The NIH would ensure that a suitable pedestrian route between Medlars Drive and Parking Lot 41 is available during construction. Upon completion of construction, on-campus pedestrian and bicycle routes are expected to return to normal and the completed project would have no permanent impacts.

Upon completion of construction, traffic levels would be expected to return to pre-construction levels. No permanent changes would occur in traffic volume to, from, or within the Campus.

Alternative Action

Implementation of the Alternative Action would result in moderate adverse impacts to off-campus roads, transit, and traffic during construction activities. These impacts would be temporary, and would end following completion of construction.

Unlike the Proposed Action, the Alternative Action would include excavation work to sever existing connections to WSSC water lines or install new connections. This work would occur at locations on or near West Cedar Lane, Old Georgetown Road, Rockville Pike, and Roosevelt Avenue. NIH would prefer to sever and cap these connections on campus property. However, it is possible that WSSC will require excavation at the point of connection to the water main (i.e., under the public roadway). Depending on WSSC requirements, some excavation activity at off-campus sites will likely occur. Refer to Section 2.1 (Proposed Action) for illustrations of these locations. Although not currently planned, additional excavations at other locations could be necessary. At locations where WSSC requires excavation under the public roadway, closures of lanes would be required during construction activities. It is anticipated that excavation work and re-paving would result in no more than three days of lane closures at each location. The NIH would coordinate with WSSC and other stakeholders to minimize impacts to traffic.

As with vehicular traffic pattern changes and delays, pedestrian and bicycle traffic could experience temporary and intermittent delays and detours. These impacts would occur within the Campus, as construction would be limited to on-campus sites. Upon construction completion, pedestrian and bicycle traffic would return to normal and the completed project would have no permanent impacts.

The NIH would coordinate with WSSC and other stakeholders to ensure that off-campus pedestrian and bicycle routes are properly accommodated during excavation work to connect to the water lines under Old Georgetown Road and West Cedar Lane. The NIH would also ensure that access is maintained to the Bethesda Trolley Trail throughout construction activities. The section of piping located in the area of the Bethesda Trolley Trail would be installed adjacent to the trail, with the exception of one or two trail crossings where the piping would lead under the trail. The section or sections of piping would be installed through a direct push method, which requires minimal excavation by installing the piping underground. This method would permit the trail to remain intact and in use during construction, as well as minimize impacts to areas adjacent to the trail.

The additional construction associated with the Alternative Action (e.g., additional potable water lines, Booster Pump Station, backflow preventer structures) would result in a greater impact to on-campus roads, traffic, and transit relative to that for the Proposed Action. For additional detail on the relative extent and locations of the planned construction, refer to illustrations provided in Section 2.1 (Proposed Action) and Section 2.2 (Alternative Action).

The construction of the Potable Water Storage System under the Alternative Action (instead of the Industrial Water Storage System) would not significantly alter anticipated impacts relative to those discussed under the Proposed Action.

4.6.2 *Parking*

Proposed Action

Implementation of the Proposed Action would result in moderate adverse impacts to on-campus parking during construction activities. Demand for parking spaces would temporarily increase during construction, due to vehicles used by construction workers. The likelihood of construction workers parking in surrounding neighborhoods is low due to existing restrictions on street parking (e.g., meters, signage). The NIH would further mitigate this potential issue by including language in the construction contract that requires the contractor to ensure employees and subcontractors park in designated areas within the Campus.

The construction of the Industrial Water Storage System would reduce parking capacity at Parking Lot 41 by approximately 90 parking spaces. Displaced vehicles would be required to park at other existing parking areas on the Campus. The NIH would ensure access to Parking Lot 41 is maintained during construction activities – likely via all three entrances. If closures of the westernmost entrance would be required, the NIH would seek to minimize the frequency and duration of closures.

In the long term, the demand for parking would return to normal after conclusion of the construction activities. However, the Proposed Action would have a minor long-term impact on parking due to the reduction in parking at Parking Lot 41.

As noted in Section 2.1 (Proposed Action), several parking spaces may be constructed at the Thermal Energy Storage System to accommodate operations or maintenance vehicles. The NIH would ensure that the overall parking ratio, as established by the 1992 MOU, would be maintained at no more than 0.50 parking spaces per employee. The NIH would also ensure additional parking for the projected future growth of an estimated 3,000 Bethesda Campus- based employees is planned for at a ratio of 0.33 spaces per employee.

Alternative Action

Implementation of the Alternative Action would result in identical moderate impacts to parking during construction activities and minor impacts in the long term.

No-Action Alternative

The No-Action Alternative would not impact the regional or local transportation network or traffic levels and would not change vehicle use within the Campus. There would be no change to parking availability or access throughout the Campus.

4.7 Noise Levels

Proposed Action

Implementation of the Proposed Action would result in temporary minor noise impacts due to construction activities as well as long-term moderate noise impacts due to operational changes at the CUP.

Construction activities associated with the Proposed Action would temporarily increase environmental noise levels in the vicinity of the project sites, primarily due to the use of heavy equipment. Equipment that may be used includes backhoes, bulldozers, and excavators. Construction equipment noise emission levels generally range between 74 to 101 dBA 50 feet from the source, depending on the type of equipment (U.S. DOT FHWA, 2014). The NIH would mitigate the impact of this construction noise by limiting most construction activity to between the hours of 7 AM and 5 PM. The NIH would ensure that noise levels from construction activities would not exceed 75 dBA at neighboring properties or 85 dBA if a noise suppression plan is approved by the Montgomery County DEP. Most of the construction noise would be temporary and would dissipate as the distance from the source increases. Thus, it is expected that residents in surrounding neighborhoods would not experience noise louder than the applicable noise limit.

Construction personnel would take the necessary precautions (e.g., hearing protection) to ensure that they would not be exposed to noise louder than the OSHA standard of 90 dBA for 8 hours.

Because the construction of the Industrial Water Storage System would result in the loss of some parking spaces at Parking Lot 41, some vehicular traffic would be redirected to other parking areas at the Campus. While these other destinations may see an increase in vehicular traffic, the increases are expected to be minor and would not be expected to substantially alter the noise levels anywhere at the Campus. Any added noise would blend with ambient noise.

The Proposed Action would include installation of new equipment, including pumps and generators at the Industrial Water Storage System and Thermal Energy Storage System. The NIH would mitigate operational noise from this equipment by installing equipment inside utility buildings or providing sound-attenuating enclosures. Due to this mitigation, operational noise from all elements of the Proposed Action would be expected to be below regulatory thresholds.

The Proposed Action would also result in a moderate noise impact due to operational changes at the CUP. As noted in Section 3.7 (Noise Levels), current CUP operations peak during daytime hours. When the CUP is operating at night, fewer chillers and associated cooling towers are in service. As discussed in Section 2.1 (Proposed Action), the Proposed Action would result in more frequent peak operations at night in order to efficiently meet campus demand for chilled water. Although operational noise levels would not increase relative to current peak operation noise levels, the perception of noise generated by the CUP could increase as nighttime ambient noise levels are lower than in the daytime. CUP operations would continue to meet the Montgomery County nighttime noise ordinance of 55 dBA at the property lines. If necessary, the NIH would utilize noise suppression techniques in order to meet that requirement.

Alternative Action

Implementation of the Alternative Action would result in minor temporary noise impacts and moderate long-term noise impacts similar to those discussed in the Proposed Action. The Alternative Action would include additional construction sites including the Booster Pump Station, water line, and backflow preventer building near the North Gate; the water line and backflow preventer building south of Lincoln Drive and adjacent to the Bethesda Trolley Trail; and the water line near Buildings 6A and 67. Temporary construction noise levels would be present in these additional locations. All other noise impacts would be identical to the Proposed Action.

No-Action Alternative

The No-Action Alternative would not generate any temporary noise associated with construction. Operational noise levels within the Campus would not change.

4.8 Air Quality

4.8.1 *Ambient Air Quality*

Proposed Action

Implementation of the Proposed Action would result in minor direct and indirect impacts to air quality at the Campus as a result of the following activities:

- Onsite stationary sources: Operation of two emergency generators; and
- Temporary activities: Construction of the Industrial Water Storage System, Thermal Energy Storage System, and associated infrastructure.

In order to demonstrate that both the Proposed Action and the Alternative Action (discussed in the following subsection) would result in minor increases in emissions, the NIH conservatively performed a GCR and air emission calculations for the Alternative Action, which would result in higher air emissions due to the larger construction scope (e.g., larger tank at the Parking Lot 41 site, Booster Pump Station, additional water lines and other supporting infrastructure) and greater operational impacts (e.g., more emergency generators). Refer to the following subsection for more details regarding the types and quantities of emissions expected under the Alternative Action, which also serve as a conservative estimate for the Proposed Action.

As discussed below under the Alternative Action, the NIH would work with the MDE to determine regulatory applicability of the NSPS and NESHAP to the new emergency generators installed at the water tanks; to assess the need for updates to the Campus Title V permit; to obtain a PTC for all new generators exceeding the engine output thresholds specified in COMAR 26.11.02.10; and to confirm that the expected operational emissions do not exceed NSR or PSD levels.

The NIH would also implement best management practices during construction to limit fugitive dust emissions, as described in greater detail under the Alternative Action.

The air quality effects of criteria pollutants at the Campus would be insignificant under the Proposed Action and would not interfere with regional efforts to meet the NAAQS. The Proposed Action is not subject to GCR requirements and a conformity determination is not required. This finding is based on the NIH's GCR applicability analysis of the Alternative Action (Appendix B), but the determination also conservatively applies to the Proposed Action due to its smaller construction and operational scope.

Alternative Action

The Alternative Action would result in minor direct and indirect impacts to air quality at the Campus as a result of the following activities:

- Onsite stationary sources: Operation of three emergency generators;
- Offsite stationary sources: Minor net increase in electricity demand; and
- Temporary activities: Construction of the Booster Pump Station, Potable Water Storage System, Thermal Energy Storage System, and other supporting infrastructure.

The following subsections describe these air quality impacts in more detail and summarize the results of the GCR applicability analysis.

Onsite Stationary Sources

Under the Alternative Action, a minor increase in air emissions of NO_X, CO, VOC, SO_2, and PM from onsite stationary sources is expected due to the occasional use of diesel emergency generators at the Booster Pump Station, Potable Water Storage System, and Thermal Energy Storage System. The generators would be run regularly for testing and would be used to power multiple electric pumps in the event of a power outage. The Alternative Action would install three new diesel emergency generators at the Campus, including a 300-kW generator at the Booster Pump Station, a 1,250-kW generator at the Potable Water Storage System, and a 1,250-kW generator at the Thermal Energy Storage System. The generators would likely operate for one hour per week for regular testing, for a total of 52 operating hours per year. The analysis assumes 104 hours of annual operation in order to account for occasional power outages that might occur in addition to the known 52 hours of testing. (Note, however, that the evaluation of air permitting requirements may require a higher assumed frequency of operation.)

The new generators would likely be subject to "Tier 4" USEPA emission standards for nonroad engines. The Tier 4 emission standards establish emission limits for multiple pollutants, including CO, PM, and NO_X. The generators would also likely be subject to the NSPS for Stationary

Compression Ignition Internal Combustion Engines (40 CFR Part 60 Subpart IIII) and the NESHAP for Stationary Reciprocating Internal Combustion Engines (40 CFR Part 63 Subpart ZZZZ). The NIH would consult with the MDE prior to installation to reach final regulatory applicability determinations for these units. The NIH would obtain a PTC from MDE prior to installation of any generators that exceed the applicability thresholds defined in COMAR 26.11.02.10 and would confirm that the potential emissions from each generator do not exceed the NSR or PSD applicability thresholds. The electric pumps do not require a PTC because they do not have any direct emissions.

As discussed in the next section (Offsite Stationary Sources), the electricity required for chilling the water in the Thermal Energy Storage System, heating and cooling of the pump houses and continuously operating the 12 pumps would be generated offsite and therefore would not increase the onsite air emissions.

The diesel emergency generators may require an amendment to the NIH's Title V permit for the Campus. The NIH would work with the MDE to determine whether the additional expected emissions from the three new generators exceed the NIH's permitted levels for the Campus. Table 4-3 presents the summary of projected criteria pollutant emissions from the generators that would be installed under the Alternative Action. The emissions were calculated using the USEPA emission factors from two tables from AP-42 Chapter 3: Table 3.3-1 (applicable to the 300-kW generator) and Table 3.4-1 (applicable to the 1,250-kW generators). The AP-42 emissions factors for diesel-fueled engines by engine output in units of grams per horsepower-hour (g/HP-hr) were multiplied by the product of engine output in HP and 104 hours of annual operation. The hydrocarbon (HC) emission factor likely overestimates the VOC emissions because it includes non-volatiles. The emissions calculation for this analysis conservatively uses total HC as VOC.

Table 4-3. Projected Criteria Air Pollutant Emissions from New Stationary Onsite Sources (Generators) under the Alternative Action

Generator Location	CO (tons)	NOx (tons)	$PM_{2.5}$ (tons)	PM_{10} (tons)	SO_2 (tons)	VOC (tons)
Booster Pump Station	0.14	0.65	0.05	0.05	0.04	0.05
Potable Water Storage System	0.96	4.19	0.12	0.12	1.41	0.12
Thermal Energy Storage System	0.96	4.19	0.12	0.12	1.41	0.12
Total	**2.06**	**9.02**	**0.29**	**0.29**	**2.86**	**0.30**

Offsite Stationary Sources

The Alternative Action would have a minor impact on offsite stationary emissions. The continuous operation of 12 pumps at the Booster Pump Station, Potable Water Storage System, and Thermal Energy Storage System would require the purchase of additional electricity generated at offsite EGUs. The electricity demand would be partially offset by the shift in operation of the chillers to nighttime when the chillers operate more efficiently. The net increase in electricity demand should be minor.

Mobile Sources

The Alternative Action would have no impact on vehicle-related air emissions because the implementation of the Alternative Action would have no long-term impact to traffic patterns at the

Campus and would not affect the number of personnel commuting to and working at the Campus. Refer to Section 4.6 (Transportation and Traffic) for discussion of traffic impacts.

Temporary Activities

Construction activities associated with the Alternative Action would result in temporary minor emissions of NO_X, VOC, CO, PM, and SO_2 from the use of construction equipment, such as excavators, cranes, loaders, and backhoes, as well as on-road vehicles, such as delivery trucks, concrete trucks, and dump trucks, over an approximately 15 to 24 month period. The NIH estimated emissions from construction equipment and the on-road vehicles using USEPA's National Mobile Inventory Model (NMIM) and Motor Vehicle Emission Simulator (MOVES) model. NMIM is a framework that runs USEPA's NONROAD model, the current regulatory model for nonroad equipment emissions estimation. MOVES is USEPA's official regulatory model for on-road mobile emissions. The maximum annual projected NO_X, VOC, CO, PM, and SO_2 emissions from construction activities and the methodology used to calculate these emissions can be found in Appendix B.

Construction activities often cause fugitive dust (PM) emissions that might have a temporary impact on local air quality. Dust emissions during building construction are associated with land clearing, ground excavation, grading, and the construction of the building itself. Emissions may vary substantially from day to day, depending on the level of activity, specific type of activity, and weather conditions. The quantity of dust emissions from construction is proportional to the area of land where the activity is taking place, as well as the level of construction activity.

The NIH is required to take reasonable precautions to prevent PM from becoming airborne, per COMAR 26.11.06.03D. These precautions may include a number of air quality best management practices, which would limit fugitive dust impacts to temporary, minimal health or environmental effects. These practices would include, but would not be limited to, the following:

- Watering down active construction areas to reduce fugitive dust emissions;
- Stabilizing exposed or graded areas (e.g., by paving roads and hydroseeding open areas) as soon as possible upon completion of grading;
- Properly covering trucks hauling fill material or maintaining at least two feet of free-board;
- Limiting truck speeds on unpaved areas of the site to 15 miles per hour or less;
- Grading sites in phases, thereby limiting the time that disturbed soil is exposed; and
- Temporarily halting construction activities when winds exceed 25 miles per hour.

GCR Analysis and Emissions Summary

The NIH has prepared a GCR Applicability Analysis for the Alternative Action (Appendix B). This analysis conservatively estimates the emissions of nonattainment criteria pollutants during construction and operation of the affected facilities for the years of construction (2015 and 2016) and the first full year of operation (2017). This analysis demonstrates that the Alternative Action would result in emissions well below the *de minimis* thresholds each calendar year for nonattainment pollutants and their precursors (NO_X, VOC, $PM_{2.5}$, CO, and SO_2). The Alternative Action is therefore not subject to GCR requirements and a conformity determination is not required. The air quality effects of criteria pollutants at the Campus would be insignificant under the Alternative Action and would not interfere with regional efforts to meet the NAAQS.

No-Action Alternative

The No-Action Alternative would result in no changes in campus air quality compared to the baseline.

4.8.2 *Greenhouse Gas Emissions*

Proposed Action

Implementation of the Proposed Action would result in minor impacts to Scope 1, 2, and 3 GHG emissions due to construction and operation activities. As discussed in Section 4.8.1 (Ambient Air Quality), the construction and operations scope for the Proposed Action is smaller than that under the Alternative Action; therefore, the GHG emissions estimated for the Alternative Action can conservatively apply to the Proposed Action. The total quantifiable GHG emissions resulting from the Alternative Action are presented in Table 4-4.

Alternative Action

Implementation of the Alternative Action would result in minor impacts to Scope 1, 2, and 3 GHG emissions. Construction and operation activities under the Alternative Action would result in emissions of GHG. Scope 1 GHG emissions would include those occurring due to operation of the emergency diesel generators beginning in 2017. Scope 2 GHG emissions would be generated from the additional electricity purchased by the Campus to power the 12 continuously operating pumps at the Booster Pump Station, the Potable Water Storage System, and the Thermal Energy Storage System. Finally, Scope 3 emissions of GHG would result from the temporary construction activities during years 2015 and 2016 due to the use of on-road and nonroad mobile equipment. The NIH used the MOVES model to directly calculate carbon dioxide (CO_2), methane (CH_4) and nitrous oxide (N_2O) emissions from Scope 3 emissions occurring during temporary construction activities (e.g., delivery of pipe and concrete to the site) in addition to the criteria air pollutants discussed previously. The NIH also used NMIM and AP-42 emission factors to calculate CO_2 emissions from nonroad construction sources (Scope 3) and operation of generators (Scope 1). The NIH estimated CH_4 and N_2O emissions from nonroad sources (construction and operations) as a function of fuel consumption (gallons of diesel). The NIH calculated diesel fuel consumption using the CO_2 estimates and a carbon content of 2,778 grams per gallon of diesel, according to Equation 1 below (USEPA, 2005).

$$FC = \frac{CO_2}{2{,}778 \times 0.99 \times 44/12} \qquad \text{Equation 1}$$

Where:

FC	=	Fuel consumption (gallons)
CO_2	=	CO_2 emissions (grams)
2,778	=	Carbon content of distillate fuel no. 2 (grams/gallon)
0.99	=	Conversion efficiency factor (unitless)
44/12	=	Molecular weight ratio of CO_2 to C (unitless)

The NIH calculated emissions of CH_4 and N_2O emissions from nonroad equipment and the stationary generators by multiplying the fuel consumed (determined from the above Equation 1) by emission factors of 0.57 g/gal for CH_4 and 0.26 g/gal for N_2O (USEPA, 2014f). Table 4-4 quantifies

Scope 1 and known Scope 3 sources of GHG emissions and shows that the maximum year of CO_2-equivalent emissions would be 2016, which is the year with a worst-case 12 consecutive months of high-intensity construction (with activities compressed to 15 months that could have spanned 24 months). For the worst-case scenario, approximately 9,000 tons of CO_2e per year are expected from Scope 3 GHGs, which is less than five percent of the 2011 Campus CO_2e emission inventory for the CUP reported in Table 3-8. The on-going emissions from the operation of diesel emergency generators would contribute less than 500 tons CO_2e per year, which is less than half of one percent of the CUP GHG emissions.

The continuous operation of electric pumps at the Booster Pump Station and water tanks would require the Campus to purchase additional electricity, which would result in off-site GHG emissions (Scope 2) and the associated losses of transmission/distribution (Scope 3). The NIH did not develop emissions estimates for these GHG emissions but they are expected to be minor.

Table 4-4. Projected Greenhouse Gas Emissions Resulting from the Alternative Action

Scope	Source	Year	CO_2 (tons)	CH_4 (tons)	N_2O (tons)	*CO_2e (tons)*
1	Generator at the Booster Pump Station	2017+	24	0.00	0.00	24
	Generator at the Potable Water Storage System	2017+	202	0.01	0.01	204
	Generator at the Thermal Energy Storage System	2017+	202	0.01	0.01	204
	Scope 1 Total:		**429**	**0.02**	**0.01**	**432**
3	On-road Vehicles for Construction	2015	2,207	0.28	0.01	2,215
	Nonroad Equipment for Construction		4	0.00	0.00	4
3	On-road Vehicles for Construction	2016	8,827	1.13	0.03	8,859
	Nonroad Equipment for Construction		15	0.00	0.00	15
	Scope 3 Total:		**11,053**	**1.41**	**0.04**	**11,093**

No-Action Alternative

The No-Action Alternative would result in no increase in GHG emissions at the Campus.

4.9 Biological Resources

4.9.1 *Vegetation*

Proposed Action

The Proposed Action would result in minor impacts to vegetated areas due to development of grassy areas, urban landscape, and trees. As discussed in Section 3.9 (Biological Resources), the Campus currently contains 186 acres of open space. Construction of the Industrial Water Storage System would result in the net loss of approximately 66,000 SF (1.5 acres) of vegetated area. Construction of the Thermal Energy Storage System would result in the net loss of approximately 87,000 SF (2.0 acres) of vegetated area. Total project implementation would result in the net loss of approximately 153,000 SF (3.5 acres) of vegetated area. Site preparation and installation of supporting pipelines may result in the minor or temporary disturbance of additional areas of vegetation; these areas would be replanted with native vegetation after completion of work, where feasible. The Proposed Action would result in impacts to vegetation in an established no-mow area at the site of the proposed Industrial Water Storage System, as discussed in Section 3.9.1 (Vegetation).

Implementation of the Proposed Action would require cutting of trees within the impacted vegetated areas discussed above. Trees that may be cut as a result of installation of the Industrial Water Storage System are shown in Figure 4-4. The Proposed Action would not result in any impacts to champion trees or to Cedar Lane Woods, the forested area discussed in Section 3.9.1 (Vegetation). Current NIH tree, forest and vegetation policies would remain in place requiring ongoing protection, replacement, and enhancement. The NIH is currently updating their *Urban Forest Conservation Plan* to cover the projects included in the *2013 Campus Master Plan*. The revised *Urban Forest Conservation Plan* will be submitted to MDNR for review and approval.

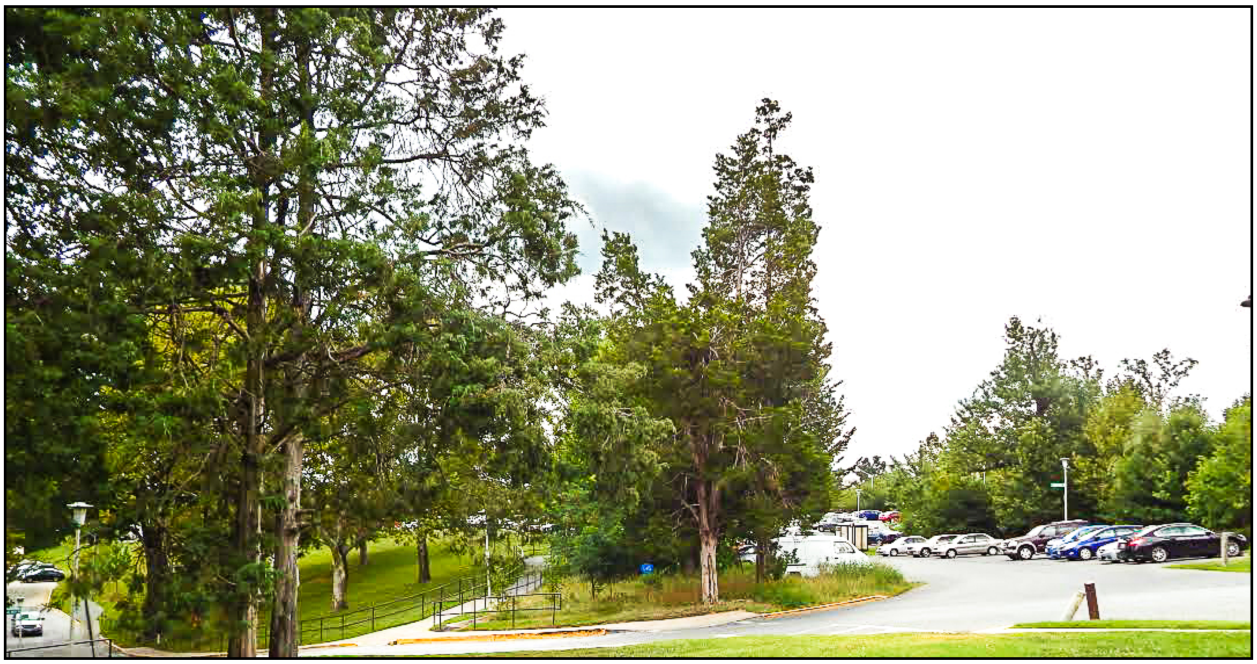

Figure 4-4. Trees that Would be Cleared for the Industrial Water Storage System (Photo from the West)

Trees that would be affected by development would be transplanted when feasible. Most prior transplants on the Campus have been five inches or less in bole diameter, although transplants have been successful with trees up to ten inches in diameter. Trees lost as a result of construction activities would be replaced on at least a one for one basis in accordance with the NIH's 1996 policy, which in order to maintain 15 percent tree canopy cover on a campus-wide basis, requires no net tree loss. Any hardwood trees removed would be managed in accordance with Maryland Department of Agriculture guidance to prevent the spread of the emerald ash borer.

Alternative Action

Implementation of the Alternative Action would result in minor vegetation impacts similar to those discussed above for the Proposed Action. One difference relative to the Proposed Action is that construction would occur at a number of additional sites, including the site near North Gate, along the Bethesda Trolley Trail, near the South Drive Entrance, and in the vicinity of Buildings 6A and 67. As a result, the vegetation impacts of the Alternative Action would be somewhat greater than the Proposed Action. Construction of the Booster Pump Station when combined with demolition of the existing basketball court and parking area would result in the net loss of approximately 6,000 SF (0.14 acres) of vegetated area currently designated as a no-mow area. Total project implementation would result in the net loss of approximately 160,000 SF (3.7 acres) of vegetated area. Site preparation and installation of supporting infrastructure (e.g., pipelines and other utility lines) may result in the minor or temporary disturbance of additional areas of vegetation, including some in established no-mow areas; these areas would be replanted with native vegetation after completion of work, where feasible.

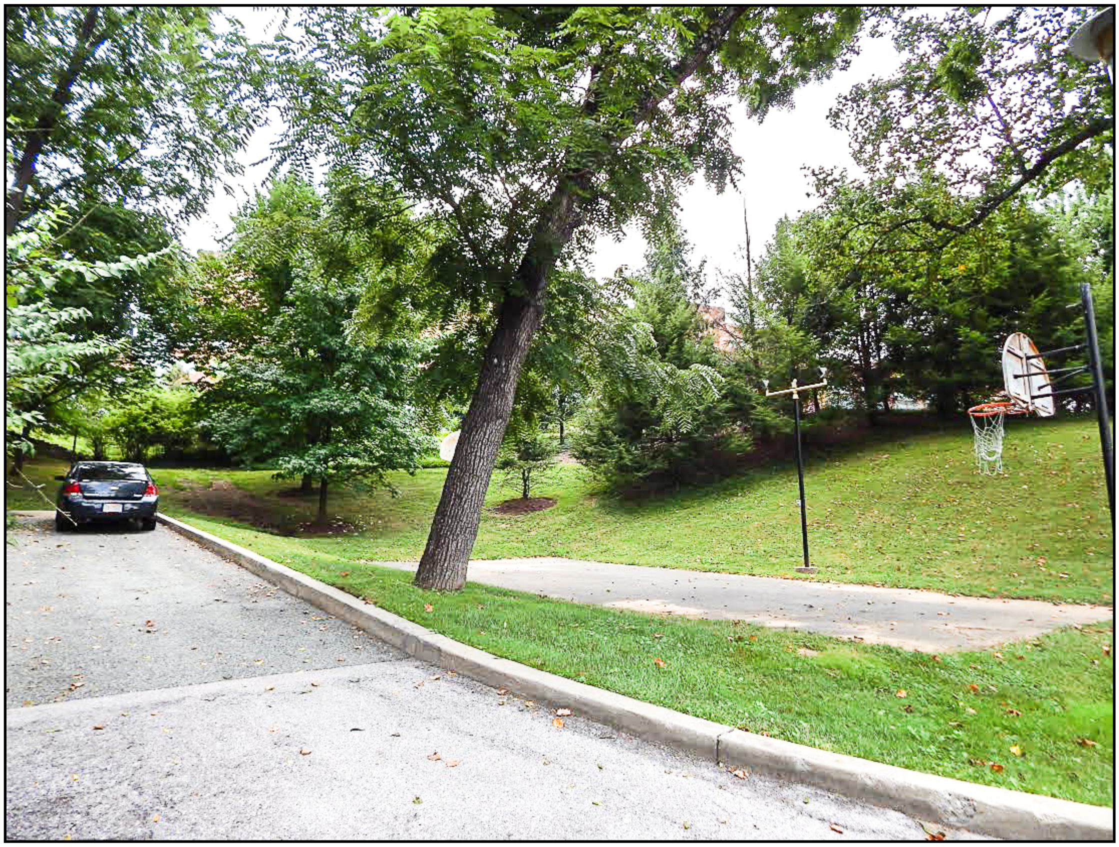

Figure 4-5. Trees in the Vicinity of the Site for the Booster Pump Station

Implementation of the Alternative Action would result in tree impacts similar to those discussed above for the Proposed Action. One difference relative to the Proposed Action is that construction would occur at a number of additional sites as described above. Tree cutting could be required at these additional sites. Trees that could be cut as a result of construction of the Booster Pump Station are shown in Figure 4-5. Trees could also be cut at the site near the Bethesda Trolley Trail for construction of the backflow preventer building. The NIH would minimize the number of trees removed at that location. Similar to the Proposed Action, the Alternative Action would not result in any impacts to champion trees or to Cedar Lane Woods.

The NIH would apply similar mitigation measures to those discussed under the Proposed Action.

No-Action Alternative

The No-Action Alternative would not result in any changes in impacts to vegetation.

4.9.2 *Wildlife*

Proposed Action

Implementation of the Proposed Action would result in minor impacts to wildlife. The reduction in grassy vegetated areas discussed in Section 3.9.1 (Vegetation) represents a minor reduction in potential wildlife habitat. Much of the affected grassy areas, however, are routinely landscaped and offer less foraging and habitation value than other vegetated areas (e.g., large contiguous tracts and stream buffers) around the Campus. The Proposed Action would not disturb federal or state-listed rare, threatened, or endangered species. The Proposed Actions would also not disturb forested areas of sufficient size to support Forest Interior Dwelling Species.

Trees to be cleared may need to be surveyed to comply with the Migratory Bird Treaty Act (16 U.S.C. §703). The NIH would verify that no bird eggs and/or young protected under the Migratory Bird Treaty Act are present. If the NIH determines that eggs and/or young are present, tree clearing would proceed only after it is verified that the young have fledged.

Noise emissions from the construction activities under the Proposed Action may disturb wildlife in and around the project sites, including migratory birds nesting in nearby bird boxes; however, these impacts would be temporary. In addition, nighttime noise emissions associated with CUP operations would have potential to disturb wildlife around the CUP. The Campus is located in an urban environment, however, with many existing noise sources and it is anticipated that wildlife would acclimate to the expected moderate change in noise at the CUP. Construction and operational activities would comply with all applicable local, state, and federal noise regulations. Potential noise impacts are discussed further in Section 4.7 (Noise Levels).

As discussed in Section 4.3.2 (Surface Water), the Proposed Action would result in minor indirect impacts to campus streams due to runoff from construction sites. Runoff to streams could include sediment or other contaminants, which have the potential to adversely impact aquatic organisms that dwell in the streams. As discussed in Section 4.4 (Stormwater), the NIH would implement stormwater management and pollution prevention measures during construction to reduce impacts to aquatic species that inhabit the campus streams.

Alternative Action

Implementation of the Alternative Action would result in minor wildlife impacts similar to those discussed above for the Proposed Action. One difference relative to the Proposed Action is that construction would occur at a number of additional sites, including the site near North Gate, along the Bethesda Trolley Trail, near the South Drive Entrance, and in the vicinity of Buildings 6A and 67. As a result, minor wildlife impacts of the Alternative Action would be somewhat greater than the Proposed Action. The NIH would apply similar mitigation measures to those described under the Proposed Action.

Implementation of the Alternative Action could result in a direct impact to the NIH Stream during construction of the water line that would cross the NIH Stream in the area of Buildings 6A and 67. If a direct impact is unavoidable, aquatic organisms in the stream would be adversely impacted. As discussed in Section 3.3.2 (Surface Waters), the campus streams are classified as Use I streams (for water contact recreation and protection of non-tidal warm water aquatic life). As such, in-stream work could not be conducted from March 1 through June 15 (COMAR 26.08.02.11).

Another difference relative to the Proposed Action is that water treatment of the Potable Water Storage System could be implemented as required under applicable drinking water regulations.

Although a treatment process has not yet been determined, this may involve the periodic addition of chlorine to the Potable Water Storage System. This could increase the amount of residual chlorine in the blowdown water discharged from the CUP to the NIH Stream. Additional chlorine in blowdown water has the potential to impact aquatic organisms, however, chlorine thresholds established under the NIH's current NPDES permit would not be exceeded as a result of implementation of the Alternative Action.

No-Action Alternative

The No-Action Alternative would not result in any changes in impacts to wildlife or habitat.

4.10 Topography, Geology, and Soils

4.10.1 *Topography*

Proposed Action

The Proposed Action would have moderate localized impacts on topography due to construction activities, including extensive grading. The existing hillside at the site of the Industrial Water Storage System (located at the Parking Lot 41 site) would be cut and a terraced retaining wall would be constructed from the south and southwest stepping down toward the proposed site of the system to create a level area for construction. The retaining wall would stabilize the resulting cliff and thus prevent erosion. Much less grading would be required at the site of the Thermal Energy Storage System (located at the Building 34 site) as that area has been previously developed and is relatively level. Grading for installation of piping under the Proposed Action is expected to be minimal since the construction would occur in previously disturbed and developed areas (e.g., along existing roads or sidewalks).

These impacts to the campus topography would influence drainage patterns in the immediate vicinity of the proposed structures. Refer to Section 4.4 (Stormwater) for discussion of stormwater management techniques that the NIH would utilize to mitigate impacts to stormwater runoff.

Alternative Action

Implementation of the Alternative Action would result in moderate localized topography impacts similar to those discussed above for the Proposed Action. One difference relative to the Proposed Action is that construction would occur at a number of additional sites, including the site near North Gate, along the Bethesda Trolley Trail, near the South Drive Entrance, and in the vicinity of Buildings 6A and 67. Under the Alternative Action, the existing hillside at the site of the Booster Pump Station would be cut and a terraced retaining wall would be constructed to create a level area for development. As a result, the moderate topography impacts of the Alternative Action would be somewhat greater than the Proposed Action. Grading for installation of supporting infrastructure under the Alternative Action is expected to be minimal since most of the construction would occur in previously disturbed and developed areas (e.g., along existing roads or sidewalks).

No-Action Alternative

The No-Action Alternative would not involve grading activities and, therefore, would not impact the topography of the Campus.

4.10.2 *Geology and Soils*

Proposed Action

The Proposed Action would result in moderate soil disturbances due to construction activities. Both previously developed and previously undisturbed soils would be impacted. The NIH would implement SEC measures during earth disturbance to minimize impacts to soil. The Proposed Action would exceed 5,000 SF of disturbance and would, therefore, require an SEC plan designed in accordance with the *Maryland Standards and Specifications for Soil Erosion and Sediment Control* and submitted to MDE for approval. As noted in Section 4.10.1 (Topography), the Proposed Action would require extensive grading at the Parking Lot 41 site, but with the use of appropriate SEC measures, the potential for extensive soil erosion is expected to be minimal.

Construction activities could potentially impact soil quality. Soil surface and subsurface compaction may result from heavy machinery traffic around the sites of the project elements.

The stability of existing development at the Campus indicates that soil conditions would be suitable for new development. Geotechnical subsurface borings at the sites of the evaluated alternatives would be conducted prior to construction to ensure the adequacy of the design to address geology and soil conditions.

Operational use of the proposed structures is not expected to impact soils.

No impacts associated with employee exposure to radon are anticipated as a result of implementation of this project (Jacobus, 2015).

Alternative Action

Implementation of the Alternative Action would result in moderate geology and soil impacts similar to those discussed above for the Proposed Action. One difference relative to the Proposed Action is that construction would occur at a number of additional sites, including the site near North Gate, along the Bethesda Trolley Trail, near the South Drive Entrance, and in the vicinity of Buildings 6A and 67. As a result, the moderate soil disturbances of the Alternative Action would be somewhat greater than the Proposed Action. As noted in Section 4.10.1 (Topography), the Alternative Action would require extensive grading for installation of the Booster Pump Station (site near the North Gate), but with the use of appropriate SEC measures, the potential for extensive soil erosion is expected to be minimal.

Similar to the Proposed Action, if the NIH elects to pursue the Alternative Action, geotechnical subsurface borings at the sites of the evaluated alternatives would be conducted prior to construction to ensure the adequacy of the de sign to address geology and soil conditions.

Consistent with the Proposed Action, operational use of the proposed structures is not expected to impact soils and no impacts associated with employee exposure to radon are anticipated.

No-Action Alternative

Continued operations under the No-Action Alternative would not impact geology or soils.

4.11 <u>Wastes</u>

4.11.1 *Non-Hazardous Solid Wastes*

Proposed Action

Implementation of the Proposed Action would result in minor impacts to non-hazardous solid waste generation associated with construction activities. Any impacts would be temporary and occur only during the construction period. As part of construction requirements, the NIH would require the contractors to recycle and reclaim significant portions of waste and demolished materials, reducing the waste stream from construction activities. Any excavated soil not able to be reused onsite would be transported offsite to another NIH location that would be able to accommodate the spoils or the NIH would have to make arrangements with a third party to accept their construction spoils.

No new solid waste from operations is expected to be generated as a result of the Proposed Action. The NIH would continue to generate, manage, and dispose of solid waste as described in Section 3.11.1 (Non-Hazardous Solid Wastes).

Alternative Action

Implementation of the Alternative Action would result in minor impacts to non-hazardous solid waste generation similar to those discussed above for the Proposed Action. One difference relative to the Proposed Action is that construction would occur at a number of additional sites. As a result, the minor non-hazardous solid waste generation impacts of the Alternative Action would be somewhat greater than the Proposed Action.

No-Action Alternative

The NIH would not generate any new solid waste as a result of implementing the No-Action Alternative. The NIH would continue to generate, manage, and dispose of solid waste as described in Section 3.11.1 (Non-Hazardous Solid Wastes).

4.11.2 *Hazardous Wastes*

Proposed Action

Implementation of the Proposed Action would result in a minor impact on hazardous waste generation due to operation, maintenance and repair of new emergency generators. These activities could result in the generation of waste oil or diesel fuel. Personnel would exercise caution in the handling, storage and disposal of any waste oil and/or fuel in order to prevent release to the environment. Wastes would be stored and disposed or recycled in accordance with state and federal regulations.

Alternative Action

Implementation of the Alternative Action would result in minor hazardous waste generation impacts similar to those discussed above for the Proposed Action. One difference relative to the Proposed Action is that one additional emergency generator would be installed under the Alternative Action. Another difference is that water treatment would potentially be conducted (e.g., periodic addition of chlorine to the Potable Water Storage System) if required per applicable drinking water regulations. As a result, the minor hazardous waste generation impacts of the

Alternative Action would be somewhat greater than the Proposed Action. Wastes generated from these operations would be stored and disposed or recycled in accordance with state and federal regulations.

No-Action Alternative

The NIH would not generate any new hazardous wastes as a result of implementing the No-Action Alternative. The NIH would continue to generate, manage, and dispose of hazardous wastes at the Campus as described in Section 3.11.2 (Hazardous Wastes).

4.12 Cultural and Historic Resources

4.12.1 *Architectural Resources*

Proposed Action

Construction of the Thermal Energy Storage System and associated infrastructure would result in temporary construction impacts (e.g., noise) and a permanent change in the appearance of the Building 34 site. These impacts would be perceptible from the rear of the historic Biologics Standards Laboratory and Annex (Buildings 29 and 29A), located north of the project site. The new infrastructure would also result in a minor change in the appearance of the Campus when viewed from the historic NLM complex (Buildings 38 and 38A). Additionally, construction of the Industrial Water Storage System may result in a minor change in the appearance of the Campus when viewed from the upper levels of Building 38A. Construction of these new facilities, however, would not affect the integrity of setting of these historic properties; would not obscure or compromise their original design intent; and would not otherwise affect the characteristics that qualify these historic properties for listing in the National Register.

Based on this analysis, the NIH has determined that the Proposed Action would not adversely affect any historic properties or MIHP-listed properties. Pursuant to Section 106 of the NHPA, the NIH has initiated consultation with the MD SHPO to obtain their concurrence with this finding. Appendix C presents the correspondence associated with this consultation.

Alternative Action

The Alternative Action would result in similar impacts to architectural resources as discussed above for the Proposed Action, with the following additional impacts.

Implementation of the Alternative Action would result in construction of a larger tank at the Parking Lot 41 site. As discussed in Section 2, the Potable Water Storage System that would be constructed under the Alternative Action includes a tank that would be about 90 feet in height. By comparison, the Proposed Action would construct the Industrial Water Storage System at the same site, which includes a tank that would be about 50 feet in height.

Demolition of the basketball court and construction of the Booster Pump Station and nearby backflow preventer building would result in a minor, permanent change to the appearance of the Officer's Quarters Historic District and minor, occasional increases in noise levels during testing and operation of the generator. A review of historical site plans and the district's Determination of Eligibility (DOE) form indicates that the basketball court is not an original feature of the district and its demolition would not affect the integrity of the district. The NIH would mitigate the visual impacts of construction by designing the Booster Pump Station and backflow preventer building to be consistent with the appearance of contributing resources within the district (e.g., Building 15B).

Design features for both structures would include a brick veneer exterior with a grey slate hip roof, the slope of which would be generally consistent with those of the surrounding structures. While grading and vegetation removal would affect the immediate vicinity of the Booster Pump Station, this would not affect the park-like setting within the core of the historic district.

The NIH would mitigate noise levels from the Booster Pump Station generator (and all other new generators) by providing a sound-attenuating enclosure. Any residual noise would be minor and would not affect the setting or feeling of the Officer's Quarters Historic District. Refer to Section 4.7(Noise Levels) for additional details on noise.

Construction of the underground electrical and water lines associated with the Booster Pump Station would require temporary removal of vegetation and pavement within the Officer's Quarters Historic District. The NIH would restore landscaping vegetation and pavement to match the existing features following completion of the utility installation. Construction would not affect the configuration of the access road that encircles the core of the historic district, thus preserving the Radburn principles of the district site plan. Overall, the Alternative Action would not directly affect any contributing elements to the Officer's Quarters Historic District and would not affect any of the district's aspects of integrity.

Construction of the water line near Buildings 6A and 67 would result in temporary construction impacts within a small portion of the NIH Historic Core Historic District. Visibility and noise impacts during construction would generally be limited to the area around historic Building 6, and the site would be restored to existing conditions following completion of the utility installation.

Construction of the backflow preventer building near the South Drive Entrance (West) would result in temporary construction impacts and a minor change (a small structure no larger than 500 SF) in the surroundings of the MIHP-listed Bethesda Community Store (M: 35-43) located across Old Georgetown Road from the project site. These impacts, however, would not directly affect any elements of the protected parcel (the store itself, the parking area, service delivery area, storage shed, or the picnic and lawn areas to the rear of the parcel) and would not trigger a review by the Montgomery County Historic Preservation Commission.

Based on this analysis, the NIH has determined that the Alternative Action would not adversely affect any historic properties or MIHP-listed properties. Pursuant to Section 106 of the NHPA, if the NIH elects to pursue the Alternative Action, they would consult with the MD SHPO to obtain their concurrence with this finding prior to performing any construction.

No-Action Alternative

The No-Action Alternative would not result in improvements to the campus water system. The No-Action Alternative would not adversely affect any historic properties or MIHP-listed properties.

4.12.2 *Archeological Resources*

Proposed Action

The Proposed Action would not involve any earth disturbance within archeologically sensitive areas or any previously identified archeological sites.

The Proposed Action would not adversely affect any archeological sites listed or eligible for listing on the National Register. As described earlier, the NIH has initiated consultation with the MD SHPO to obtain their concurrence with this finding. Appendix C presents the correspondence associated with this consultation.

Alternative Action

Impacts under the Alternative Action would be similar to those described under the Proposed Action, with the following exception. Construction of the backflow preventer building near the South Drive Entrance (West) would take place directly across South Drive from an archeologically sensitive area. The NIH would take measures to ensure that unintentional earth disturbance (e.g., tire rutting or disturbance from storing construction materials or equipment on the ground) does not occur within the archeological site. This may include installation of temporary diversion fencing to exclude vehicles and materials from the sensitive area.

Based on this analysis, the NIH has determined that the Alternative Action would not adversely affect any archeological sites listed or eligible for listing on the National Register. If the NIH elects to pursue the Alternative Action, they would consult with the MD SHPO to obtain their concurrence with this finding prior to performing any construction.

No-Action Alternative

Under the No-Action Alternative, the NIH would not perform any earth disturbance associated with improvements to the campus water system. The No-Action Alternative would not adversely affect any archeological sites listed or eligible for listing on the National Register.

4.13 Land Use and Zoning

Proposed Action

The Proposed Action would not impact land use or zoning within the Campus. The Proposed Action would be consistent with the current institutional land use within Campus. Land use under the Proposed Action would remain consistent with the Montgomery County zoning and the MNCPPC *Bethesda-Chevy Chase Master Plan*. The Proposed Action is consistent with the land use goals and objectives of the *Campus Master Plan*.

Alternative Action

Impacts under the Alternative Action would be identical to those described under the Proposed Action. Land use and zoning would not be affected by implementation of the Alternative Action.

No-Action Alternative

The No-Action Alternative would not impact land use.

4.14 Socioeconomics

Proposed Action

Implementation of the Proposed Action would result in temporary minor impacts on the population and the availability of housing, due to construction workers who might temporarily relocate to the area. The Proposed Action would result in no permanent impacts to these resources as there is no projected change in staff. Temporary impacts on population and housing associated with construction activities are expected to be minor as Bethesda is a densely populated urban area and therefore the small temporary increase in population would be very small on a percentage basis.

Bethesda as a whole has relatively low proportions of children, minority, or low-income populations. Although there are areas of higher minority populations (30 to 35 percent) adjacent to the Campus, the percent minority is still low relative to Montgomery County (40.5 percent) and Maryland (37.9 percent). As discussed above, the impacts to social resources such as population and housing would be minor and temporary. Therefore, the Proposed Action would not result in disproportional impacts to sensitive populations.

Implementation of the Proposed Action would reduce the potential for interruptions to the NIH chilled water supply. The Proposed Action would not improve the reliability of the Campus potable water supply. This would reduce the potential for interruptions to the NIH's mission to conduct and support innovative biomedical research, a key driver of Montgomery County's economy. However, this benefit would be somewhat less relative to the Alternative Action.

The Proposed Action would not have a significant impact on recreational activities and the use of nearby parks. Temporary construction-related noise levels would be minor and would not affect the recreational use of nearby parks (see Section 4.7, Noise Levels). Air emissions from operations and construction activities would not be expected to affect ambient air quality within nearby parks (see Section 4.8, Air Quality). Impacts to viewscapes are expected to be minor due to intervening topography, vegetation, and buildings (see Section 4.5, Visual Impacts).

The Proposed Action would result in minor benefits to the local economy during construction activities (e.g., meals and incidentals for construction workers). The Proposed Action would not result in a permanent change in job availability at the Campus or associated effects on the local economy.

Alternative Action

Socioeconomic impacts under the Alternative Action would be identical to those described under the Proposed Action, with one exception. Relative to the Proposed Action, the Alternative Action would further reduce the potential for interruptions to the NIH's mission to conduct and support innovative biomedical research, a key driver of Montgomery County's economy. This is because the Alternative Action would include the Potable Water Storage System, which would serve to improve the reliability of the Campus potable water supply.

No-Action Alternative

The No-Action Alternative would have no impact on the population (including sensitive populations), housing, or open spaces in the surrounding area.

The No-Action Alternative would not reduce the potential for interruptions to the NIH's mission to conduct and support innovative biomedical research, a key driver of Montgomery County's economy. Failure to minimize interruptions to the NIH's mission could result in significant economic impacts on the surrounding communities.

The No-Action Alternative would not affect parks or recreation in the vicinity of the Campus.

4.15 Tank Failure

Proposed Action

Implementation of the Proposed Action would result in construction of a Thermal Energy Storage System and an Industrial Water Storage System as detailed in Section 2.1 (Proposed Action). Each of these systems includes a large water storage tank. Each tank will be designed and constructed in accordance with all applicable safety and construction regulations, requirements, and industry standards. NIH will properly maintain and monitor each tank and associated components in accordance with manufacturer's specifications, regulations, and guidance.

In the unlikely event that a tank failure should occur (e.g., leak or rupture), a sudden release of water would result. Release of a large volume of water could result in localized soil erosion, localized impacts to vegetation, and temporary impacts to surface water bodies due to mobilization of sediment and debris in floodwaters and subsequent discharge to stormwater sewers.

Tank failure associated with either system would likely result in damage to the associated pump house and support equipment (e.g., pumps, generator, valves, controls). Tank failure could also result in damage to adjacent roads or utilities. Temporary road and parking area closures would be likely due to flooding and erosion damage.

In the event of a tank rupture, damage to vehicles in campus parking areas and roadways in the path of floodwater is possible. Persons nearby could be injured as a result of a tank failure. Fencing may be installed around each system to prevent unauthorized access.

The site proposed for the Thermal Energy Storage System is adjacent to two 100,000-gallon underground storage tanks used for fuel oil. The tanks are located east of Building 34 and along Service Road West. The risk that tank failure could damage the underground tanks and/or result in a release of fuel oil into the environment would be minimized by constructing the Thermal Energy Storage System in a recessed area and using site grading and/or retaining walls to divert much of the floodwater away from the USTs in the event of tank failure.

Though tank failure associated with the Thermal Energy Storage System could temporarily disrupt chilled water operations (e.g., building climate control) and steam generation, impacts on the availability of chilled water to meet campus demand are expected to be minor because chilled water could be supplied directly from the CUP as needed.

Tank failure associated with the Industrial Water Storage System could result in erosion to the adjacent hillside or damage to the adjacent proposed retaining wall. Extensive damage to existing structures would not be expected.

Though tank failure associated with the Industrial Water Storage System could temporarily disrupt the supply of water to the CUP, impacts would be expected to be minor because water could be supplied directly from the campus water distribution system as needed.

Alternative Action

Implementation of the Alternative Action would result in construction of a Thermal Energy Storage System and a Potable Water Storage System as detailed in Section 2.2 (Alternative Action). As described above for the Proposed Action, the NIH would incorporate appropriate safeguards into the design, construction, maintenance, and monitoring of the associated tanks and tank components to minimize the potential for a leak or rupture.

In the unlikely event that a tank failure (e.g., leak or rupture) should occur within the Thermal Energy Storage System, the associated impacts would be the same as those described above for the Proposed Action.

In the unlikely event that a tank failure (e.g., leak or rupture) should occur within the Potable Water Storage System, the associated impacts would differ from those described above for the Industrial Water Storage System under the Proposed Action. These impacts would differ in the following ways:

- Failure of the Potable Water Storage System could also result in a temporary disruption to the drinking water supply on the Campus.

- Impacts resulting from floodwaters associated with failure of the Potable Water Storage System tank would likely be more severe under the Alternative Action as the tank capacity would be larger under the Alternative Action (nine million gallons) relative to the Industrial Water Storage System tank under the Proposed Action (five million gallons).

No Action

Under the No-Action Alternative, there would be no potential for tank failure because the Thermal Energy Storage System, Industrial Water Storage System, and Potable Water Storage System would not be constructed.

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5. CUMULATIVE IMPACTS

The Proposed or Alternative Action, in combination with other past, present and reasonably foreseeable actions at or near the Campus, could potentially contribute to cumulative improvements and impacts to certain environmental resources. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

5.1 Other Actions

The following list identifies past, present, and reasonably foreseeable actions at or near the Campus that were considered in the development of this cumulative impacts analysis. Figure 5-1 and Figure 5-2 illustrate the locations of these actions relative to elements of the Proposed or Alternative Actions.

Funded NIH Projects at the Campus:

- **(1) Construction of MLP-12:** The NIH plans to construct MLP-12, a multi-level parking garage. Construction of MLP-12, which is funded and planned for FY2016, was discussed in the Campus Master Plan and the Campus Master Plan EIS. At this time, the NIH's intent is to initially construct the lowest level (slab foundation) of the garage and to design the facility to permit later construction of additional levels as warranted and if funds became available. This initial portion of MLP-12 would have a footprint of approximately 75,000 SF and would accommodate approximately 233 parking spaces.

- **(2) Demolition of Building 34**: The NIH plans to demolish Building 34, a refrigeration plant; Building 34A, an addition to the south end of Building 34; and an associated parking lot adjacent to the buildings. Buildings 34 and 34A are no longer in use, are severely deteriorated, and are unsafe. This demolition project is funded and planned for FY2016.

- **(3) Construction of the Northwest Childcare Center (NWCCC):** The NIH is currently constructing the NWCCC near the intersection of Convent Drive and Center Drive. The two-story, 21,000-SF facility will provide space for 170 children and will meet the licensing requirements of the state of Maryland. Construction is expected to be complete in spring 2015 and the facility will be open for children in summer 2015.

- **(4) Improved Maintenance of CUP** Chillers**:** The NIH is implementing ongoing improvements to improve chiller reliability, including improved preventive maintenance practices and upgrades to existing equipment.

Unfunded Construction, Renovation, and Demolition Activities in Accordance with the Campus Master Plan:

As discussed in Section 1.2.1 (2013 Campus Master Plan and Parking Garage MLP-12), the NIH has developed a Campus Master Plan that identifies planned development at the Campus. The NIH projects potential growth over 20 years from 20,000 to 24,000 employees. To accommodate this growth and address aging facilities, the NIH plans to construct up to seventeen new buildings for research, administrative offices, amenities and other support facilities. The NIH also plans to construct up to three parking garages (including MLP-12). When feasible, older historic buildings would be renovated and converted to administrative or support functions. The NIH would upgrade utilities and roadways to support this growth and address aging infrastructure. This includes additions to the CUP and distribution systems for steam, chilled water, and electric power. The Campus Master Plan also identifies broad goals for development and land use, such as enhancing the natural buffer zone around the campus periphery by removing surface parking and adding plantings. This cumulative impacts analysis considers the potential impacts associated with the following elements of the Campus Master Plan:

- **(5) Construction and Demolition at the South Research Cluster**: The South Research Cluster is located at the south end of the Campus, just north of the planned sites for MLP-12 and the Industrial Water Storage System (or Potable Water Storage System). The NIH plans to demolish existing Buildings 14, 18, 28, and 32, which are one to two stories in height. The NIH plans to construct a 770,000-GSF biomedical laboratory complex and animal research facility as well as two multi-level parking structures, MLP-12 (discussed above) and MLP-13. The Campus Master Plan EIS proposes that a formal open space would be set aside to buffer the new construction and protect the setting of the National Register-eligible National Library of Medicine (Building 38).

- **(6) Construction and Demolition at the South Service Complex**: The NIH plans to demolish existing Parking Lot 41 and construct the South Service Complex. This complex would consist of multiple one to two-story buildings, including a Hazardous Waste Management Facility. Earthen berms are planned to minimize off-campus views of the complex.

- **(7) Adaptive Reuse of Residential Housing**: The NIH plans to convert Buildings 15B2, 15C1-C2, 15D1-D2, 15E1-E2, 15F1-F2, and 15G1 within the Officer's Quarters Historic District from residential to administrative use. The adaptive reuse of these contributing resources would be limited to interior spaces and would not impact the integrity of the historic district.

- **(8) Construction of MLP-14**: The NIH plans to construct MLP-14, a new multi-level parking structure that would be located at the north end of the Campus near the Officer's Quarters Historic District.

- **(9) Construction of Building N48 and Addition to Building A40**: As part of the West Research Cluster, the NIH plans to construct Building N48 and an addition to Building 40 (denoted A40), both of which would be located along South Drive near the west end of the Campus. Existing or new trees lining South Drive would tend to screen views of these buildings from Old Georgetown Road.

Planned Projects at Adjacent Institutions:

- **(10) Expansion of Medical Facilities and University Expansion at NSA Bethesda.** The United States Navy plans to expand and enhance facilities at the WRNMMC and Uniformed Services University of the Health Sciences (USU) at NSA Bethesda. Plans for WRNMMC include demolition of five hospital buildings and construction of a single five-story facility and associated 500-space underground parking garage; internal renovation of five hospital buildings; temporary medical facilities during construction; utility capacity upgrades; and accessibility and appearance improvements. Plans for USU include construction of a new education/research facility and associated 400-space above-ground parking garage and internal renovation of existing USU buildings. The current status of this project is unknown; however, the Navy planned to conduct construction between 2013 and 2018 (DOD, 2013).

- **(11) Expansion of Suburban Hospital.** Suburban Hospital in Bethesda is expanding its existing facilities by replacing 10 houses owned by the hospital with a 235,597-SF addition and a parking lot with 1,280 parking spaces. Construction began in October 2014 and is expected to be completed in 2017 (parking lot) and 2019 (addition).

Transportation/Roadwork Projects near the Campus:

- **(12) Construction of the Medical Center Metro Crossing.** The Montgomery County Department of Transportation plans to construct a pedestrian underpass between the Medical Center Metro station and the National Naval Medical Center to promote pedestrian safety and improve traffic flow along Rockville Pike. Construction is expected to begin in fall 2015 and be completed in fall 2018.

- **(13) Improvements at Old Georgetown Road and Cedar Lane Intersection.** The Maryland Department of Transportation, SHA is making changes to the intersection of Old Georgetown Road and Cedar Lane to improve traffic flow. Improvements include widening roads, constructing new turn lanes, and constructing a shared use path from Cedar Lane to the Campus as part of the historic Bethesda Trolley Trail. Construction began in fall 2014 and is expected to be completed in summer 2015.

- **(14) Improvements at Rockville Pike and Cedar Lane Intersection.** The Maryland SHA is making changes to the intersection of Rockville Pike and Cedar Lane to improve traffic flow. The first of two tiers was completed in 2014. The second tier, which includes road widening to create new turn lanes and through lanes, is expected to be completed in fall 2016.

- **(15) Reconfiguration of Wisconsin Avenue convergence with Jones Bridge Road, Center Drive, and Woodmont Avenue.** The Maryland SHA will reconfigure a major intersection where Wisconsin Avenue converges with Jones Bridge Road, Center Drive, and Woodmont Avenue to improve traffic flow. Construction is expected to begin by fall 2015 and be completed in 2017.

Residential/Commercial Development Projects within One-Half Mile of the Campus:

- **(16 and 17) Construction of Woodmont Central.** Private developers are constructing a three-phase mixed-use complex in Woodmont Triangle. The first phase (Gallery of Bethesda), which broke ground in March 2012 and is now complete, constructed a 17-story residential and retail building at 4800 Auburn Avenue (16). The second phase, which is in progress, will construct a 16-story residential and retail building at 4850 Rugby Avenue (16). The third phase, which is in progress, will construct a six-story residential building on the 1.61-acre site at 8280 Wisconsin Avenue (corner of Wisconsin Avenue and Battery Lane) (17).

- **(18) Construction of Bainbridge Bethesda.** Private developers are constructing a residential and retail building on a 0.47-acre site located on Fairmont Avenue, 150 feet south of Norfolk Avenue. The development will consist of a condominium building with five or more stories, 200 units, and 7,700 SF of retail space. Construction is in progress.

- **(18) Construction of 7770 Norfolk Avenue.** Private developers are currently constructing a residential and retail building across the street from Veterans Park and approximately a third of a mile from the Bethesda Metro Station. The development will consist of 17-story building with 244 apartments, 6,000 SF of ground floor retail space, and 3.5 levels of below grade parking.

- **(19) Construction of 7750 Wisconsin Avenue Bethesda Center.** Private developers will redevelop two buildings into mixed-use commercial and retail space. The development will consist of a 196,357-SF hotel, 253,787-SF office building, and 16,326 SF of ground floor retail space. The project has been approved, but construction has not started.

- **(20) Construction of 7900 Wisconsin Avenue.** Private developers will construct a 17-story mixed use development consisting of 450 rental units and 21,630 SF of ground floor retail space. The project has been approved, but construction has not started.

- **(21) Construction of 8101 Wisconsin Avenue.** Private developers are currently constructing a low-rise TD Bank, replacing an existing BP gas station.

As discussed in Section 4 (Environmental Consequences) and summarized in Table S-1, certain resources would not be substantially affected by the Proposed or Alternative Actions and therefore were not considered in this cumulative effects analysis. Other resources that would either be improved or impacted as a result of implementation of the Proposed or Alternative Action are included in the analyses below.

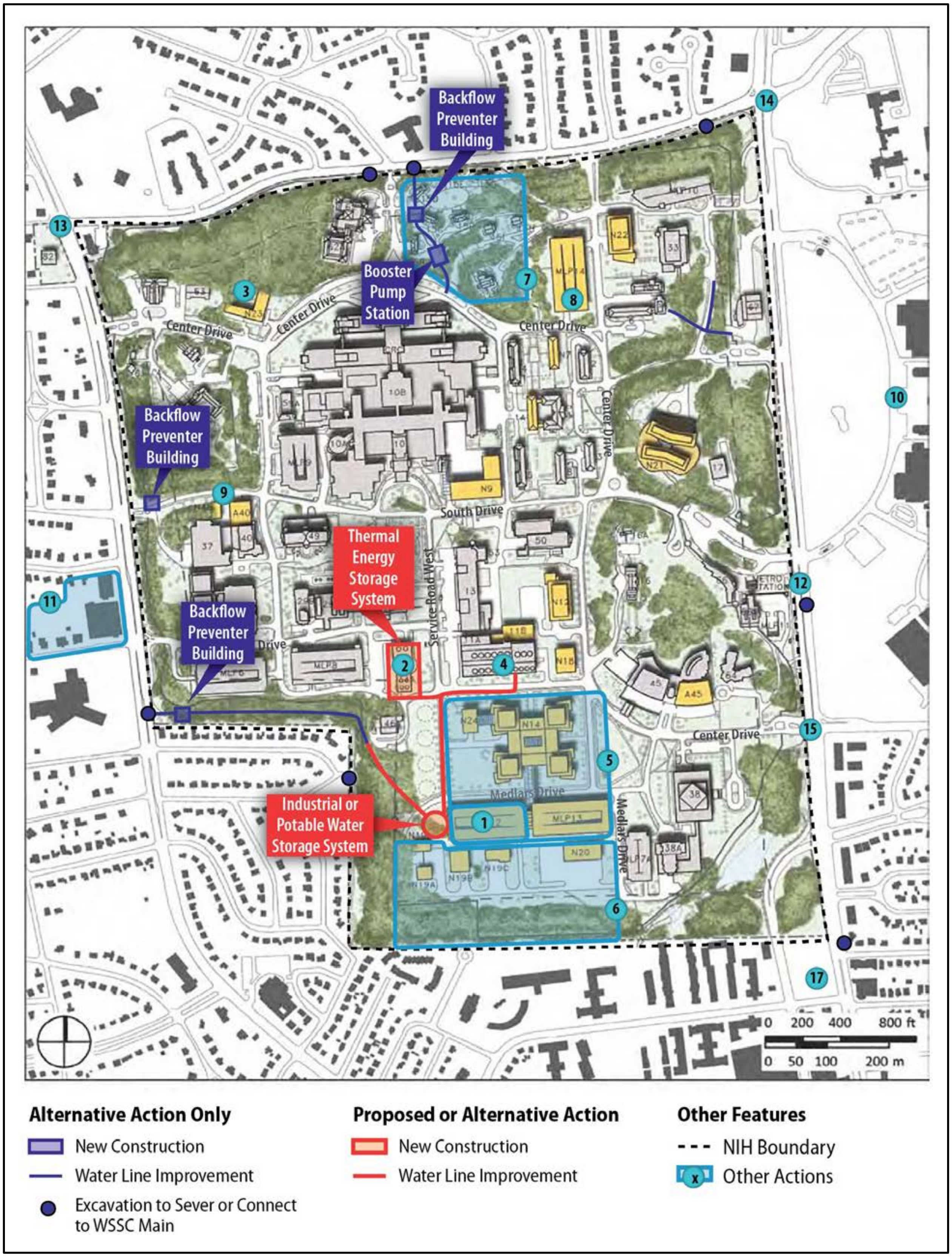

Figure 5-1. Other Actions at the Campus

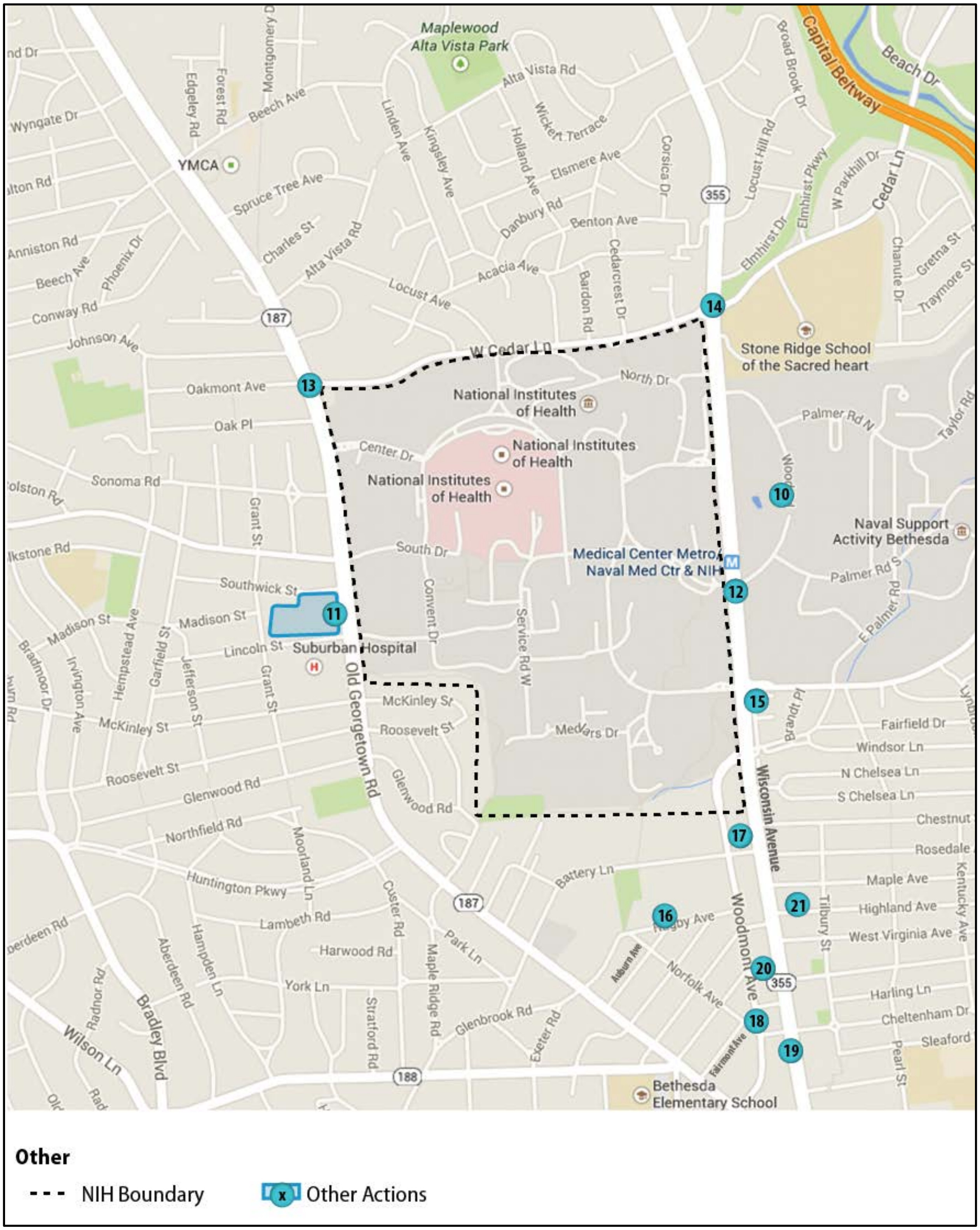

Figure 5-2. Other Actions Near the Campus

5.2 Cumulative Improvements

The sections below evaluate the long term potential cumulative improvements of the Proposed and Alternative Actions when viewed in combination with the past, present, and reasonably foreseeable actions listed above.

5.2.1 *Potable Water*

The NIH currently relies on WSSC to provide potable water to the Campus. As discussed in Section 4.1.1 (Potable Water), implementation of the Alternative Action would have a major benefit to the reliability of the campus water supply, by providing at least a two day supply of potable water in the event of a water emergency.

Implementation of the projects identified in Section 5.1 (Other Actions) would not have an impact on the reliability of the campus potable water supply. Therefore, the cumulative benefit would be no greater than the benefit derived from the Alternative Action.

Implementation of the Proposed Action would have no impact on the reliability of potable water to the Campus. Therefore, there would be no potential for a cumulative benefit to potable water reliability at the Campus.

5.2.2 *Chilled Water*

Implementation of the Proposed or Alternative Action would have a major benefit on the reliability of the chilled water supply to the NIH during a water emergency or unplanned maintenance at the CUP. Either action would provide a minimum of two-day supply of chilled water and an additional two-day supply of industrial water to supply the chillers.

As discussed in Section 3.1 (Utilities), the NIH recently implemented improvements to preventive maintenance practices and equipment modifications that have resulted in improved chiller reliability. These actions, in combination with the Proposed or Alternative Action, would lead to further cumulative benefits to the campus chilled water supply.

As the infrastructure to generate and distribute chilled water is wholly located within the Campus, other actions that occur off-campus would impact the reliability of campus chilled water only if they impact availability of potable water or electricity, which are required for the NIH to generate chilled water. The off-campus actions listed in Section 5.1 (Other Actions) are not anticipated to significantly impact the reliability of the potable water or electricity to the Campus. Therefore, the off-campus actions identified in Section 5.1 (Other Actions) are not expected to further contribute to or detract from the cumulative benefit described above.

5.3 Cumulative Impacts

The sections below evaluate the long term potential cumulative impacts of the Proposed and Alternative Actions when viewed in combination with the past, present, and reasonably foreseeable actions listed above.

Impacts associated with construction of the Proposed or Alternative Action, if implemented at the same time as the present or foreseeable actions listed above, could result in cumulative temporary impacts to noise, air emissions, GHG emissions, potable water quality or availability, traffic, and socioeconomics. The scope of the Proposed and Alternative Actions is very small compared to the actions listed above and thus would contribute to only a small fraction of any cumulative impacts associated with temporary construction activities. Most of these impacts would be minor, would cease upon the completion of construction, and would not contribute to issues of significant regional concern. However, in addition to the long term potential cumulative impacts, the sections below address select temporary cumulative impacts that the NIH anticipates may be of regional interest: noise, air emissions, and traffic.

5.3.1 *Visual Impacts*

As discussed in Section 4.5 (Visual Impacts), the Proposed and Alternative Actions would result in minor lighting impacts, minor impacts to viewscapes from outside the Campus, and minor to moderate impacts to viewscapes from inside the Campus. These impacts would be localized to the specific sites of the Proposed Action or Alternative Action.

Additional planned projects at the Campus that could contribute to cumulative impacts to lighting and viewscapes at those sites include the following:

- Demolition of Building 34;
- Construction of MLP-12;
- Construction of South Research Complex, including MLP-14;
- Demolition of Parking Lot 41 and Construction of South Service Complex, including earthen berms to minimize views; and
- Ongoing efforts to increase the vegetative buffer around the campus perimeter.

Several of these actions would occur at the south end of the Campus, in the vicinity of Parking Lot 41. These additional actions planned by the NIH, when coupled with the visual impacts that would result from implementation of the Proposed or Alternative Action, could result in a moderate cumulative impact to lighting and viewscapes. Implementation of the Proposed Action or Alternative Action would not detract from NIH's goal to improve the vegetative buffer around the Campus perimeter, which serves to mitigate the combined visual impacts of the listed construction projects.

The off-campus actions listed in Section 5.1 (Other Actions) would be located sufficiently distant from the Campus that they would not contribute to a cumulative impact to lighting or viewscapes. Therefore, those projects would not combine to present additional cumulative impacts.

5.3.2 *Noise*

Temporary Impacts to Noise

As discussed in Section 4.7 (Noise Levels), the Proposed and Alternative Actions would result in temporary minor noise impacts due to construction activities.

The following funded and planned or in-progress actions at the Campus could be executed concurrently with the Proposed or Alternative Action and would therefore have the potential to contribute to cumulative noise impacts: construction of the NWCCC and construction of MLP-12.

Construction of MLP-12 would contribute to a cumulative impact as the site is adjacent to the planned site for the Industrial Water Storage System (Proposed Action) or Potable Water Storage System (Alternative Action) and construction could occur concurrently.

Other planned projects identified in the Campus Master Plan are unlikely to be funded and executed in the near term, and therefore would not be expected to occur concurrently with the Proposed or Alternative Action. Therefore, those projects would not contribute to a cumulative temporary noise impact.

Additional actions off-campus that would have the potential to contribute to cumulative noise impacts at sites affected by noise from the Proposed or Alternative Actions include the following:

- Construction of Suburban Hospital Expansion: This site is about 0.25 miles from the site of the Industrial Water Storage System (Parking Lot 41 site).
- Construction of Medical Center Metro Crossing: This site is about 0.3 miles from the water line near Buildings 6A and 67 (Alternative Action) and about 0.6 miles from the Building 34 site.
- Construction of 8280 Wisconsin Avenue: This site is about 0.4 miles from the site of the Industrial Water Storage System (Parking Lot 41 site).
- Reconfiguration of Wisconsin Avenue convergence with Jones Bridge Road, Center Drive, and Woodmont Avenue: This site is about 0.4 miles from the site of the Industrial Water Storage System (Parking Lot 41 site) or the Building 34 site.
- Rockville Pike and Cedar Lane Intersection Improvements: This site is about 0.3 miles from the site of the Booster Pump Station and associated infrastructure (Alternative Action).

These additional actions planned by the NIH, when coupled with the noise impacts that would result from implementation of the Proposed or Alternative Action, could result in a temporary moderate cumulative impact to noise. It is not anticipated that the cumulative noise levels would exceed state or county requirements for construction noise. Therefore, the cumulative impact to temporary noise would be expected to be not significantly greater than the impacts that would result from implementation of the Proposed or Alternative Action.

The other off-campus actions identified in Section 5.1 (Other Actions) are either unlikely to occur concurrently with the Proposed or Alternative Action or are sufficiently distant that they would not be expected to contribute to cumulative noise impacts during construction.

Long-Term Impacts to Noise

As discussed in Section 4.7 (Noise Levels), the Proposed and Alternative Actions would result in long-term moderate noise impacts due to increased frequency of peak CUP operations occurring during the nighttime hours.

Other actions identified in Section 5.1 (Other Actions) that involve new construction, such as the Suburban Hospital expansion and the construction of 8280 Wisconsin Avenue, would be expected to contribute to the overall urban noise profile. However, none of these planned projects are expected to contribute enough noise to significantly impact noise levels in areas potentially impacted by the CUP operational noise.

In general, the future boundary noise environment is expected to be similar to existing conditions, since no one source of noise dominates and no new significant noise source would be created. Therefore, the cumulative impact to long-term noise would not be significantly greater than the impacts that would result from implementation of the Proposed or Alternative Action.

5.3.3 *Stormwater*

As discussed in Section 4.4 (Stormwater), implementation of the Proposed or Alternative Action would result in minor long-term impacts to stormwater, due to increased impervious surface. Implementation of the Proposed Action would result in a net increase of up to 153,000 SF of impervious surface; implementation of the Alternative Action would result in a net increase of up to 160,000 SF of impervious surface.

Demolition of Building 34 and construction of MLP-12 each would result in a cumulative impact to stormwater at the same locations that would be impacted by the Proposed or Alternative Actions. Demolition of Building 34 would have a benefit to stormwater by reducing impervious surface and offsetting the subsequent increase in impervious surface that would result due to construction of the Thermal Energy Storage System. Construction of MLP-12 would increase impervious surface by 30,000 SF adjacent to the site of the Industrial Water Storage System, which would result in a cumulative impact to stormwater. The percentage of total impervious area at the Campus would increase from 41.8 percent to approximately 42.9 percent after implementation of the Proposed or Alternative Action, Building 34 demolition, and MLP-12 construction. In general, implementation of other planned construction actions identified in the Campus Master Plan would result in a benefit to stormwater due to offsetting demolition, net reduction in impervious area, and incorporation of improved stormwater management techniques (e.g., low impact development). The NIH would ensure each individual action would comply with MDE requirements outlined in the Maryland Stormwater Management Guidelines for State and Federal Projects. Long-term stormwater impacts would be expected to be minor.

Each of the off-campus actions identified in Section 5.1 (Other Actions) has the potential to further impact stormwater quantity and quality. As Bethesda is a developed urban environment, many of these actions are re-development (i.e., demolish an existing building and construct a new building) and therefore would likely result in minor net increase or decrease in impervious area and resulting stormwater runoff. Many of these actions would occur in the same watershed, and would therefore have the potential to have a cumulative impact to Stoney Creek (and Rock Creek).

The state stormwater permitting process would ensure that stormwater impacts associated with larger projects are properly mitigated. Also, the Stoney Creek Pond would serve to further mitigate any impact. Therefore, the cumulative impact to stormwater would not be significantly greater than the impacts that would result from implementation of the Proposed or Alternative Action.

5.3.4 *Architectural Resources*

As discussed in Section 4.12.1 (Architectural Resources), implementation of the Proposed or Alternative Actions would result in no adverse effect on any historic or MIHP-listed properties. Implementation of the Alternative Action would result in minor (non-adverse) impacts to the Officer's Quarters Historic District, due to construction of non-contributing structures within the district. Implementation of the Proposed or Alternative Action would also result in minor (non-adverse) changes in the view of, and from, certain historic properties within and around the Campus (Buildings 29/29A, 38/38A, and the Bethesda Community Store).

The NIH identifies the following planned actions in the Campus Master Plan that if implemented, would have the potential to contribute to cumulative impacts to architectural resources:

- Development of the South Research Cluster: The South Research Cluster would be in the vicinity of the National Register-eligible National Library of Medicine (Building 38). The Campus Master Plan EIS proposes that a formal open space would be set aside to buffer the new construction and protect the setting of Building 38. Construction under the Proposed or Alternative Actions would not conflict with or detract from this plan to protect the setting of Building 38 and would not present adverse cumulative impacts in combination with the South Research Cluster.

- Adaptive Reuse of Residential Housing: The NIH would consult with the MD SHPO prior to converting Buildings 15B2, 15C1-C2, 15D1-D2, 15E1-E2, 15F1-F2, and 15G1 within the Officer's Quarters Historic District from residential to administrative use. The adaptive reuse of these contributing resources would be limited to interior spaces and is not expected to impact the integrity of the historic district. Construction of the Booster Pump Station under the Alternative Action is therefore not expected to present adverse cumulative impacts to the historic district.

- Construction of MLP-14: This parking garage would be located east of the Officer's Quarters Historic District. Construction of this garage would have the potential to impact the Officer's Quarters Historic District and other historic properties within the Campus. The NIH would consult with the MD SHPO prior to constructing MLP-14 to identify appropriate mitigation measures. Construction of the Booster Pump Station under the Alternative Action in the southwest corner of the historic district is not expected to present additional cumulative impacts to the historic district beyond those associated with MLP-14.

- Construction of Building N48 and addition A40: Both of these new structures would be located along South Drive near the west end of the Campus. This site would be near the planned site for the backflow preventer structure (Alternative Action) and Bethesda Community Store. None of these actions would directly affect the Bethesda Community Store (e.g., through demolition or substantial alteration) or present cumulative impacts that directly affect the property.

The off-campus actions identified in Section 5.1 (Other Actions) would not be expected to contribute to a cumulative impact to historic properties within the Campus. While some of these projects may be visible from the historic NLM complex, they would not affect the view of the complex from vantage points within the Campus.

5.3.5 *Air Quality*

As discussed in Section 4.8 (Air Quality), long-term Air Quality impacts that would result from the implementation of the Proposed or Alternative Actions include minor increases in Scope 1 GHG emissions and air emissions from stationary sources. These air emissions have the potential to contribute to global climate change.

Implementation of other planned projects identified in the Campus Master Plan would result in additional impacts to air quality, including increased mobile source emissions (vehicles) and stationary source air emissions (primarily due to increased operations at the CUP). The Campus Master Plan, in accordance with the NIH's SSPP, proposes to reduce Scope 1 and 2 GHG emissions 10.4 percent by 2020 through a combination of energy reduction activities and use of renewable resources. The NIH also reduced energy intensity by greater than 30 percent by the end of FY2014, relative to a FY2003 baseline. The NIH proposes to implement several design mandates by 2020 to ensure new buildings that enter the planning stage achieve zero-net energy by 2030. These ongoing and foreseeable reductions in energy intensity, and the associated reductions in emissions of GHGs and other air pollutants, would help to offset the increased mobile source and stationary source emissions under the Campus Master Plan. Therefore, implementation of the Campus Master Plan would result in minor changes to air emissions and air quality and would not interfere with regional efforts to meet air quality standards.

Additional actions off-campus that would have the potential to further impact local air quality includes the following:

- The various residential and office development projects identified in Section 5.1 (Other Actions) will tend to increase development within Bethesda, which will tend to increase mobile source (vehicle) emissions and stationary source emissions due to higher demand for electricity.

- As a federal facility, NSA Bethesda and tenants are also subject to EO 13423 and 13514 goals related to reducing energy intensity and GHG emissions. This should result in a cumulative benefit to regional air quality.

As discussed in Section 4.8 (Air Quality) and Appendix B, emissions from the Proposed and Alternative Actions would be well below CAA GCR *de minimis* levels and would not interfere with regional efforts to meet air quality standards. This finding, in combination with the broader efforts by the NIH and NSA Bethesda to reduce energy intensity and GHG emissions, support the determination that the Proposed and Alternative Actions would not contribute to adverse cumulative impacts to air quality or climate change.

5.3.6 *Vegetation*

Implementation of the Proposed or Alternative Action along with the actions described in the Campus Master Plan may result in cumulative impacts to vegetation. As discussed in Section 4.9.1 (Vegetation), the Proposed and Alternative Actions would result in permanent removal of up to 160,000 SF (3.7 acres) of vegetation.

Implementation of the Campus Master Plan would result in 15 acres of new vegetated spaces, 4 acres of which would be within the perimeter buffer. Although it is foreseeable that the full plan may not be implemented, current NIH tree, forest and vegetation policies remain in place requiring ongoing protection, replacement, and enhancement. Tree losses would be determined on an individual project basis but policy prohibiting an overall net loss of vegetative cover or number of trees remains in place. Impacts would be minor, adverse, long-term, and site specific (NIH, 2014a).

As a result of these policies, the cumulative impact to vegetation would be no greater than the impacts that would result from implementation of the Proposed or Alternative Action.

5.3.7 *Traffic Impacts*

Temporary Impacts

As discussed in Section 4.6 (Transportation and Traffic), implementation of the Proposed and Alternative Actions would result in minor temporary impacts such as increases in traffic due to construction vehicles, and temporary impacts on traffic patterns within the Campus (which may temporarily impact volumes at access gates). Implementation of the Alternative Action would additionally result in further impacts to off-campus traffic when establishing new connections to the WSSC water mains and severing existing connections.

Construction of MLP-12 is funded and could be executed concurrently with the Proposed or Alternative Action. Construction of MLP-12 would therefore have the potential to contribute to cumulative temporary traffic impacts.

Other planned projects identified in the Campus Master Plan would be completed prior to implementation of the Proposed or Alternative Action or are unlikely to be funded and executed in the near term. Therefore those actions would not be expected to occur concurrently with the Proposed or Alternative Action and would not contribute to a cumulative temporary traffic impact.

Additional actions off-campus that would have the potential to contribute to cumulative traffic impacts on or near the Campus includes the following:

- Construction of Suburban Hospital Expansion;
- Construction of Walter Reed National Military Medical Center Expansion;
- Construction of Medical Center Crossing;
- Construction of 8280 Wisconsin Avenue;
- Reconfiguration of Wisconsin Avenue convergence with Jones Bridge Road, Center Drive, and Woodmont Avenue; and
- Rockville Pike and Cedar Lane Intersection Improvements.

These off-campus actions, when coupled with the cumulative impacts associated with temporary construction activities at the Campus, could result in a temporary moderate cumulative impact to traffic. Although the cumulative impact would be moderate, the contribution of the Proposed or Alternative Action to this cumulative impact is relatively minor. Also, as discussed in Section 4.6.1 (Roads, Transit, and Traffic), the NIH would mitigate impacts to traffic by utilizing multiple entrances at the Campus as needed to prevent backup at the service vehicle entrance on Rockville Pike.

The other off-campus actions identified in Section 5.1 (Other Actions) are either unlikely to occur concurrently with the Proposed or Alternative Action or are sufficiently distant that they would not be expected to significantly contribute to cumulative traffic impacts adjacent to the Campus.

Long-Term Impacts

As discussed in Section 4.6 (Transportation and Traffic), implementation of the Proposed and Alternative Actions would result in no long-term impacts to traffic and transportation. Therefore there would be no potential for the Proposed or Alternative Action to contribute to a cumulative impact.

6. LIST OF PREPARERS

Name: Ward Libby, PE
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Items: Graphic design, production
Experience: M.A. in Environmental Science and Policy, B.A. in Fine Arts and Economics; 5 years of experience in visual communication and functional design

7. LIST OF AGENCIES AND PERSONS CONSULTED

Agency: Maryland Department of Natural Resources, Wildlife and Heritage Service

Reason: Potential presence of rare, threatened, or endangered species at the Campus.

Agency: Maryland Department of Planning, Maryland Historical Trust

Reason: Potential impacts to historic resources.

Agency: U.S. Fish and Wildlife Service, Chesapeake Bay Field Office

Reason: Potential presence of rare, threatened, or endangered species at the Campus.

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8. DISTRIBUTION LIST

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Michael Weil
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Senator Barbara A. Mikulski
503 Hart Senate Office Bldg
Washington, DC 20510

Senator Benjamin L. Cardin
509 Hart Senate Office Bldg
Washington, DC 20510

Congressman 8th District Chris Van Hollen
1707 Longworth H.O.B.
Washington, DC 20515

Bethesda Library
7400 Arlington Road
Bethesda, MD 20814

M-NCPPC Department of Parks
9500 Brunett Ave.
Silver Spring, MD 20901

Maryland – National Capital Park and Planning Commission
Montgomery County Planning Department
Planning Area 1
8787 Georgia Avenue
Silver Spring, MD 20910-3760

National Capital Planning Commission
401 9th Street, NW, North Lobby, Suite 500
Washington, DC 20004

USEPA (via eNEPA)

Maryland Department of Environment
1800 Washington Blvd.
Baltimore, MD 21230

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APPENDIX A
NOTICE OF INTENT

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www.fda.gov/AdvisoryCommittees/CommitteesMeetingMaterials/RiskCommunicationAdvisoryCommittee/default.htm. The link will become active shortly before the open session begins at 9 a.m.

Interested persons can also log on to *https://collaboration.fda.gov/rcac/* to see and hear the proceedings.

Agenda: On November 3 and 4, 2014, the Risk Communication Advisory Committee will discuss methods for effective risk communication with a focus on messages about the importance of eating adequate amounts of fish, while avoiding certain fish with higher amounts of methyl-mercury. These messages are especially important for women who are pregnant or nursing, or for anyone who prepares food for young children.

FDA intends to make background material available to the public no later than 2 business days before the meeting. If FDA is unable to post the background material on its Web site prior to the meeting, the background material will be made publicly available at the location of the advisory committee meeting, and the background material will be posted on FDA's Web site after the meeting. Background material is available at *http://www.fda.gov/AdvisoryCommittees/Calendar/default.htm.* Scroll down to the appropriate advisory committee meeting link.

Procedure: Interested persons may present data, information, or views, orally or in writing, on issues pending before the committee. Written submissions may be made to the contact person on or before October 20, 2014. Oral presentations from the public will be scheduled between approximately 1 p.m. and 2 p.m. on November 3 and 4, 2014. Those individuals interested in making formal oral presentations should notify the contact person and submit a brief statement of the general nature of the evidence or arguments they wish to present, the names and addresses of proposed participants, and an indication of the approximate time requested to make their presentation on or before October 10, 2014. Time allotted for each presentation may be limited. If the number of registrants requesting to speak is greater than can be reasonably accommodated during the scheduled open public hearing session, FDA may conduct a lottery to determine the speakers for the scheduled open public hearing session. The contact person will notify interested persons regarding their request to speak by October 14, 2014.

Persons attending FDA's advisory committee meetings are advised that the Agency is not responsible for providing access to electrical outlets.

FDA welcomes the attendance of the public at its advisory committee meetings and will make every effort to accommodate persons with physical disabilities or special needs. If you require special accommodations due to a disability, please contact Luis G. Bravo at least 7 days in advance of the meeting.

FDA is committed to the orderly conduct of its advisory committee meetings. Please visit our Web site at *http://www.fda.gov/AdvisoryCommittees/AboutAdvisoryCommittees/ucm111462.htm* for procedures on public conduct during advisory committee meetings.

Notice of this meeting is given under the Federal Advisory Committee Act (5 U.S.C. app. 2).

Dated: August 25, 2014.

Leslie Kux,

Assistant Commissioner for Policy.

[FR Doc. 2014–20481 Filed 8–27–14; 8:45 am]

BILLING CODE 4164–01–P

DEPARTMENT OF HEALTH AND HUMAN SERVICES

National Institutes of Health

Notice of Intent To Prepare an Environmental Impact Statement and Notice of Scoping Meeting

SUMMARY: In accordance with the National Environmental Policy Act, 42 U.S.C. 4321–4347, the National Institutes of Health (NIH) is issuing this notice to advise the public that an environmental impact statement will be prepared for the Assure/Expand Chilled Water Capacity project located on the National Institutes of Health, Bethesda Campus, Bethesda, Maryland.

DATES: The Scoping Meeting is planned for 6:00 p.m., formal presentation to begin at 7:00 p.m., on Wednesday September 24, 2014. Scoping comments must be postmarked no later than October 18, 2014 to ensure they are considered.

ADDRESSES: The Scoping Meeting will be held on The National Institutes of Health Bethesda Campus, Building 50, Room 1227/1233, Bethesda, Maryland. All comments and questions on the Scoping Meeting and Environmental Impact Statement should be directed to Valerie Nottingham, Deputy Director, Division of Environmental Protection, Office of Research Facilities, NIH, B13/2S11, 9000 Rockville Pike, Bethesda, Maryland 20892, telephone 301–496–7775; fax 301–480–0204; or email <*nihnepa@mail.nih.gov*>.

FOR FURTHER INFORMATION CONTACT: Valerie Nottingham, Deputy Director, Division of Environmental Protection, Office of Research Facilities, NIH, B13/2S11, 9000 Rockville Pike, Bethesda, Maryland 20892, telephone 301–496–7775; fax 301–480–0204; or email <*nihnepa@mail.nih.gov*>.

SUPPLEMENTARY INFORMATION: The NIH's mission is to seek fundamental knowledge about the nature and behavior of living systems and the application of that knowledge to enhance health, lengthen life, and reduce illness and disability. In order to fulfill and uphold this mission the infrastructure of the NIH Bethesda Campus must be able to support the NIH's biomedical research programs.

Chilled water is a critical utility for the Bethesda Campus. The campus chilled water demand has exceeded the design capacity several times during the previous years. Expansion of the chilled water capacity is necessary.

The NIH has also become increasingly concerned about the vulnerability of the local water utility system, and the risk of reliably delivering water to the NIH Bethesda Campus infrastructure. A reliable water supply is vital to the NIH mission. The NIH proposes to address these concerns by construction of water storage structures to expand the Bethesda Campus chilled water capacity and to assure the availability of chilled water and potable water during a water emergency. In addition, NIH desires to improve sustainability, energy conservation, and to reduce the operating cost on the campus.

In accordance with 40 CFR 1500–1508 and DHHS environmental procedures, NIH will prepare an Environmental Impact Statement (EIS) for the proposed project. The EIS will evaluate the impacts of the alternatives should development occur as proposed. Among the items the EIS will examine are the implications of the project on community infrastructure, including, but not limited to, utilities, storm water management, traffic and transportation, and other public services. To ensure that the public is afforded the greatest opportunity to participate in the planning and environmental review process, NIH is inviting oral and written comments on the proposed project and related environmental issues.

The NIH will be sponsoring a public Scoping Meeting to provide individuals an opportunity to share their ideas, including recommended alternatives and environmental issues the EIS should consider. All interested parties are encouraged to attend. NIH has established a 45-day public comment period for the scoping process.

Dated: August 21, 2014.

Daniel G. Wheeland,

Director, Office of Research Facilities Development and Operations, National Institutes of Health.

[FR Doc. 2014–20489 Filed 8–27–14; 8:45 am]

BILLING CODE 4140–01–P

DEPARTMENT OF HEALTH AND HUMAN SERVICES

National Institutes of Health

Final NIH Genomic Data Sharing Policy

SUMMARY: The National Institutes of Health (NIH) announces the final Genomic Data Sharing (GDS) Policy that promotes sharing, for research purposes, of large-scale human and non-human genomic[1] data generated from NIH-funded research. A summary of public comments on the draft GDS Policy and the NIH responses are also provided.

FOR FURTHER INFORMATION CONTACT: Genomic Data Sharing Policy Team, Office of Science Policy, National Institutes of Health, 6705 Rockledge Drive, Suite 750, Bethesda, MD 20892; 301–496–9838; *GDS@mail.nih.gov.*

SUPPLEMENTARY INFORMATION:

Introduction

The NIH announces the final Genomic Data Sharing (GDS) Policy, which sets forth expectations that ensure the broad and responsible sharing of genomic research data. Sharing research data supports the NIH mission and is essential to facilitate the translation of research results into knowledge, products, and procedures that improve human health. The NIH has longstanding policies to make a broad range of research data, in addition to genomic data, publicly available in a timely manner from the research activities that it funds.[2 3 4 5 6]

The NIH published the *Draft NIH Genomic Data Sharing Policy Request for Public Comments* in the **Federal Register** on September 20, 2013,[7] and in the *NIH Guide for Grants and Contracts* on September 27, 2013,[8] for a 60-day public comment period that ended November 20, 2013. The NIH also used Web sites, listservs, and social media to disseminate the request for comments. On November 6, 2013, during the comment period, the NIH held a public webinar on the draft GDS Policy that was attended by nearly 200 people and included a question and answer session.[9]

The NIH received a total of 107 public comments on the draft GDS Policy. Comments were submitted by individuals, organizations, and entities affiliated with academic institutions, professional and scientific societies, disease and patient advocacy groups, research organizations, industry and commercial organizations, tribal organizations, state public health agencies, and private clinical practices. The public comments have been posted on the NIH GDS Web site.[10] Comments were supportive of the principles of sharing data to advance research. However, there were a number of questions and concerns and calls for clarification about specific aspects of the draft Policy. A summary of comments, organized by corresponding sections of the GDS Policy, is provided below.

Scope and Applicability

Several commenters stated that the draft Policy was unclear with regard to the types of research to which the Policy would apply. Some commenters suggested that the technology used in a research study (i.e., array-based or high-throughput genomic technologies) should not be the focus in determining applicability of the Policy. They suggested instead that the information gained from the research should determine the applicability of the Policy. Many other commenters expressed the concern that the Policy was overly broad and would lead to the submission of large quantities of data with low utility for other investigators. Several other commenters suggested that the scope of the Policy was not broad enough. Additionally, some commenters were uncertain about whether the Policy would apply to research funded by multiple sources.

The NIH has revised the Scope and Applicability section to help clarify the types of research to which the Policy is intended to apply, and the reference to specific technologies has been dropped. The list of examples of the types of research projects that are within the Policy's scope, which appeared in Appendix A of the draft GDS Policy (now referred to as ''Supplemental Information to the NIH Genomic Data Sharing Policy''[11]), has been revised and expanded, and examples of research that are not within the scope have been added as well. Also, the final GDS Policy now explicitly states that smaller studies (e.g., sequencing the genomes of fewer than 100 human research participants) are generally not subject to this Policy. Smaller studies, however, may be subject to other NIH data sharing policies (e.g., the National Institute of Allergy and Infectious Diseases Data Sharing and Release Guidelines[12]) or program requirements. In addition, definitions of key terms used in the Policy (e.g., aggregate data) have been included and other terms have been clarified.

The statement of scope remains intentionally general enough to accommodate the evolving nature of genomic technologies and the broad range of research that generates genomic data. It also allows for the possibility that individual NIH Institutes or Centers (IC) may choose on a case-by-case basis to apply the Policy to projects generating data on a smaller scale depending on the state of the science, the needs of the research community, and the programmatic priorities of the IC. The Policy applies to research funded in part or in total by the NIH if the NIH funding supports the generation of the genomic data. Investigators with questions about whether the Policy applies to their current or proposed research should consult the relevant Program Official or Program Officer or the IC's Genomic Program Administrator (GPA). Names and contact information for GPAs are available through the NIH GDS Web site.[13]

Some commenters expressed concern about the financial burden on investigators and institutions of validating and sharing large volumes of genomic data and the possibility that resources spent to support data sharing would redirect funds away from research. While the resources needed to support data sharing are not trivial, the NIH maintains that the investments are warranted by the significant discoveries made possible through the secondary use of the data. In addition, the NIH is taking steps to evaluate and monitor the impact of data sharing costs on the conduct of research, both programmatically through the Big Data to Knowledge Initiative[14] and organizationally through the creation of the Scientific Data Council, which will advise the agency on issues related to data science.[15]

Data Sharing Plans

Some commenters pointed out that the Policy was not clear enough about the conditions under which the NIH would grant an exception to the submission of genomic data to the NIH. Some also suggested that the NIH should allow limited sharing of human genomic data when the original consent or national, tribal, or state laws do not permit broad sharing.

While the NIH encourages investigators to seek consent for broad

APPENDIX B
GENERAL CONFORMITY RULE APPLICABILITY ANALYSIS

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EXECUTIVE SUMMARY

EPA established the General Conformity Rule (GCR) to ensure that federal activities do not hamper local efforts to control air pollution. In particular, the GCR implements Section 176(c) of the Clean Air Act, which prohibits federal agencies, departments, or instrumentalities from engaging in, supporting, licensing, or approving any action that does not conform to an approved state or federal implementation plan. The purpose of the GCR Applicability Analysis is to determine whether the construction and operational activities under the Proposed and Alternative Actions are subject to the federal GCR.

The Proposed Action would construct the Thermal Energy Storage System at the site currently occupied by Building 34 and the Industrial Water Storage System next to the planned site of multi-level parking garage 12 (MLP-12). The construction of these two tanks would also include associated infrastructure upgrades such as new piping, valves, and pumps. The Alternative Action, in comparison to the Proposed Action, would construct a similar (but larger) Potable Water Storage System in place of the Industrial Water Storage System and would provide additional supporting infrastructure. The Proposed Action and Alternative Action would result in increases in emissions from operational and temporary construction activities. Because the emissions are expected to be greater under the Alternative Action, this GCR applicability analysis is based on the Alternative Action and the conclusions conservatively apply to the Proposed Action. Using USEPA's *National Mobile Inventory Model,* the *Motor Vehicle Emission Simulator* model, and *AP-42* emission factors for generators, this analysis estimated the resulting emissions of carbon monoxide, nitrogen oxides, fine particulate matter, sulfur dioxide, and volatile organic compounds. These calculations demonstrate that the emissions resulting from the Alternative Action would be below the *de minimis* levels defined for those pollutants in the Applicability section of the GCR for the years 2015 through the first operational year 2017. Therefore, the GCR is not applicable to the Proposed Action or the Alternative Action.

INTRODUCTION

The purpose of this analysis is to determine whether the construction and operational activities under the Proposed Action and Alternative Action at the NIH Bethesda Campus (the Campus) in Bethesda, Maryland are subject to the federal General Conformity Rule (GCR) established in 40 Code of Federal Regulations (CFR), Part 51, Subpart W, *Determining Conformity of General Federal Actions to State or Federal Implementation Plans*. The GCR was established to ensure that federal activities do not hamper local efforts to control air pollution. In particular, Section 176(c) of the Clean Air Act (CAA) prohibits federal agencies, departments, or instrumentalities from engaging in, supporting, licensing, or approving any action that does not conform to an approved state or federal implementation plan. This analysis will determine under which of the following areas the Proposed Action and Alternative Action will fall:

- <u>Not subject to the rule</u> - The action does not emit criteria pollutants or precursors for which the area is designated as a nonattainment or maintenance area—all procurement actions are excluded from the GCR.

- <u>Exempt or below *de minimis* levels</u> - Emissions from the action are below *de minimis* levels and are not regionally significant, or the action is exempt.

- <u>Does not meet *de minimis* levels or is regionally significant</u> - Emissions from the action exceed *de minimis* levels—a Conformity Determination must be prepared for such actions.

The presentation of this analysis includes the following sections:

- Background—Information on applicable air emission programs and limitations including *de minimis* levels.
- Proposed Action—A brief description of the Proposed Action project elements.
- Alternative Action—A brief description of the Alternative Action project elements and their relationship to the Proposed Action.
- Selection of Alternative Action for Analysis—Rationale for performing quantitative analysis solely on the Alternative Action, plus additional discussion of assumptions regarding the scope of analysis.
- Emissions Calculation Methods and Results—Procedures and results for estimating emissions associated with the Alternative Action.
- Conclusion—Assessment of whether the GCR is applicable to the Proposed Action and the Alternative Action.

BACKGROUND

As part of the implementation of the CAA Amendments, the United States Environmental Protection Agency (USEPA) issued National Ambient Air Quality Standards (NAAQS) for six criteria air pollutants: carbon monoxide (CO), sulfur dioxide (SO_2), particulate matter with an aerodynamic diameter less than or equal to a nominal 10 micrometers (PM_{10}) and 2.5 micrometers ($PM_{2.5}$), ozone (O_3), nitrogen dioxide (NO_2), and lead (Pb). USEPA defines ambient air in 40 CFR Part 50.1(e) as "that portion of the atmosphere, external to buildings, to which the general public has access."

The CAA divides the U.S. into geographic areas called "air quality control regions" (AQCR). These AQCRs are established areas such as counties, urbanized areas, and consolidated metropolitan statistical areas. An AQCR in which levels of a criteria air pollutant meet the health-based NAAQS is defined as an *attainment* area for the pollutant, while an area that does not meet the NAAQS is designated a *nonattainment* area for the pollutant. An area that was once designated a nonattainment area but was later reclassified as an attainment area is known as a *maintenance* area. Nonattainment and maintenance areas can be further classified as extreme, severe, serious, moderate, or marginal. An AQCR may have an acceptable level for one criteria air pollutant but may have unacceptable levels for other criteria air pollutants. Thus, an area could be attainment, maintenance, and/or nonattainment at the same time for different pollutants.

Each nonattainment AQCR is responsible for submitting a State Implementation Plan (SIP), which specifies the manner in which the NAAQS will be achieved and maintained. Maintenance areas must adhere to a maintenance plan for the specific pollutant for which the area was initially designated nonattainment.

The Campus is located in Montgomery County, Maryland, part of the Metropolitan Washington AQCR, which is managed by the Metropolitan Washington Air Quality Committee (MWAQC). The Washington, D.C.-MD-VA Metropolitan Area is also included in the larger North-East/Mid-Atlantic Ozone Transport Region. The USEPA has designated Montgomery County as nonattainment for the ozone and $PM_{2.5}$ NAAQS. Montgomery County is a maintenance area for CO and an attainment area for PM_{10}, SO_2, NO_2, and lead.

The Applicability Analysis Section of the GCR, 40 CFR 93.153, states that Federal actions are required to perform a conformity determination for each nonattainment criteria pollutant (or precursor to those pollutants) if the total of direct and indirect emissions of those pollutants would equal or exceed the *de minimis* levels defined in that section. Table B-1 identifies the *de minimis* levels that would apply to actions in Montgomery County, Maryland. This GCR applicability analysis will determine whether the Proposed or Alternative Action has the potential to result in emissions above the levels listed in Table B-1.

Table B-1. General Conformity Rule *De Minimis* Levels for Nonattainment and Maintenance Pollutants in Montgomery County, Maryland

Pollutant	***De Minimis*** **Level (tons per year)**
Ozone Precursors *(marginal and moderate nonattainment area inside an ozone transport region)*	
Volatile Organic Compounds (VOC)	50
Nitrogen Oxides (NO_X)	100
PM2.5 and Precursors	
$PM_{2.5}$ (direct emissions)	100
SO_2	100
NO_X	100
CO Emissions *(maintenance area)*	
CO	100

Source: USEPA, 2014a.

The thresholds for NO_X appear twice in Table B-1 because it contributes to both $PM_{2.5}$ and ozone formation. In summary, the following *de minimis* levels are used in this applicability analysis:

- NOX – 100 tons/yr.
- VOC – 50 tons/yr.
- PM2.5 – 100 tons/yr.
- SO2 – 100 tons/yr.
- CO – 100 tons/yr.

USEPA promulgated revisions to the General Conformity regulations on March 24, 2010. The revised rule removes requirements for federal agencies to conduct conformity determinations for "regionally significant" actions that have emissions greater than 10 percent of the emissions inventory for a nonattainment area if expected pollutant emissions do not exceed *de minimis* levels. Therefore, this applicability analysis does not evaluate the Proposed or Alternative Action for "regional significance."

PROPOSED ACTION

The Proposed Action includes the construction and operation of the following:

Thermal Energy Storage System

The Thermal Energy Storage System would store up to approximately nine million gallons of chilled water. The proposed location is the site currently occupied by Building 34, Building 34A and the adjacent parking lot. The demolition of the buildings and associated parking lot will be evaluated via a separate NEPA analysis. Components of the Thermal Energy Storage System would include:

- Storage Tank: The tank would likely be cylindrical, constructed of concrete or steel, have a footprint of approximately 12,000 SF, be at grade or partially below-grade, and similar to the height of the adjacent Building 11. The tank would be a neutral color, consistent with surrounding buildings.

- Pump House: The NIH would construct a pump house building near the tank to house support equipment (e.g., pumps, valves, controls, electrical). The building could have multiple levels, including a below grade level (basement). The total size of the building would be about 10,000 SF or less, with a footprint of 5,000 SF or less.

- Support Equipment: Various support equipment would be necessary, such as pumps, valves, piping, and controls. NIH would install an emergency generator rated up to 1,700 kW. Much of this equipment would be located in the pump house, although the NIH would install some equipment (e.g., the generator) outside on a cement slab. The NIH would install a sound-attenuating enclosure around the generator to minimize noise to surrounding areas. Other additional equipment not specifically listed may be required.

- Utilities and Site Improvements: The NIH would install new aboveground or belowground utilities or modify existing utilities, such as electrical and water lines. The NIH would likely install security fencing to prevent unauthorized access to the area. The NIH would provide lighting for security and to facilitate maintenance. The NIH would construct access driveways, parking, and sidewalks to provide vehicular and pedestrian access to (or around) the tank. Other additional site improvements not specifically listed may be required.

Industrial Water Storage System

The Industrial Water Storage System would store up to approximately five million gallons of industrial water to ensure an adequate supply of water to the chillers. The Industrial Water Storage System would be constructed adjacent to the planned site of MLP-12, which has been evaluated via a separate NEPA analysis. Prior to construction of the Industrial Water Storage System, demolition of existing site improvements would occur including a portion of Parking Lot 41 and the existing sidewalk between that parking lot and Medlars Drive.

Components of the Industrial Water Storage System would include:

- Storage Tank: The tank would be cylindrical in shape, partially below-grade, and about 50 feet in height. The NIH would likely construct the tank of steel or concrete that is painted a neutral color, consistent with surrounding buildings. The NIH would likely place architectural screening on or adjacent to the tank to reduce views of the tank.

- Pump House: The NIH would construct a pump house building near the tank to house support equipment (e.g., pumps, valves, controls, electrical). The building could contain multiple levels, including a below grade level (basement). The total size of the building would be about 10,000 SF or less, with a footprint of 5,000 SF or less.

- Backflow Preventer: The NIH would install a backflow preventer on the tank supply line so water from the tank cannot flow back into the campus potable water distribution system. The backflow preventer would likely be housed in a small building, similar to a storage shed, with a footprint of approximately 500 SF or less.

- Support Equipment: Various support equipment would be necessary, such as pumps, valves, variable frequency drives, electrical equipment, switchgear, piping, controls, and instrumentation. The NIH would also install an emergency generator rated up to 1,700 kW. Much of this equipment would be located in the pump house, although the NIH would install some equipment (e.g., the generator) outside (e.g., on cement pads) or underground. The NIH would install a sound-attenuating enclosure around the generator to minimize noise to surrounding areas.

- Utilities and Site Improvements: The NIH would install new aboveground or belowground utilities or modify existing utilities, such as electrical and water lines. The NIH would likely install security fencing to prevent unauthorized access to the area. The NIH would provide lighting for security and to facilitate maintenance. The NIH would construct access driveways, parking, and sidewalks to provide vehicular and pedestrian access to (or around) the tank. Other additional site improvements not specifically listed may be required.

Other Supporting Infrastructure

Equipment, piping, utilities, and site improvements located at the sites of the Thermal Energy Storage System and Industrial Water Storage System are considered integral to each system and included in the system descriptions above. Each system would require additional new or upgraded utility infrastructure not located in direct vicinity to the tank. Examples of the types of infrastructure changes that NIH may implement would include the following:

- Equipment: The NIH would install equipment such as pumps, valves, variable frequency drives, electrical equipment, switchgear, piping, controls, and instrumentation. This equipment would be located outside (e.g., on cement pads), underground, and/or in new or existing buildings, including but not limited to the CUP.

- Other Utility Buildings: If required by the design, the NIH would construct small utility buildings in addition to those buildings more specifically discussed in this section. The size for these buildings is uncertain, but would be about 400 SF or less each. The requirement for these buildings would be identified during design.

- Piping: The NIH would install various new or modified piping to connect the storage tanks to the CUP and the existing campus-wide potable and chilled water distribution networks. Generally, the NIH would run new water pipes underground, although in some locations water pipes may be installed aboveground. Although the NIH identified potential locations for these water pipes during the planning process, precise details including piping locations and sizes are not yet known. Examples of likely new or modified piping routes would include the following:

  - A new 16-inch pipe to supply chilled water from the CUP to the Thermal Energy Storage System. A second new 16-inch pipe would supply chilled water from the Thermal Energy Storage System to the campus chilled water distribution system.

The NIH would bury these pipes underground, likely in the vicinity of Service Road West.

- A new 16-inch pipe would supply water from the potable water distribution network to the Industrial Water Storage System. This pipe would be located in the vicinity of Service Road West.

- A new 16-inch pipe would supply water from the Industrial Water Storage System to the CUP. This pipe would be located in the vicinity of Service Road West.

- Utilities and Site Improvements: The NIH would install or modify aboveground or belowground utilities, such as electricity, telecommunication, and controls. The NIH would implement limited site improvements, consisting of repairs to existing sidewalks or roads damaged during excavation or minor modifications to existing features as needed to accommodate new infrastructure. The NIH may construct concrete slabs to support new equipment. Other additional site improvements not specifically listed may be required.

ALTERNATIVE ACTION

The Alternative Action modifies and expands the scope of the Proposed Action to include the construction and operation of the following:

Thermal Energy Storage System

See the description under Proposed Action.

Potable Water Storage System

The Potable Water Storage System would store up to approximately nine million gallons of potable water to ensure an adequate supply of water to the chillers and for potable water requirements on Campus. The proposed location for the Potable Water Storage System is at the same location as the Industrial Water Storage System under the Proposed Action. The characteristics and components of the Potable Water Storage System would be similar to the Industrial Water Storage System described previously for the Proposed Action, except that the storage tank would be larger. The tank would be about 90 feet in height, which is similar to the planned height of MLP-12 once fully built. The pump house, support equipment, and utilities and site improvements would otherwise be identical to the described features of the Industrial Water Storage Tank.

Other Supporting Infrastructure

Similar to the Proposed Action, the Thermal Energy Storage System and Potable Water Storage System would require new or upgraded utility infrastructure not directly adjacent to each tank. Types of infrastructure would include:

- Equipment: The NIH would install equipment such as pumps, valves, variable frequency drives, electrical equipment, emergency generators, switchgear, valves, piping, controls, and instrumentation. This equipment would be located outside (e.g., on cement pads), underground, and/or in new or existing buildings, including but not limited to the CUP.

- Backflow Preventers: The NIH would install backflow preventers at all active water utility connections so water from the Campus cannot flow back into the WSSC system. The number and location of backflow preventers has not yet been finalized. Backflow preventers would likely be housed in small buildings, similar to a storage shed, each with a footprint of approximately 500 SF or less. Up to three backflow preventers, each with a building, would be installed/constructed.

- Booster Pump Station: The NIH would install a Booster Pump Station to ensure adequate water pressure for campus fire pumps and building sprinkler systems. The proposed location for the Booster Pump Station would be at the north end of the Campus near the North Gate. The building for the Booster Pump Station would have a footprint of about 5,000 SF or less, and would be less than 15 feet in height. These booster pumps are electric-powered and anticipated to operate continuously. The Booster Pump Station would be supported by a diesel-fueled emergency generator.

- Other Utility Buildings: If required by the design, the NIH would construct small utility buildings in addition to those buildings more specifically discussed in this section. The size for these buildings is uncertain, but would be about 400 SF or less each. The requirement for these buildings would be identified during design.

- Piping: See the description under Proposed Action. The Alternative Action would expand this scope to include additional new buried piping, including a 16-inch pipe to connect the existing WSSC line along West Cedar Lane, via the new Booster Pump Station, to the existing 16-inch pipe on Center Drive; a 16-inch pipe to supply water from the WSSC supply line under Old Georgetown Road to the Potable Water Storage System; and a 12-inch pipe on the east side of Campus. Additional new piping requirements would likely be identified during the design.

- Severing Existing Connections: The NIH would close and disconnect about four to five of the existing connections to WSSC supply lines to improve water flows and reduce the required number of backflow preventers on the Campus. Refer to Section 4.1 (Utilities) for additional detail.

- Utilities and Site Improvements: The NIH would install or modify aboveground or belowground utilities, such as electricity telecommunication, and controls. The NIH would implement limited site improvements, consisting of repairs to existing sidewalks or roads damaged during excavation or minor modifications to existing features as needed to accommodate new infrastructure. The NIH may construct concrete slabs to support new equipment. Other additional site improvements not specifically listed may be required.

SELECTION OF ALTERNATIVE ACTION FOR ANALYSIS

The Proposed Action and Alternative Action would result in increases in emissions at the Campus due to operational and temporary construction activities. The magnitude of this increase under the Proposed Action, however, would be smaller than that under the Alternative Action due to the smaller construction scope (e.g., smaller Industrial Water Storage System versus the Potable Water Storage System, no Booster Pump Station, fewer water lines and other supporting infrastructure) and lesser operational impacts (e.g., fewer emergency generators). This GCR applicability analysis, therefore, is based on the Alternative Action and the conclusions conservatively apply to the

Proposed Action. Refer to the following section for more details regarding the types and quantities of emissions expected under the Alternative Action.

The construction emissions associated with the Alternative Action would be temporary and would likely occur over a 24-month period with the possibility to compress the schedule by six to nine months depending on weather and other factors. The worst case scenario for air quality would occur if all the construction occurred in the shortest possible amount of time because this maximizes emissions per year. Therefore, this analysis assumes the construction duration spans 15 months—with 3 of them occurring at the end of 2015 (October to December) and the remaining 12 month's work occurring during 2016.

The operational emissions associated with the Alternative Action would be ongoing and this analysis assumes that they begin immediately following the completion of construction. The on-going operational emissions for this analysis are presented for the first full operational year 2017.

EMISSIONS CALCULATION METHODS AND RESULTS

Because USEPA has designated the Washington, DC-MD-VA area a nonattainment area for ozone and $PM_{2.5}$ as well as a maintenance area for CO, this applicability analysis estimates emissions of ozone precursors (VOCs and NO_X), $PM_{2.5}$ (direct emissions) and $PM_{2.5}$ precursors (SO_2 and NO_X), and CO associated with the Alternative Action. According to Chapter 2.8 of the *SIP for Fine Particles ($PM_{2.5}$)*, ammonia and VOCs are not considered significant precursors for $PM_{2.5}$ (MWCOG, 2008) and do not require analysis. For this reason, the GCR analysis does not include ammonia. Because VOCs are an ozone precursor, they are included. This analysis considers the changes in emissions resulting from temporary construction activities and the operation of pumps and emergency generators.

Temporary Construction Emissions

Emissions associated with the Alternative Action would originate from mobile sources such as bulldozers, excavators, cranes, loaders, dump trucks, and construction crew vehicles. As mentioned above, the emissions analysis assumes a worst-case scenario of a compressed construction schedule lasting 15 months. Table B-2 quantifies the estimated construction activity associated with the Alternative Action, divided into categories of Site Preparation, Tank and Pump Station Construction, Piping Work, and Final Site Work.

Emissions from sources described above fall into mobile categories of on-road (vehicles designed to operate on roadways, such as dump trucks) or nonroad (equipment operating primarily off roadways such as excavators). This analysis uses on-road emission estimates from the USEPA's Motor Vehicle Emission Simulator (MOVES) model and nonroad estimates from the National Mobile Inventory Model (NMIM) with the current version of the NONROAD model. In 2010, MOVES replaced the MOBILE6 model as the official regulatory model for estimating emissions from on-road sources. As of 2014, the current version of MOVES has the ability to model nonroad sources; however, at the time of this analysis, USEPA allows the continued use of their NONROAD model for official purposes (USEPA, 2014b). Eventually, MOVES will fully replace the NMIM framework.

NMIM requires the following inputs for fleet modeling of nonroad equipment: source classification code (SCC); equipment model year; number of equipment; average annual operating hours; maximum horsepower (HP); technology type; and monthly activity allocation. Table B-3 and Table B-4 provide the user-defined global parameter settings for NMIM and MOVES, respectively.

Table B-2. Construction Equipment Categories and Quantity of Activity for the Alternative Action

Phase	Equipment/Vehicle Description	Source Category Code	Rated horsepower (hp) or Vehicle Class	Activity	Units [a]	Mobile Category
Initial Site Preparation	Skid Steer Loader	2270002072	75 hp	3	days	Nonroad
	Bulldozer	2270002069	175 hp	3	days	Nonroad
	Backhoe	2270002066	175 hp	14	days	Nonroad
	Excavator	2270002036	330 hp	34	days	Nonroad
	Roller	2270002015	100 hp	1	days	Nonroad
	Vibratory Compactor	2270002015	6 hp	1	days	Nonroad
	Flatbed Delivery Truck	2202610000	Single Unit Short-Haul Truck	74	trips	Onroad
	Dump Truck	2202520000	Single Unit Short-Haul Truck	6600	trips	Onroad
Tank/Pump Station Construction	Crane	2270002045	175 hp	3	days	Nonroad
	Concrete Truck	2202520000	Single Unit Short-Haul Truck	3212	trips	Onroad
	Flatbed Delivery Truck	2202610000	Combination Unit Short-Haul Truck	3	trips	Onroad
Piping Work	Excavator	2270002036	330 hp	9	days	Nonroad
	Backhoe	2270002066	175 hp	32	days	Nonroad
	Crane	2270002045	175 hp	62	days	Nonroad
	Flatbed Delivery Truck	2202610000	Combination Unit Short-Haul Truck	117	trips	Onroad
	Concrete Truck	2202520000	Single Unit Short-Haul Truck	146	trips	Onroad
	Paver	2270002003	175 hp	32	days	Nonroad
Final Site Work	Concrete Truck	2202520000	Single Unit Short-Haul Truck	65	trips	Onroad
	Paver	2270002003	175 hp	14	days	Nonroad
Full Duration of Construction [b]	Crew Transportation	2202320000	Light Commercial Truck	5214	trips	Onroad

Notes:
[a] Units of days assume a typical 8-hour work day and trips assume 10 miles per trip for crew transportation and 30 miles per trip for all other on-road categories.
[b] The count of daily Construction Crew Transportation trips is based on a construction duration of 24 months. This analysis compresses the construction-related emissions into a 15-month period, thus providing a conservative estimate of annual emissions.

Table B-3. NMIM Global Parameters

NMIM Parameter	GCR Analysis Setting
Perform On-road Fleet Modeling	No
Perform Nonroad Fleet Modeling	Yes
Geography	Montgomery County, MD
Time	2015
Use Yearly Weather Data	No
Pollutants	Exhaust $PM_{2.5}$, HC as VOC, NO_X, SO_2, CO
Advanced Features	None
Diesel Retrofit	None

Table B-4. MOVES Global Parameters

MOVES Parameter	GCR Analysis Setting
Model	Onroad
Domain/Scale	National
Calculation Type	Inventory
Time Aggregation Level	Hour
Years	2015
Months	January and July
Days	Weekdays
Hours	All
Geographic Region	County
Region Selections	Montgomery County, MD
Fuels	Diesel
Source Use Types	Combination Unit Short-Haul Truck
	Single Unit Short-Haul Truck
	Light Commercial Truck
Road Types	Off-Network
	Urban Unrestricted Access
Pollutants	VOC, CO, NO_X, Primary $PM_{2.5}$ Exhaust, Primary $PM_{2.5}$ Brakewear, Primary $PM_{2.5}$ Tirewear, SO_2
Manage Input Datasets	No
Rate-of-Progress Calculations	No
Output Units	Mass in Grams
	Energy in Joules
	Distance in Miles
Output Activity	Distance Traveled
Output Aggregation Level	24-Hour Day for County
	By vehicle model year
	By SCC
Advanced Performance Features	None

In the NMIM model setup, this analysis assumes that all nonroad construction equipment would be five years old in 2015 (model year 2010). Consistently with NMIM, the MOVES results were selected for only the five-year old vehicles (model year 2010) to develop the on-road construction emission inventory. Table B-5 shows the annual average emission factors in units of grams of pollutant emissions per horsepower-hour (g/HP-hr) for each unique nonroad equipment type, while Table B-6 shows the MOVES emission factors in units of grams per mile traveled (g/mi) for each truck type. Table B-7 shows the total estimated construction equipment and vehicle emissions under the Alternative Action.

Table B-5. 2015 Annual Average Day Emission Factors for Nonroad Equipment for Construction

SCC	Model Year	Actual HP	CO (g/HP-hr)	NO_x (g/HP-hr)	$PM_{2.5}$ (g/HP-hr)	SO_2 (g/HP-hr)	VOC (g/HP-hr)
2270002003	2010	175	0.6616	1.1927	0.1595	0.0016	0.0944
2270002015	2010	6	2.5347	2.3224	0.2038	0.0021	0.3187
2270002015	2010	100	1.9718	1.5756	0.2664	0.0020	0.1038
2270002036	2010	330	1.0280	1.9283	0.1604	0.0027	0.1363
2270002045	2010	175	0.3367	0.8976	0.0780	0.0013	0.0701
2270002066	2010	175	0.3386	0.4408	0.0752	0.0006	0.0660
2270002069	2010	175	0.6770	1.2068	0.1672	0.0017	0.0956
2270002072	2010	75	0.3963	0.4863	0.0325	0.0008	0.0309

Table B-6. 2015 Annual Average Day Emission Factors for On-road Trucks for Construction

MOVES Source Type	SCC	Model Year	CO (g/mi)	NO_X (g/mi)	$PM_{2.5}$ (g/mi)	SO_2 (g/mi)	VOC (g/mi)
Combination Unit Short-Haul Truck	2202610000	2010	0.934	1.904	0.081	0.018	0.095
Single Unit Short-Haul Truck	2202520000	2010	1.089	1.398	0.046	0.011	0.132
Light Commercial Truck	2202320000	2010	2.484	0.673	0.019	0.006	0.134

Note: All emission factors include exhaust emissions from starts and running exhaust; PM includes exhaust, brakewear and tirewear.

Table B-7. 2015 and 2016 Construction Emissions from the Alternative Action

Year	Emission Source	CO (tons)	NO_X (tons)	$PM_{2.5}$ (tons)	SO_2 (tons)	VOC (tons)
2015	On-road	0.13	0.08	0.00	0.00	0.01
	Nonroad	0.05	0.09	0.01	0.00	0.01
	2015 Totals:	**0.17**	**0.17**	**0.01**	**0.00**	**0.02**
2016 [a]	On-road	0.51	0.31	0.01	0.00	0.04
	Nonroad	0.19	0.36	0.04	0.00	0.03
	2016 Totals:	**0.70**	**0.67**	**0.05**	**0.00**	**0.07**

Note: The sum of individual numbers may not match the totals due to rounding.
[a] 2016 emissions were compiled using 2015 emission factors multiplied by 2016 activity estimated as the ratio of 12/15 because 12 of 15 construction months occur would occur in 2016.

Surface Disturbance (Fugitive $PM_{2.5}$ Emissions)

Construction activities have the potential to generate PM emissions during many operations, including land clearing, ground excavation, site preparation, and in particular, equipment traffic on unpaved roads. The quantity of PM emissions from construction operations is proportional to the level of activity, duration of activity and the area of land being worked. Emissions factors derived from AP-42 Sections 11.9 (Equation 3 below) and 13.2 (Equations 1 and 2) were used to calculate PM emissions associated with surface disturbance. Equations 1 through 3 below summarize the approach. The emission factor from Equation 1 yielded a rate of 0.11 lbs of fugitive dust per vehicle mile traveled (lb/VMT) and applies to backhoes and concrete trucks operating on unpaved roads. The analysis assumes backhoes activity from dumping excavated soil emits an additional 0.007 lb/ton of fugitive dust and that a backhoe drives 1 VMT and dumps 1 ton per hour of operation.

$$E = k(s/12)^a(W/3)^b \qquad \text{Equation 1}$$

Where:

E = size-specific emission factor (lb/VMT)
s = surface material silt content (percent) value equal to 8.5
W = mean vehicle weight (tons) value equal to 3
k = empirical constant equal to 0.15
a = empirical constant equal to 0.90
b = empirical constant equal to 0.45

Equation 2 yields an emission factor of 0.02 lb/VMT for on-road vehicles driving on paved roads to the Campus; the emission factor applies to dump trucks, pick-up trucks, and heavy delivery trucks.

$$E = k(sL)^{0.91}(W)^{1.02} \qquad \text{Equation 2}$$

Where

E = particulate emission factor (lb/VMT)
k = particle size multiplier (lb/VMT) value equal to 0.00054
sL = road surface silt loading (g/m^2) value equal to 12
W = mean vehicle weight (tons) value equal to 3

Equation 3 yields a value of 0.41 lb/hr of fugitive dust from the operation of rollers, vibratory compactors and bulldozers at the Campus.

$$E = 0.105(5.7s^{1.2}/M^{1.3}) \qquad \text{Equation 3}$$

Where:

E = particulate emission factor (lb/hr)
s = surface material silt content (percent) value equal to 6.9
M = material moisture content (percent) value equal to 7.9

PM emissions from surface disturbance due to construction equipment and vehicles are summarized by year and mobile category in Table B-8.

Table B-8. Total Estimated Surface Disturbance (Fugitive $PM_{2.5}$) Emissions under the Alternative Action

Year	Mobile Category	Fugitive $PM_{2.5}$ (tons)
2015	On-road	1.5
	Nonroad	0.0
	Total	**1.5**
2016	On-road	6.0
	Nonroad	0.1
	Total	**6.1**

Painting Activities (VOC Emissions)

VOCs are emitted as gases from a variety of construction materials, including paints and coatings. This analysis assumes that the surface area requiring painting would be equal to the exterior area of the two tanks, and this area would receive three coats of paint (one primer and two finish). The analysis conservatively assumes 1 lb of VOC is emitted per gallon (gal) of paint. Equation 4 below shows the VOC calculation from painting. VOC emissions from painting activities are summarized by building in Table B-9.

Table B-9. Total Estimated VOC Emissions from Painting Activities under the Alternative Action

Building	VOC Emissions (tons)
Potable Water Storage System	0.30
Thermal Energy Storage System	0.30
Total	**0.59**

$$E = ER[SA/(C \times N)]/2000 \qquad \text{Equation 4}$$

Where:

E = VOC emissions from painting (tons)
ER = VOC emission rate from paint (lb/gal) value equal to 1
SA = Surface area (ft^2) of the exterior wall of cylindrical tank plus roof area, assuming a tank height of 90 ft and a radius of 75 ft
C = Paint coverage (ft^2/gal) value equal to 300
N = Number of coats of paint (unitless) value equal to 3
2000 = unit conversion factor (lb/ton)

Ongoing Operational Emissions

Operational emissions associated with the Alternative Action include the use of emergency generators. The NIH expects that the emergency generators would operate on a regular schedule for a period of one hour per week for testing and might be used on rare occasion, in the event of electrical outages in order to power 12 pumps. Each storage system tank would also have one 1250-kW diesel emergency generator. The Booster Pump Station would have five electric pumps and a 300-kW diesel emergency generator.

NIH estimated emissions from the three emergency diesel generators using AP-42 emission factors from Chapter 3 Tables 3.3-1 and 3.4-1. The diesel emission factors by engine output from AP-42 Table 3.3-1 apply to the 300-kW generator at the Booster Pump Station, and the AP-42 Table 3.4-1 applied to the 1,250-kW generators located at the storage tanks. Table B-10 shows the on-going emissions each year for the operations equipment.

Table B-10. 2017 Annual Emissions from Diesel Generator Operations under the Alternative Action

Generator Location	HP	Number of Generators	Hrs/Yr per Generator	CO (tons)	NO_X (tons)	$PM_{2.5}$ (tons)	SO_2 (tons)	VOC (tons)
Booster Pump Station	402	1	104	0.14	0.65	0.05	0.04	0.05
Potable Water Storage System	1677	1	104	0.96	4.19	0.12	1.41	0.12
Thermal Energy Storage System	1677	1	104	0.96	4.19	0.12	1.41	0.12
2017 Total				***2.06***	***9.02***	***0.29***	***2.86***	***0.30***

Note: The sum of individual numbers may not match the totals due to rounding.

There are no expected emissions from on-road sources associated with the on-going operations for the Alternative Action.

CONCLUSION

The projected levels of emissions generated by the Alternative Action, resulting from the construction activities and emissions from operating emergency generators would be below *de minimis* thresholds for all pollutants, as summarized by Table B-11. Therefore, the GCR is not applicable to the Alternative Action. Because the emissions under the Proposed Action are expected to be less than those under the Alternative Action, this analysis also finds that the GCR is not applicable to the Proposed Action.

Table B-11. Estimated Emissions from Alternative Action Compared to GCR *De Minimis* Thresholds

Year	Pollutant	Construction Emissions (tons)	Surface Disturbance Emissions (tons)	Painting Activity Emissions (tons)	Operational Emissions (tons)	Total Emissions (tons)	*De Minimis* Level (tons)
2015	VOC	0.02	---	---	---	**0.02**	50
	NO_X	0.17	---	---	---	**0.17**	100
	CO	0.17	---	---	---	**0.17**	100
	$PM_{2.5}$	0.01	1.52	---	---	**1.53**	100
	SO_2	0.00	---	---	---	**0.00**	100
2016	VOC	0.07	---	0.59	---	**0.66**	50
	NO_X	0.67	---	---	---	**0.67**	100
	CO	0.70	---	---	---	**0.70**	100
	$PM_{2.5}$	0.05	6.08	---	---	**6.13**	100
	SO_2	0.00	---	---	---	**0.00**	100

Table B-11. Estimated Emissions from Alternative Action Compared to GCR *De Minimis* Thresholds

Year	Pollutant	Construction Emissions (tons)	Surface Disturbance Emissions (tons)	Painting Activity Emissions (tons)	Operational Emissions (tons)	Total Emissions (tons)	*De Minimis* Level (tons)
2017	VOC	---	---	---	0.30	**0.30**	50
	NO_X	---	---	---	9.02	**9.02**	100
	CO	---	---	---	2.06	**2.06**	100
	$PM_{2.5}$	---	---	---	0.29	**0.29**	100
	SO_2	---	---	---	2.86	**2.86**	100

REFERENCES

1. Metropolitan Washington Council of Governments (MWCOG). 2008. Plan to Improve Air Quality in the Washington, DC-MD-VA Region: State Implementation Plan (SIP) for Fine Particle ($PM_{2.5}$) Standard and 2002 Base Year Inventory for the Washington DC-MD-VA Nonattainment Area. 7 March 2008.

2. U.S. Environmental Protection Agency (USEPA). 2014a. *De Minimis* Levels. http://www.epa.gov/air/genconform/deminimis.html. Accessed 13 January 2015.

3. USEPA. 2014b. EPA Releases MOVES2014 Mobile Source Emissions Model. Questions & Answer Sheet. United States Environmental Protection Agency, Office of Transportation and Air Quality. EPA-420-F-14-049. July 2014.

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APPENDIX C
CORRESPONDENCE

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United States Department of the Interior
U.S. Fish & Wildlife Service
Chesapeake Bay Field Office
177 Admiral Cochrane Drive
Annapolis, MD 21401
410/573 4575

Online Certification Letter

Today's date: 12/2/2014

Project: NIH Bethesda Chilled Water System Improvements

Dear Applicant for online certification:

Thank you for using the U.S. Fish and Wildlife Service (Service) Chesapeake Bay Field Office online project review process. By printing this letter in conjunction with your project review package, you are certifying that you have completed the online project review process for the referenced project in accordance with all instructions provided, using the best available information to reach your conclusions. This letter, and the enclosed project review package, completes the review of your project in accordance with the Endangered Species Act of 1973 (16 U.S.C. 1531-1544, 87 Stat. 884), as amended (ESA).This letter also provides information for your project review under the National Environmental Policy Act of 1969 (P.L. 91-190, 42 U.S.C. 4321-4347, 83 Stat. 852), as amended. A copy of this letter and the project review package must be submitted to this office for this certification to be valid. This letter and the project review package will be maintained in our records.

Based on this information and in accordance with section 7 of the Endangered Species Act (87 Stat. 884, as amended; 16 U.S.C. 1531 et seq.), we certify that except for occasional transient individuals, no federally proposed or listed endangered or threatened species are known to exist within the project area. Therefore, no Biological Assessment or further section 7 consultation with the U.S. Fish and Wildlife Service is required. Should project plans change, or if additional information on the distribution of listed or proposed species becomes available, this determination may be reconsidered.

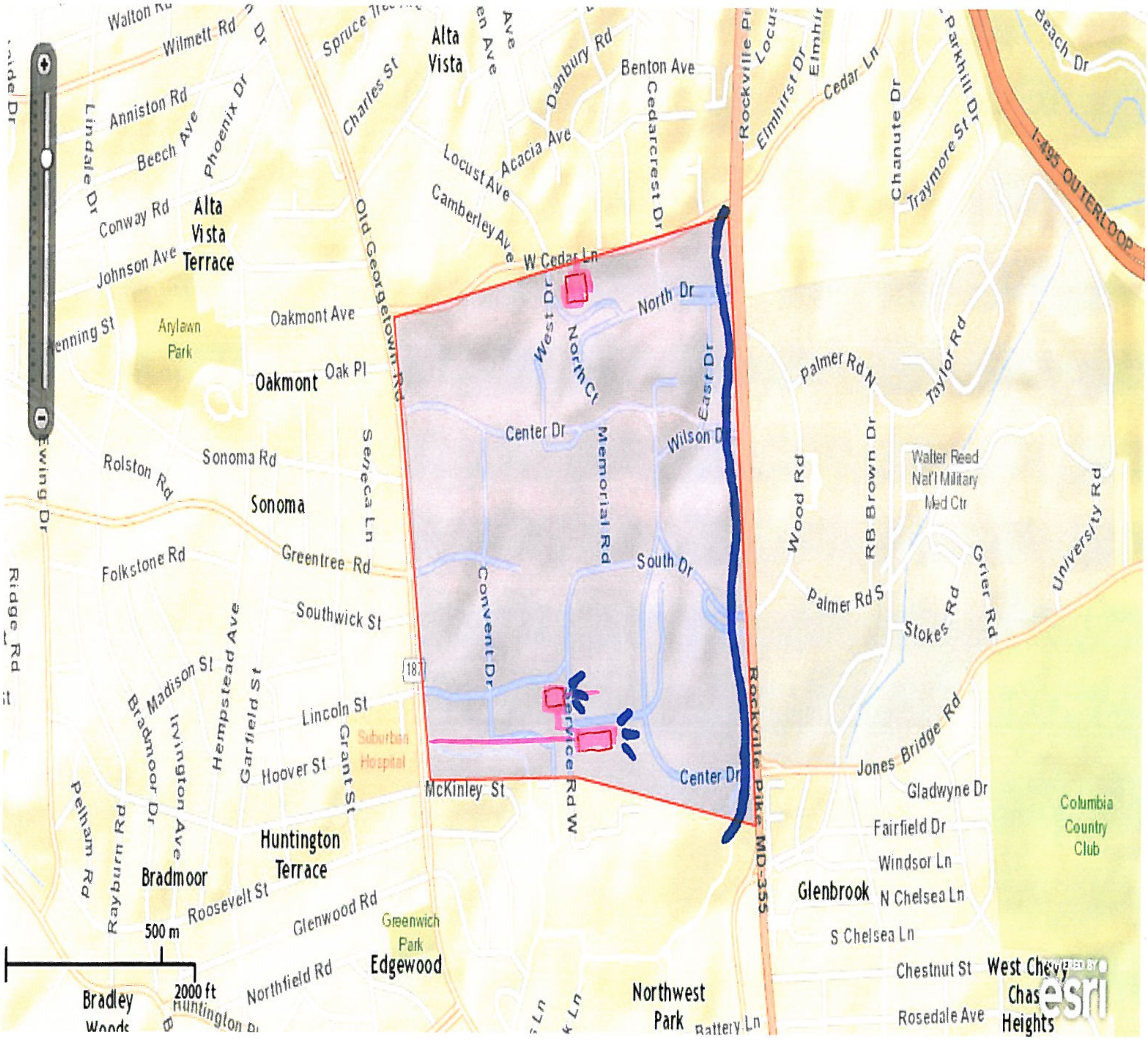
This response relates only to federally protected threatened or endangered species under our jurisdiction. For additional information on threatened or endangered species in Maryland, you should contact the Maryland Wildlife and Heritage Division at (410) 260-8540. For information in Delaware you should contact the Delaware Natural Heritage and Endangered Species Program, at (302) 653-2880. For information in the District of Columbia, you should contact the National Park Service at (202) 535-1739.

The U.S. Fish and Wildlife Service also works with other Federal agencies and states to minimize loss of wetlands, reduce impacts to fish and migratory birds, including bald eagles, and restore habitat for wildlife. Information on these conservation issues and how development projects can avoid affecting these resources can be found on our website (www.fws.gov/chesapeakebay)

We appreciate the opportunity to provide information relative to fish and wildlife issues, and thank you for your interest in these resources. If you have any questions or need further assistance, please contact Chesapeake Bay Field Office Threatened and Endangered Species program at (410) 573-4527.

Sincerely,

Genevieve LaRouche
Field Supervisor



□ = Action Area

= Potential Noise Disturbance

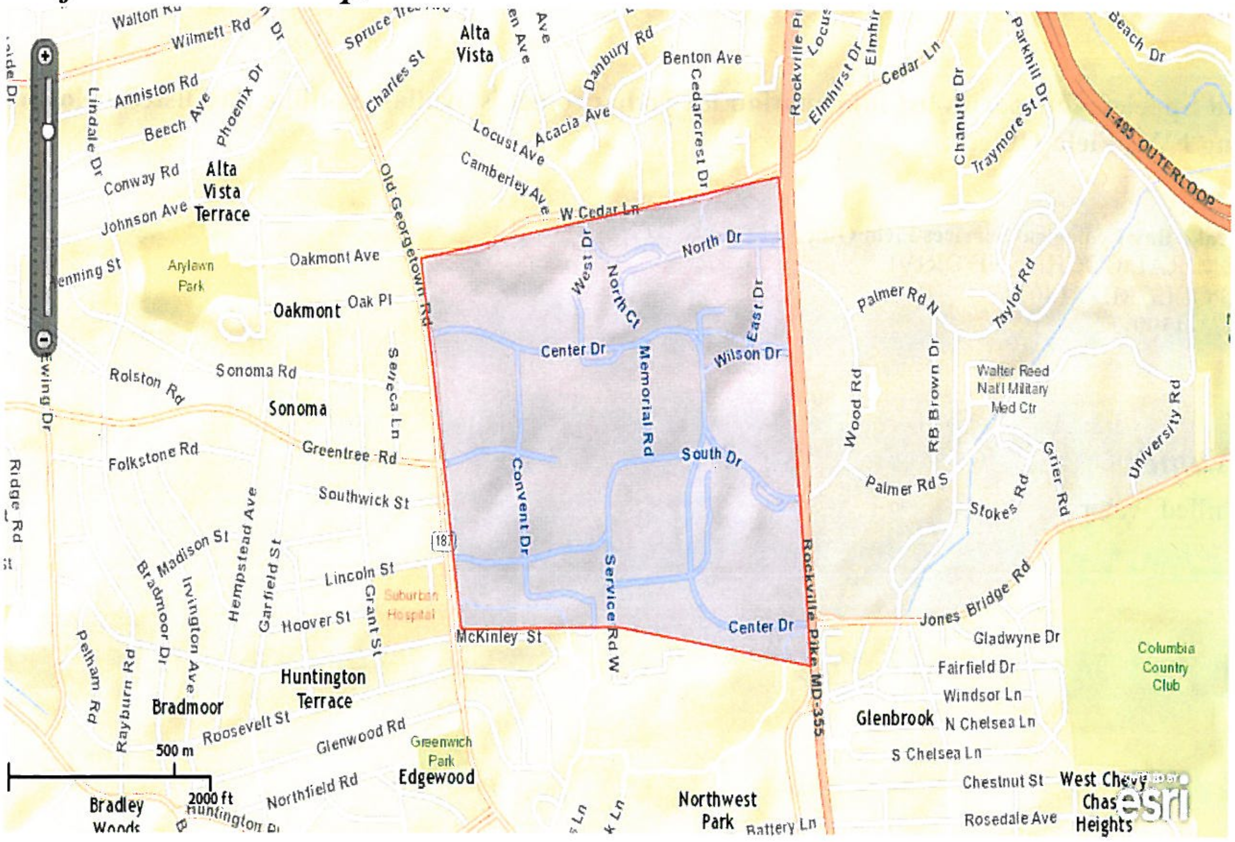
= Water Source – No Potential for contamination

= Ground Disturbance

U.S. Fish and Wildlife Service

Trust Resources List

Project Location Map:



Project Location Measurements:

Area : 257.0 ac.

Length : 2.6 mi.

Project Counties:

Montgomery, MD

Geographic coordinates (Open Geospatial Consortium Well-Known Text, NAD83):

MULTIPOLYGON (((-77.1102412 39.004392, -77.0978177 39.0061255, -77.0966372 38.9959702, -77.103332 38.996754, -77.108778 38.9966815, -77.1102412 39.004392)))

U.S. Fish and Wildlife Service

Trust Resources List

This resource list is to be used for planning purposes only — it is not an official species list.

Endangered Species Act species list information for your project is available online and listed below for the following FWS Field Offices:

Chesapeake Bay Ecological Services Field Office
177 ADMIRAL COCHRANE DRIVE
ANNAPOLIS, MD 21401
(410) 573-4599

Project Name:

USFWS Chilled Water

U.S. Fish and Wildlife Service

Trust Resources List

Project Type:

Development

Endangered Species Act Species List (USFWS Endangered Species Program).

There are no listed species found within the vicinity of your project.

Critical habitats within your project area:

There are no critical habitats within your project area.

FWS National Wildlife Refuges (USFWS National Wildlife Refuges Program).

There are no refuges found within the vicinity of your project.

FWS Migratory Birds (USFWS Migratory Bird Program).

The protection of birds is regulated by the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act (BGEPA). Any activity, intentional or unintentional, resulting in take of migratory birds, including eagles, is prohibited unless otherwise permitted by the U.S. Fish and Wildlife Service (50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)). The MBTA has no provision for allowing take of migratory birds that may be unintentionally killed or injured by otherwise lawful activities. For more information regarding these Acts see: http://www.fws.gov/migratorybirds/RegulationsandPolicies.html.

All project proponents are responsible for complying with the appropriate regulations protecting birds when planning and developing a project. To meet these conservation obligations, proponents should identify potential or existing project-related impacts to migratory birds and their habitat and develop and implement conservation measures that avoid, minimize, or compensate for these impacts. The Service's Birds of Conservation Concern (2008) report identifies species, subspecies, and populations of all migratory nongame birds that, without additional conservation actions, are likely to become listed under the Endangered Species Act as amended (16 U.S.C 1531 et seq.).

For information about Birds of Conservation Concern, go to: http://www.fws.gov/migratorybirds/CurrentBirdIssues/Management/BCC.html.

U.S. Fish and Wildlife Service

Trust Resources List

To search and view summaries of year-round bird occurrence data within your project area, go to the Avian Knowledge Network Histogram Tool links in the Bird Conservation Tools section at: http://www.fws.gov/migratorybirds/CCMB2.htm.

For information about conservation measures that help avoid or minimize impacts to birds, please visit: http://www.fws.gov/migratorybirds/CCMB2.htm.

Migratory birds of concern that may be affected by your project:
There are **21** birds on your Migratory birds of concern list. The underlying data layers used to generate the migratory bird list of concern will continue to be updated regularly as new and better information is obtained. User feedback is one method of identifying any needed improvements. Therefore, users are encouraged to submit comments about any questions regarding species ranges (e.g., a bird on the USFWS BCC list you know does not occur in the specified location appears on the list, or a BCC species that you know does occur there is not appearing on the list). Comments should be sent to the ECOS Help Desk.

Species Name	Bird of Conservation Concern (BCC)	Species Profile	Seasonal Occurrence in Project Area
American Oystercatcher (*Haematopus palliatus*)	Yes	species info	Year-round
American bittern (*Botaurus lentiginosus*)	Yes	species info	Wintering
Bald eagle (*Haliaeetus leucocephalus*)	Yes	species info	Year-round
Black-billed Cuckoo (*Coccyzus erythropthalmus*)	Yes	species info	Breeding
Blue-winged Warbler (*Vermivora pinus*)	Yes	species info	Breeding
cerulean warbler (*Dendroica cerulea*)	Yes	species info	Breeding
Fox Sparrow (*Passerella liaca*)	Yes	species info	Wintering
Golden-Winged Warbler (*Vermivora chrysoptera*)	Yes	species info	Breeding
Kentucky Warbler (*Oporornis formosus*)	Yes	species info	Breeding
Least Bittern (*Ixobrychus exilis*)	Yes	species info	Breeding

Pied-billed Grebe (*Podilymbus podiceps*)	Yes	species info	Breeding
Prairie Warbler (*Dendroica discolor*)	Yes	species info	Breeding
Prothonotary Warbler (*Protonotaria citrea*)	Yes	species info	Breeding
Purple Sandpiper (*Calidris maritima*)	Yes	species info	Wintering
Red-headed Woodpecker (*Melanerpes erythrocephalus*)	Yes	species info	Year-round
Rusty Blackbird (*Euphagus carolinus*)	Yes	species info	Wintering
Short-billed Dowitcher (*Limnodromus griseus*)	Yes	species info	Wintering
Short-eared Owl (*Asio flammeus*)	Yes	species info	Wintering
Snowy Egret (*Egretta thula*)	Yes	species info	Breeding
Wood Thrush (*Hylocichla mustelina*)	Yes	species info	Breeding
Worm eating Warbler (*Helmitheros vermivorum*)	Yes	species info	Breeding

NWI Wetlands (USFWS National Wetlands Inventory).

The U.S. Fish and Wildlife Service is the principal Federal agency that provides information on the extent and status of wetlands in the U.S., via the National Wetlands Inventory Program (NWI). In addition to impacts to wetlands within your immediate project area, wetlands outside of your project area may need to be considered in any evaluation of project impacts, due to the hydrologic nature of wetlands (for example, project activities may affect local hydrology within, and outside of, your immediate project area). It may be helpful to refer to the USFWS National Wetland Inventory website. The designated FWS office can also assist you. Impacts to wetlands and other aquatic habitats from your project may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal Statutes. Project Proponents should discuss the relationship of these requirements to their project with the Regulatory Program of the appropriate U.S. Army Corps of Engineers District.

Data Limitations, Exclusions and Precautions

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery and/or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

Exclusions - Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tuberficid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

Precautions - Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

IPaC is unable to display wetland information at this time.

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DEPARTMENT OF HEALTH & HUMAN SERVICES

Public Health Service

National Institutes of Health
Bethesda, Maryland 20892

www.nih.gov

Division of Environmental Protection
Bldg. 13/2S11, MSC 5746
Phone: 301-496-7775
Fax: (301) 480-8056

March 9, 2015

Lori Byrne
DNR Wildlife & Heritage Service
580 Taylor Ave.
Tawes Office Bldg E-1
Annapolis MD 21401

Subject: **Environmental Review Request**
National Institutes of Health (NIH) Bethesda Campus Chilled Water System Improvements Environmental Impact Statement (EIS)
Bethesda, Maryland

Dear Ms. Byrne:

I am writing to request information about any state listed threatened or endangered species that may occur on or adjacent to the area proposed for implementation of the chilled water system improvements at the NIH Campus in Bethesda, Maryland. The boundaries of the NIH Campus and the potential project elements are depicted on the enclosed map (Enclosure 1). In addition, an aerial view of the NIH Bethesda Campus boundaries is shown on the enclosed map (Enclosure 2).

The NIH Bethesda Campus contains over 90 buildings, which enable NIH to fulfill its mission of seeking fundamental knowledge about the nature and behavior of living systems and applying that knowledge to enhance health, lengthen life, and reduce the burdens of illness and disability. NIH utilizes a variety of utilities and infrastructure to support its facilities and operations, including a water storage and distribution system. NIH utilizes potable water for climate control and fire protection. The hospital, laboratories, cafeterias, and animal facilities use potable water for daily operations. The proposed water system improvements would provide the infrastructure necessary to:

- Promote electrical cost savings by allowing NIH to store chilled water produced during low demand periods and use it during high demand periods; and

- Ensure an uninterrupted and adequate supply of potable water, thus allowing for continued operations and preventing a mandatory evacuation of the Campus buildings due to a lack of water to supply the facility fire sprinklers and fire protection equipment in the event of an emergency that compromises WSSC's ability to provide NIH with water.

In accordance with the requirements of the National Environmental Policy Act (NEPA) of 1969, an EIS is being prepared for the proposed and alternative actions.

If you have any questions or need any additional information, you can contact Mark Radtke at 301-496-7775 or radtkem2@mail.nih.gov.

Sincerely,

Valerie Nottingham
Deputy Director, Division of Environmental Protection
NIH/OD/ORF

enclosures

ENCLOSURE 1
PROPOSED PROJECT ELEMENTS

Proposed Action
- New Construction
- Water Line Improvement

Other Planned Actions
- Building 34 Demolition
- MLP-12 Construction

Existing Features
- Domestic Water Lines
- Chilled Water Lines
- NIH_Boundary

Enclosure 2

Aerial View of the NIH Bethesda Campus