OPERATIONS & MAINTENANCE PLAN

For Proposed work at:
1320 South Street
Andover, MA 01810

Prepared By:
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Submitted to:
Town of Andover
Planning Board
36 Bartlet Street
Andover, MA 01810

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Services

During the Term, Contractor shall perform the following services on each System:

Energy Storage System will be maintained per the manufacture specific operations and maintenance plan.

Description of Work	Frequency of Inspection
Vegetation Management	Minimum of once per year
Gravel Access Road	Minimum of once per year
Stormwater System Inspection	Two times per year

Scope of Work

1. Vegetation Management

Growth of trees or other vegetation that could present a danger to the system should be noted in the annual report and removed if it presents a threat to the safe operation of the system. Vegetation growth (saplings, bush, large weeds, etc.) within the perimeter wall shall be removed. The site shall be mowed a minimum of twice per year. Outside of the energy storage facility, vegetation is allowed to grow for longer periods. **Special care should be made to prevent and remove vegetation that could present a fire hazard or an impedance to emergency services access.**

The site shall be inspected for evidence of erosion and rilling in any slopes. If slopes are degraded, they can reduce water quality and/or divert water to unintended areas. Revegetation of slopes helps to stabilize and ensure that storm water runoff behaves as intended. Any such conditions shall be noted in the annual report for re-vegetating.

Special Maintenance is required when:

- Erosion or rilling is found
- Standing water remains longer than 72 hours after a rain event
- Vegetation die-off has occurred resulting in unstable slopes

2. Gravel Access Roads

Roads should be stable enough that very little sediment is released during weather events. Preventative maintenance is required to avoid erosion to the roadway or

roadbed. Inspections of the roadway will check for rill erosion in the road or along the shoulders, and areas of poor drainage resulting from subgrade settlement or poor compaction. These conditions shall be noted and supported with photographs and locations as part of the annual report.

Maintenance:
Inspect roadways a minimum of once per year. Maintenance is required when:

- Erosion of the roadway or shoulders is identified
- Clean out roadside ditches when they become clogged with sediments or debris, to prevent ponding, bank overflows, and road washouts
- Fill in areas of erosion or settlement with clean washed stone. If erosion is along shoulder, ensure shoulder is properly revegetated

3. Stormwater Management Maintenance

Grass Lined Swale

Swale maintenance effects how efficiently water will be transported offsite or to other stormwater features. Swales should resist erosion, be self-cleaning, and discharge onto nearly level vegetated or stabilized areas, thus maximizing the length of time between regrading or cleaning, reducing maintenance costs. Typically, little maintenance is required.

Maintenance:
Check the swale after major storm events (greater than 2.5" in 24 hours) and in spring and fall for:

- Obstructions, erosion, or bank collapse
- Sediment or debris clogging or impeding the flow of water. Clean swale to prevent ponding, bank overflows, and road washouts.
- Re-grade swale only when necessary and line with vegetation or stone as necessary. Re-grading of swale should be limited to late spring or summer, after spring rains have diminished and drier weather has set in, and when vegetation can be re-established. Other times may be suitable depending on weather patterns, work to be performed, and urgency of work to be done.

Stone Check Dams

Check dams located within swales to reduce flow velocity, which reduces the erosion of the swale and allows the retention of sediments. Check dams shall be inspected as part of swale inspections.

Maintenance:
Inspect check dams after major storm events (greater than 2.5" in 24 hours) and in spring and fall for:

- Sediment or debris clogging or impeding the flow of water. Clean check dam to prevent ponding, bank overflows, and road washouts.

- Displaced stones
- Inspect for erosion of dam abutments, erosion downstream of dam, and piping under the dam.
- Stone check dams with significant amounts of sediment shall be removed and replaced with clean washed stones.

Infiltration Basin

Basins only attenuate peak flows when they operate as designed, so regular maintenance is essential. Inspections shall take place after every major storm event during the first 3 months of operation, and every six months after that.

Maintenance is required when:

- Too much sediment accumulates and interferes with volume capacity,
- Trees or other shrub vegetation grow on the embankment,
- The embankment becomes denuded or otherwise presents an erosion problem,
- Animal burrows are present on the embankment, or
- Standing water remains longer than 72 hours after a rain event.

Remediation measures to be taken include:

- Remove sediments
- Repair any rilling or gullying
- After removal of sediment, replace any vegetation damaged during the clean-out by reseeding or re-sodding. When reseeding, incorporate practices such as hydroseeding with a tackifier, blanket, or similar practice to ensure that no scour occurs while the seed germinate and develop roots.

Infiltration Trench

Infiltration trenches are shallow excavations filled with stone. Regular maintenance and inspections are critical for the infiltration trench. Excessive sediment discharge will clog and reduce or eliminate the ability of the trench to attenuate peak flows. It is important that the grass lined swale which provides pretreatment is well vegetated. Inspections shall take place after every major storm event during the first 3 months of operation, and every six months after that.

Maintenance is required when:

- Too much sediment accumulates and interferes with volume capacity,
- Standing water remains longer than 72 hours after a rain event.

Remediation measures to be taken include:

- Remove sediments
- Repair any rilling or gullying
- After removal of sediment, replace any vegetation damaged during the clean-out by reseeding or re-sodding. When reseeding, incorporate practices such as hydroseeding with a tackifier, blanket, or similar practice to ensure that no scour occurs while the seed germinate and develop roots.
- During and after maintenance, protect the infiltration trench with geotextile or silt sock. Remove these protections when remediated areas are well vegetated.

4. Fencing/Wall Management Maintenance

Sound Barrier Walls

Sound barrier wall locations are specified on plans. They typically don't encompass entire project due to the difficulty that would cause during construction.

Maintenance:

Check the wall perimeter once a year for:

- Obstructions, erosion, cracks, chips or any other blemishes.
- Look for any evidence of animal activity, digging, etc. Maintain as needed.

Chain Link Fence

The chain link fence surrounds the project with few accesses point for vehicles and personnel. Typically, little maintenance is required.

Maintenance:

Inspect fence perimeter every year. There are typically four things that should be checked:

- Examine the posts to ensure they remain at a 90-degree angle, and none should be repaired or replaced.
- Look for broken or bent mesh and replace as needed.
- Remove and inspect any rust. If rust builds up it can be more costly.
- Look for any evidence of animal activity, digging, etc. Maintain as needed.

Wildlife Fence

The wildlife fence surrounds the project with few accesses point for vehicles and personnel. It follows the chain link fence, but it adds additional mesh on the bottom couple of feet to protect the project and wildlife. Typically, little maintenance is required.

Maintenance:

Inspect fence perimeter every year. There are typically four things that should be checked:

- Examine the posts to ensure they remain at a 90-degree angle, and none should be repaired or replaced.
- Look for broken or bent mesh and replace as needed.
- Remove and inspect any rust. If rust builds up it can be more costly.
- Look for any evidence of animal activity, digging, etc. Maintain as needed.