

Planning a Site Drainage Project

Proper planning of a site drainage project is critical to the ultimate success of the project. This planning should not only account for how you are going to move water and where you are moving it to but also the impacts that will have on the integrity of the historic landscapes, features and structures.

Guidelines for Planning a Site Drainage Project

- Document the site drainage issue(s) affecting the property.
- Thoroughly review the gathered documentation related to the site drainage issue(s)
- Determine if the repair option will be pursued internally or if a consultant is required.
- Regardless of whether project development will be handled internally or by an outside consultant it is critical to fully document the intentions of the project, the expected outcomes and the scope of work.
- Review of the project plan should incorporate different viewpoints to ensure the affects of the planned project on historic resources, both landscape and building, visitor amenities and land use are being discussed.
- Plan projects that achieve maximum results through the simplest means possible with the least impact to historic fabric, whether structural or landscape.

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Technical Information for Planning a Site Drainage Project

Document the site drainage issue(s) affecting the property.

- Written description(s) and photographic evidence of the issue(s) and any related known or suspected adverse manifestations of the issue(s).
 - Include not only the on-site issue(s)/manifestations but also any that relate to upslope or downslope properties (whether or not owned or controlled by Historic New England)
- Gather all known previous documentation directly or indirectly related to the issue(s)
 - In house observation reports, construction sketches/designs, construction reports, maintenance reports, photographs
 - Archaeological reports
 - Local, State, and/or Federal Permits
 - Previous design documents (related to drainage, architectural, or landscape)
 - Conceptual sketches/designs
 - Final design plans/details/specifications
 - Contract documents
 - As-built plans, sketches, reports, photographs

Thoroughly review the gathered documentation related to the site drainage issue(s)

- Based on the review, answer the following questions:
 - Is this a new issue or an ongoing known issue?
 - Does this issue stand alone or is it part of a group of related issues?
 - Have earlier fixes been attempted and not worked, worked for a short time, or made the issue worse?
 - How large an area does this issue affect?
 - Is it a limited area minor nuisance or does it have major existing or potential impacts to structural and/or infrastructural features?
 - Are the impacts confined to the property or do they also potentially affect neighboring properties
 - Does the issue flow onto the property from upslope non-Historic New England lands or whether the issue will continue onto downslope non-Historic New England properties?
 - Will any of the work be near or along a boundary line?
 - Will any of the work be in or near a wetland, stream, river, or waterbody?
 - Are any connections to a separate privately owned or municipally owned drainage system involved?
 - Are any Local, State, or Federal Permits potentially required? If so is the involvement of a licensed professional engineer required?
 - Are there questions as to the capacity or potential capacity of existing drainage channels, drainage piping, or drainage structures to be able to handle existing or additional flows?

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- Does the issue have any definite or potential impacts to drainage infrastructure that was previously engineered?
- Will the potential fix involve adding flows to existing drainage systems?
- Where will the dispersal point be and what effect will that have on the landscape?
- Will the potential fix involve adding drainage structures/piping/channels?
- Will the potential in-house fix change the amount or type of flow (sheet flow versus concentrated flow)?
- What are the potential consequences of getting the fix wrong?
- Be aware of the engineering laws of the State in which the property is located, in regard to the legal boundaries of what design work would need the involvement of a licensed engineer.
- How comfortable/confident is Historic New England that an in-house simple fix or maintenance will alleviate the issue and not adversely affect other areas or features?
 - If after answering the above question there is substantial but not complete confidence in Historic New England moving forward with an in-house fix, then consult with and obtain an opinion from a licensed civil engineer.
- A written report outlining the above questions and the answers should be created.

Determine if the repair option will be pursued internally or if a consultant is required.

- How comfortable/confident is Historic New England that an in-house simple fix or maintenance will alleviate the issue and not adversely affect other areas or features?
 - If after answering the above question there is substantial but not complete confidence in Historic New England moving forward with an in-house fix, then consult with and obtain an opinion from a licensed civil engineer.
- If the decision is made to handle the issue(s) internally, then consider the following:
 - Fully document in a Project Review Form the existing conditions (notes, photographs, ties to nearby permanent structures or features), the reasons why action is necessary, and the reasons why Historic New England is confident on its intended plan of action. The report answering all of the questions identified in the above section should be included as an addenda.
 - Carefully consider the plan of action and its impact on surrounding structures and features while assembling the design documents.
 - Fully understand and plan for where the water is going to go (dispersal location) prior to development of drainage modifications with particular understanding of the effects that it will have on the landscape.
 - Make sure there are plans/sketches, details, and specifications on the work to be performed.
 - Do not leave it up to the contractor to determine what the work will entail and what materials to use.

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- Keep in mind though that contractors have invaluable practical experience which should be tapped into and considered in design decision making processes.
- As part of the completion report include clear as-built sketches, photographs (work in progress, completed work, conditions encountered), ties to nearby permanent structures or features, and the reasons for any changes to the design documents.
- If the decision is made to hire an engineer to perform the design work:
 - The engineer must be licensed in the State in which the property is located, and the license should cover the type of engineering work required.
 - The engineer should be experienced in the aspect of the project under consideration, with more experience required as the complexity of the issue(s) increases.
 - Professional references (past and present clients, regulatory authorities, etc...) should be provided, along with samples of design work of related past projects.
 - In considering an engineer and their work, consider the following:
 - How detailed and thorough are the design documents?
 - Are the documents clear and understandable?
 - How clean and uncluttered are the drawings?
 - Where appropriate, are design calculations included?
 - Is the consultant easy to contact and willing to spend time in dealing with comments and questions?
 - Are they sensitive to other non-engineering issues that relate to the project (historical, archaeological, aesthetic, etc...), and are they open and willing to learn about those issues and incorporate mitigating measures into the design plans?
 - Provide a clear and concise scope of work for the project.
 - Provide the engineer with all pertinent existing documentation for the project.
 - Keep and require open lines of communication between/amongst staff and all consultants.
 - Require deliverables to include as a minimum:
 - At least 5 hard copies of the design plans, details, and specifications
 - Enough for one copy each for the Archives, Property Care Files, and the individual property as well as working copies for contractors and staff, etc.
 - At least 3 hard copies of any appropriate pertinent design calculations and reports for Historic New England records.
 - Enough for one copy each for the archives, the Property Care binder collection and property care project file.
 - PDF digital files of the above plans and reports
 - AutoCad compatible digital files (dwg file) of the design plans

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Review of the project plan should incorporate different viewpoints to ensure the affects of the planned project on historic resources, both landscape and building, visitor amenities and land use are being discussed.

- Any project, whether internal or externally developed, should include a thorough review process.
- The more complex the planning project is the more time that should be allotted during the project for staff review.
 - The outcome of these review meetings should guide the results of the project.
- Project review and site meetings to discuss the issues should be inclusive of staff and outside persons to ensure a thorough review.
 - Basic staff members who should review include property care staff – both buildings and landscape, site staff and potentially functions or collections staff.
 - PPIP committee members should be included in the review process if changes to the building (eg. adding gutters to a building previously with none) or landscape (eg. removing a tree to improve drainage) are being considered.
 - It may be necessary to include landscape or properties committee members to advise on issues where their expertise exceeds or complements those on staff.
 - For particularly complex drainage projects it may be wise to contract with a second engineer to review the documents with an impartial eye.
- Carefully review the draft plan and its impact on the property and on land use.
 - Will this work change/alter existing historic or interpreted features?
 - Significant changes to existing landscape features, including the creation of swales, should be reviewed to determine the affect on the overall defining characteristics and integrity of the property.
 - Changes to historic features, whether on the building or landscape, need PPIP approval before proceeding.
 - Pay attention to where the water is being diverted to and discharged. Consider whether the location and characteristics of the discharge will affect how downslope areas are used and experienced, both now and in the future.
 - Will an outflow erode terrain?
 - Is the area downslope of the drainage discharge currently used for programs or other uses?
 - Are there plans to use the area downslope of the drainage discharge in the future?
 - Are the impacts confined to the property or do they also potentially affect neighboring properties?
 - Are any connections to a separate privately owned or municipally owned drainage system involved?

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- What is the groundwater level and the soil types in the location of the drainage recommendations?
- Will any of the work be near or along a boundary line?
- What permitting is required for the project?
- Will the work involve any digging or trenching?
 - Work below grade may require archeological review.
- What is the capacity or potential capacity of the proposed drainage channels, drainage piping, or drainage structures?
- What will the impact of construction be on the site?
- What are the maintenance demands of the new system?

Plan projects that achieve maximum results through the simplest means possible with the least impact to historic fabric, whether structural or landscape.

- Re-evaluate the proposed project with these simple concepts in mind:
 - Water always goes downhill.
 - Passive systems that rely on gravity are better than systems relying on mechanical systems.
 - Passive systems relying on natural grade changes are better than creating structures to carry the water. Less maintenance too.
 - Move the water away from the buildings as opposed to trying deal with the water at the building.
 - Avoid using new technologies to solve your drainage problems