

TASK 0
WORK PLAN

ON

FDC PHASE 2, TASK ORDER B:
NEXT-GENERATION WATERSHED MANAGEMENT PRACTICES
FOR CONSERVATION DEVELOPMENT

Prepared for:

U.S. Environmental Protection Agency, Region 1 (EPA R1)

Submitted By: Great Lakes Environmental Center, Inc.
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1 PROJECT UNDERSTANDING

This work scope represents a continuation – a second phase - of EPA’s flow duration curve (FDC) project entitled, Holistic Watershed Management for Existing and Future Land Use Development Activities: Opportunities for Action for Local Decision Makers: Phase 1 – Modeling and Development of Flow Duration Curves (FDC1 Project). This second phase FDC project will employ two separate but related task orders. This is FDC2 Task Order B: Next-Generation Watershed Management Practices for Conservation Development.

The objective of this phase (FDC2) is to apply the results of the first phase (FDC1) to a number of second and third order headwater stream segments of the Taunton River Watershed to understand the impacts of, and potential approaches for managing impervious cover (IC). Specifically, the FDC will be applied to demonstrate the efficacy of the FDC by modeling differences between watershed/ sub-watershed development scenarios, including a pre-development forest condition, the current built state, a scenario that incorporates the State of Massachusetts’ stormwater standards and a number of future scenarios that consider potential climate change conditions (flooding and drought).

The results of applying the FDC at a watershed/subwatershed scale will next be employed to illustrate the effect of land use decision making at the site scale. Application at the site scale will facilitate consideration and development of draft next-generation municipal bylaws / ordinances that inform land use decision making, particularly with respect to new development and/or redevelopment (nD/rD). Applying the FDC at the site scale will allow municipal practitioners to appreciate how nD/rD impacts water quality, flooding frequency and duration, channel stability, ecohydrological function, and hydrogeomorphology.

Application of the FDC at the site-scale anticipates a need for next-generation nD/rD practices – or as termed here, Conservation Development (CD) practices. As contemplated here, such practices are anticipated to include, among others, a de-emphasis of impervious cover (IC) (e.g., primarily access roads, driveways, parking lots and hardened or bare rooftops), and increased reliance on practices that emphasize next-generation site design and development practices (e.g., soil management practices), architecture (e.g., green roofs, Low Impact Development (LID)) and landscape architecture – in general, CD practices that promote conservation of site-scale functional attributes and ecosystem services to help ensure preservation of pre-development-like hydrology, hydrogeology, and ecological diversity and vitality. In addition, it is envisioned that such CD practices will incorporate agriculture to increase sustainability of food systems and foster an increased appreciation and use of forest canopy and landscape architecture to promote evapotranspiration to offset the “heat island effect” that results from excessive IC.

This project is about envisioning a different future of watershed management. Practitioners will be asked, rhetorically, to compare and consider likely scenarios ranging from inaction (status quo policies) to actions that incorporate flooding risk, stream-channel stability, increased pollutant export and reduced base flows. Phase 2 is very much about communicating results so that practitioners can appreciate the impact of current nD/rD on the future of their watersheds. Ideally, practitioners would be able to glean the future of a watershed managed for optimal sustainability and resilience, compared to one that acquiesces, or continues to facilitate by inertia, the phenomenon of “urban sprawl.”

2 WORK PLAN

The following draft Work Plan and methodology will serve as the starting point for discussion related to task expectations, deliverables, staffing, and schedule.

Task 0: Work Plan, Budget and Schedule

This document serves as our draft Work Plan, and it outlines our approach and staffing for each task included in the PWS. Our proposed level of effort and schedule for key milestones and deliverables are provided at the end of this section (Table 1). This includes the municipal engagement meetings and coordination of Technical Steering Committee meetings between FDC2A and FDC2B.

Task Lead: Mick DeGraeve

Key Support Staff: Robert Roseen and Khalid Alvi

Schedule: The final work plan will be delivered to EPA within two (2) weeks of receiving comments from EPA.

Deliverable: Final work plan, including the level of effort, final schedule, and deliverables

Table 1. Draft project schedule and milestones for FDC2B

Deliverable	Delivery Date
Task 0: Work Plan, Budget and Schedule	
Work Plan	12/09/2021
Monthly Progress Reports	Monthly
Task 1: Prepare QAPP	
Draft QAPP	Not Applicable
Final QAPP	Not Applicable
Task 2: Project Management and Administration	
Subtask 2A: Kickoff Meeting	10/29/2021
Subtask 2B: Monthly Conference Calls and Summaries	TBD
Task 3: Municipal Engagement Process through Working Meetings	
1. Project introduction and discussion of municipal toolbox elements and site development concepts.	December 8, 2021
2. Selection of CD and LID site-development project concepts (Task 4).	TBD, January 2022
3. FDC2A TSC Meeting #1 outlining scope of FDC2A and modeling outputs that will support this Project. Present and discuss baseline alternative level of control using conceptual site-development designs with FDC2A modeling results (Task 4) and select additional Alternative (2) level of control to be further evaluated (Task 5)	TBD, March 2022
4. FDC2A TSC Meeting #2 presenting all FDC2A project modeling results for various simulations including alternatives of level of local regulatory control for site development activities developed under FDC2B - 9 months.	TBD, July 2022
5. Present final results of site-development alternative analyses and collaborate to identify recommended effective communication methods/outputs and lessons learned through Municipal Engagement process	TBD, August 2022
Task 4: Conceptual Site-Development Plans for Hypothetical New and Redevelopment Projects	
Technical Memorandum (TM) Draft Concept Plans and Alternative Concept Plans for each new and redevelopment project site design scenario developed under this task (a total of nine (9) site plans).	February 2022

Deliverable	Delivery Date
Task 5: Local Site-Development Regulatory Control Alternatives Analysis	
Subtask 5A: Local Bylaw Review	January 2022
Subtask 5B: Best Practice Bylaw/Ordinance Research and Technical Memo	February 2022
Subtask 5C1: Alternative Next-Generation Municipal Bylaw Requirements for Enhanced Stormwater Management and Conservation Development Design Standards Subtask 5C2: Alternative Concept Plans: Nine (9) total, 3 new conventional development, 3 new conservation development, and 3 redevelopment.	April- May 2022
Task 6. Final Report and Outreach Materials	
Draft Report	September 2022
Final Report	October 2022
Outreach Materials: Draft Project Summary and Series of Conceptual Site Plans for Site-Development Designs	September 2022
Outreach Materials: Final Project Summary and Series of Conceptual Site Plans for Site-Development Designs	October 2022
Task 7: Phase 2A Project Webinar to SNEP Region	
Present Phase 2B Project Webinar to SNEP Region	October 2020
Task 8. Compendium of nD/rD Conservation Development Practices (Optional)	
Draft and Final: nD/rD CD Practice Compendium	October 2020

Task 1: Prepare Quality Assurance Project Plan (QAPP)

EPA policy requires that an approved Quality Assurance Project Plan be developed in advance for work that involves the collection, generation, evaluation, analysis or use (e.g., modeling) of secondary environmental data for environmental decision making. Because the work under this Task Order does not include such work, a QAPP is not required. However, for background and informational purposes, the project will employ as reference the QAPP developed under the predecessor project, FDC1, and as revised under the separate but contemporaneous project, FDC2A: Application FDC Modeling.

The QAPP for the prior FDC1 Project is available on the FDC1 Project website at:
<https://www.epa.gov/snep/holistic-watershed-management-existing-and-future-land-use-development-activities-opportunities>.

Task Lead: NA

Key Support Staff: NA

Schedule: NA

Deliverable: NA

Task 2: Project Management and Administration

The GLEC Team has decades of experience working with EPA to successfully manage projects of all sizes and scopes. Mick DeGraeve will serve as the GLEC Program Manager and Robert Roseen will serve as Project Manager, and both will stay in contact with EPA and will ensure the team adheres to

all schedules and provides high-quality deliverables. The following highlights our approach to completing the subtasks identified in the PWS.

Subtask 2A. Kickoff Meeting

The GLEC Team will initiate the planning for a kickoff meeting to ensure it occurs as soon as possible after the Task Order award. Due to the continuing Covid-19 pandemic, this meeting will use a video-conference application. Currently, EPA has a license and uses Microsoft Teams™ for videoconferencing. Teams™ will be considered the primary or default videoconferencing platform. Alternative platforms/applications may be employed (e.g., ZOOM™) on an as-needed case-by-case basis and consistent with EPA policy dated April 4, 2020, entitled “Revised - Guidance on Use of Third-Party Virtual Platforms”.

Our Team will work with EPA to determine the attendees and we will plan on scheduling the kickoff meeting so that it occurs within two (2) weeks of the Task Order award. EPA will make available any additional technical references not already provided, or other supplemental data or information that may assist the GLEC Team. The kickoff meeting will provide a critical opportunity for coordination and information sharing with the EPA Project Team.

The GLEC Team will deliver the Task 0 Work Plan draft for EPA’s review. It is anticipated that our Team will have compiled additional information and will come to the meeting prepared to actively participate in project-related details. We will take notes for the duration of the meeting, and will develop a meeting summary for distribution to the meeting attendees and any others as directed by EPA. Note that we also believe a short kickoff call within a week of the Task Order award would provide value to the project and could also streamline the planning of the kickoff meeting.

Subtask Lead: Robert Roseen and Mick DeGraeve

Key Support Staff: Khalid Alvi

Schedule: A kickoff call will be scheduled within two (2) weeks of the Task Order award.

Deliverable: Kickoff meeting summary will be provided within one week of call. The meeting notes will summarize key points, scheduling decisions and milestones and action items.

Subtask 2B. Conference Calls, Meetings, and Project Team Support

The GLEC Team will schedule and participate in monthly progress calls to keep the EPA Project Team apprised on the progress of all tasks as well as planned activities during the next month. These calls will utilize EPA’s teleconferencing facilities and EPA will provide video/teleconferencing details in advance of each call. We will coordinate with EPA on the best approach to scheduling and notifying attendees of call details in advance of the call. Our Team places great value on these monthly calls and, as with similar projects, we will send out an agenda in advance. We often apply simple scrum techniques to ensure each call is organized, has a set agenda that is followed and recognizes busy schedules by keeping calls on topic and efficient. Working with EPA, we will develop an agenda for each call but will also leave time on each call to discuss topics of interest to the EPA Project Team. Each call will be attended, at a minimum, by the Project Manager and key staff. Call notes, with action items, will be distributed via email to the project team members within one (1) week of the call.

It is possible that drafts of any given deliverable may require time and level of effort (LOE) for EPA review and/or same for facilitating such review of the drafts by others. The GLEC Team has included LOE provisions for incorporating such review into the development of final deliverables.

In addition to project calls and meetings related to FDC2B, the GLEC Team understands that coordination between the two projects will be instrumental to the success of both. The GLEC Team will work with EPA to ensure timely coordination with the FDC2A for the needed exchange of information throughout the project execution period. Coordination will be necessary for TSC Meetings (FDC2A, Task 3), Municipal Working Meetings (Task 3), for development of webinar (Task 7), and for coordination in regards to the development of watershed and site-scale FDC application simulations/scenarios and the presentation of results thereof (Task 6). The GLEC Team envisions these coordination meetings taking place through planned monthly project meetings or through virtual Technical Steering Committee meetings (Task 3). Table 2 outlines our understanding of expected coordination with FDC2A project team. Our cost estimate for this task accounts for any needed inter FDC2A/2B coordination.

Table 2. Expected coordination between FDC2B and FDC2A project teams

Management Scenario Type	Scale	Responsible Team
9 concept site-development plans for baseline scenario (MS4)	Site Development Projects	FDC2B
Implementation rules for baseline scenario (MS4)	Sub-watershed	FDC2A/FDC2B
9 concept site-development plans for alternative next-gen Municipality by-laws	Site Development Projects	FDC2B
Implementation rules for next-gen Municipality by-laws	Sub-watershed	FDC2A/FDC2B

Subtask Lead: Robert Roseen

Key Support Staff: Mick DeGraeve and Khalid Alvi

Schedule: Monthly progress calls and calls summary notes

Deliverable(s): Monthly calls; monthly call notes (distributed via email)

Task 3: Municipal Engagement Process through Working Meetings

The GLEC Team will conduct a Municipal Engagement Process primarily through a series of working meetings to work directly with municipal partners to share key project interim results, gain local input and support interim decision making related to task work under this TO. This engagement process will be designed to foster collaboration among the Project and Municipal Teams to translate and share information (i.e., FDC1/FDC2A modeling outputs) regarding local site development practices to ensure project deliverables are developed in a manner that reflects input and perspectives of the municipal partners and the overall communication objectives of the project. Task 3 Municipal Engagement working meetings will be strategically planned and scheduled to take advantage of the TSC experts and the technical discussions for the FDC2A project so that interpretation of continuous simulation hydrologic modeling and FDC results (to be developed under FDC2A) relating to ecosystem elements and/or conservation development stormwater control measures shall be used to inform the development and evaluation of local site-development regulatory options, as well as effective communication and outreach strategies to support sound decision making on land use and site-development activities at the local government level.

Accordingly, the GLEC Team will provision for five (5) Municipal Engagement Working Meetings with the Municipal Partners and Project Team as follows with EPA's preliminary estimate of the timing of the meeting from date of TO award:

1. Project introduction and discussion of municipal toolbox elements and site development concepts. – December 8, 2021
2. Selection of CD and LID site-development project concepts (Task 4) – Late January, 2022
3. FDC2A TSC meeting 1 outlining scope of FDC2A and modeling outputs that will support this project. Present and discuss baseline alternative level of control using conceptual site-development designs with FDC2A modeling results (Task 4) and select additional Alternative (2) level of control to be further evaluated (Task 5) – March 4, 2022.
4. FDC2A TSC meeting 2 presenting all FDC2A project modeling results for various simulations including alternatives of level of local regulatory control for site development activities developed under FDC2B – July 2022.
5. Present final results of site-development alternative analyses and collaborate to identify recommended effective communication methods/outputs and lessons learned through Municipal Engagement process – August 2022.

As indicated, two of the Municipal working meetings shall include participation in the two (2) planned FDC2A TSC meetings (each meeting being approximately two (2) hours in length) to minimize redundancy and facilitate economy of both FDC2A and 2B projects and to keep the FDC2B and its Municipal Partners informed. The EPA Project Team will be responsible for securing municipal participation in FDC2A Task 3 TSC Meetings. The GLEC Team assumes that the Municipal Engagement Working Meetings and FDC2A TSC Meetings will be convened virtually using a videoconference platform as discussed above. However, in the event pandemic conditions improve which allow for in-person meetings, an option would be to convene one or more of the Working Meetings at locations within the participating municipalities.

However, it is important to note that community engagement can be very time consuming and particularly consensus building with complex and challenging issues. It will be necessary to match engagement expectations with the LOE and adjust accordingly.

Task Lead: Robert Roseen

Key Support Staff: Khalid Alvi

Schedule: To Be Determined: See above in Task 3 for EPA estimates of approximate time of meetings from date of TO award

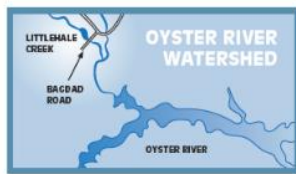
Deliverable(s): Five Municipal Engagement Working Meetings (2 meetings coordinated with FDC2A TSC Meetings)

Task 4: Conceptual Site–Development Plans for Hypothetical New and Redevelopment Projects

The purpose of this task is to develop hypothetical real-world site-development plans that will be employed in concept for modeling simulations and for demonstrating alternative site development designs and levels of potential local regulatory control for addressing water resource and watershed health impacts (hereafter referred to as “Concept Plans”). The Project Team has extensive experience in developing both concept plans in graphic form for use as an outreach product, as well as construction level designs. In both cases the Project Team has deep expertise in design and science-translation. Of equal importance is the Teams knowledge of feasible and buildable designs based on decades of BMP construction experience. EPA expects the Contractor to derive these initial Concept Plans from either (a) actual completed projects (having as-built design plans (or equivalent)) that the Contractor may have completed itself or (b) from completed projects that may be available from one or more municipalities (e.g., Appendix C of PWS). EPA is sensitive to projects that may be identifiable as sourced from one or more of the Taunton municipalities. For this reason, a development project from any other New England municipality may be employed if such project would adequately represent the type and scale of new or redevelopment project in the Taunton. For this reason, EPA is employing the descriptor “hypothetical.” Lastly, and particularly for plans that incorporate CD Practices, EPA anticipates these plans would be visually appealing, suggesting collaboration with a graphic artist and landscape architect (note: The Boston Society of Landscape Architects is an FCD1, and possibly also an FDC2A TSC participant). EPA envisions the initial Concept Plans would contain enough detail (e.g., approximate 25% level plans (as compared to typical final as-built design plans)) in conveying important site information, such as topography, location and extent of IC – and that such would be sufficient to support FDC2A modeling simulations and subsequent plans incorporating various levels of CD Practices (as described further below).

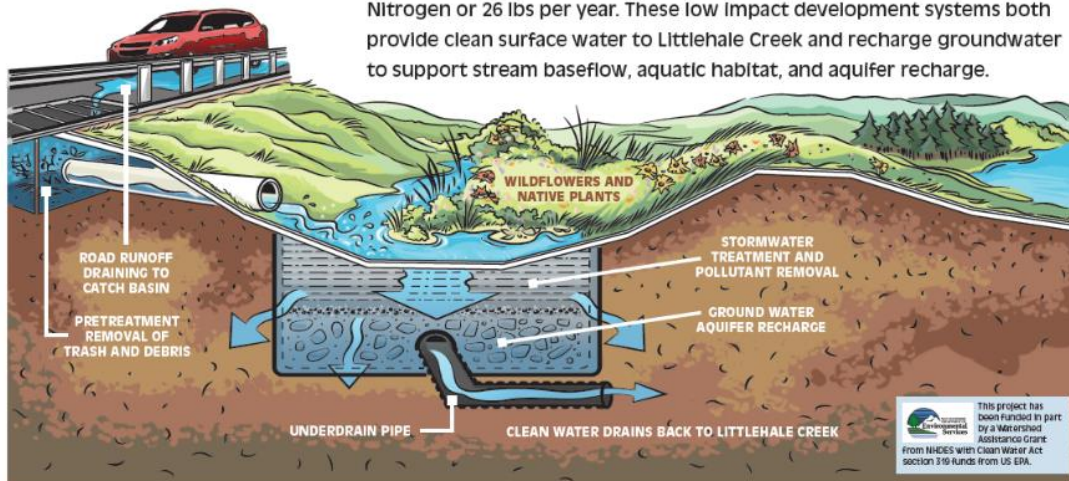
It is expected that the Concept Plans developed under this task shall serve as a future reference to the SNEP region for illustrating alternative site-development designs for a range of typical land use site-development activities that comply with alternative levels of local regulatory control focused on SW management and next-generation site design practices (i.e., CD Practices). The Concept Plans will include estimates of water resource and watershed **health** impacts associated with the development activities such as conversion of permeable vegetated surface to IC (i.e., IC conversion), as well as estimates of the **benefits** associated with depicted CD Practices and SW controls, which overall would achieve the specific level of on-site control being demonstrated and could be required or incentivized in local bylaws. The GLEC Team will also develop planning level **cost** estimates (if needed, based on a generalized cost/unit management area, e.g., cost per square or cubic foot) of site work including SW management and GI SCMs (excluding costs for buildings) for each Concept Plan further devel-

oped under this task (described below). EPA Region 1 will provide the GLEC Team with cost information for use of green roof technologies and passive IC disconnection with storage. One such exam-



What is a BIOSWALE?

This bioswale stormwater system was installed by the Town of Durham as part of a water quality improvements and culvert replacement project for Littlehale Creek. This bioswale provides treatment for stormwater runoff carrying pollutants from roadways and residential lawns and driveways. The bioswale treats runoff from 4.5 acres and removes 76% of Nitrogen or 26 lbs per year. These low impact development systems both provide clean surface water to Littlehale Creek and recharge groundwater to support stream baseflow, aquatic habitat, and aquifer recharge.



ples of the Team’s experience is Little Hale Pond Nutrient Control Design and Outreach shown below.

The initial Concept Plans will provide the basis for conducting continuous model simulations under FDC2A which shall be performed to provide FDC2B with estimates of impacts and mitigation benefits associated with each Concept Plan site-design scenario.

Municipal practitioner understanding and appreciation is a critical goal of this Project: the goal of developing these Alternative Concept Plans is to visually compare a “business as usual” site development approach with Alternative Concept Site Development Plans incorporating various levels and combination of CD Practices. This visual side-by-side comparison will be used as the primary vehicle for demonstrating, in a visceral manner, the imperative for municipal consideration and adoption of bylaws and policies that de-emphasize IC and incorporate CD Practices. In brief, presented with the past/current and a potential alternative future, the municipal practitioner will be rhetorically asked: “What future do you envision?”

FDC2A will also use the Concept Plans design scenarios to inform development of subwatershed modeling simulations for providing the FDC2B Contractor with estimates of overall cumulative effects at a subwatershed scale (e.g., Upper Hodges Brook in the Wading River watershed). The subwatershed modeling results will be used by FDC2B to inform the Municipal Partners of the cumulative outcome of applying MS4s to applicable new and redevelopment project across a watershed.

Accordingly, the GLEC Team will develop Alternative Concept Plans depicting real-world conventionally designed development projects that are and/or would be representative of typical new and redevelopment projects likely to be encountered by municipalities participating in the project. Overall,

the selected concept site-development project plans will capture a range of realistic new and redevelopment site-development conditions assuming conventional development approaches (i.e., “business as usual”) that collectively represent a range of on-site percent IC, hydrologic soil types, natural vegetated areas before and after development, and extent of soil disturbance. The GLEC Team will develop Alternative Concept Plans for up to **three (3) hypothetical new development projects** involving land uses such as commercial, single-family subdivision, industrial, and/or multi-family and **three (3) hypothetical redevelopment projects** with varying site conditions and constraints. As part of the Municipal Engagement process (Task 3), it will be important for the GLEC Team to seek input from the Municipal Partners on the selection of these new and redevelopment concept projects. An essential element of the Concept Plans is the development of designs that can be easily replicated and easily maintained. This will include readily implementable and standardized designs that can be pulled from a shelf and that do not involve substantial additional analysis or engineering. The focus will be on simple, low-maintenance systems that are identified by the TSC as feasible to implement for common nD/rD applications. Designs will include relevant information about sizing, pretreatment, and plan and detail designs and specifications, and estimated costs per unit construction. Systems will balance the ease of maintenance and the cost to construct with optimal performance for recharge and water quality treatment.

The Alternative Concept Plans for the new and redevelopment scenarios will in turn incorporate two (2) levels of local regulatory controls:

- (i) A **Baseline Scenario** equivalent with the Massachusetts MS4, and
- (ii) An **Alternative Scenario** to be developed under Task 5.

MA MS4 Standard Baseline Scenario: The GLEC Team will create two (2) Concept Site Plans for each of the three (3) new development project sites (Table 3) using:

- 1) **Conventional development** with SW management only, and
- 2) **CD practices** with GI as needed (CD Practices for MS4s). The GLEC Team will consider a range of CD practices including non-structural BMPs, structural BMPs, and LID planning such as reductions of on-site IC footprints (e.g., buildings and parking area) compared to the conventional development site.

The GLEC Team will develop **one** site plan each for the three (3) redevelopment project concepts (Table 3) focused on application of SW management controls to comply with the MA MS4.

The purpose of the CD Practices for MS4s scenarios is to understand whether or to what extent the MS4s may be achieved via use of CD Practices. Consequently, these scenarios will emphasize minimization of untreated IC (e.g., underground parking garages, dispersed GI including green roofs and passive hydrologic disconnection of IC to undisturbed natural vegetated areas, less parking area, use of overflow permeable parking areas; and to include consideration of enhanced post-construction permeable vegetated areas through soil augmentation and tree plantings). Systems will balance the ease of maintenance and the cost to construct with optimal performance for recharge and water quality treatment.

Note on Inter Project Coordination and Detail of Concept Plans

To support the municipal engagement process (Task 3) and the alternatives analyses discussed in Task 5 below, the FDC2A project team will conduct continuous model simulations for each Alternative Concept Plan proposed/ developed by the FDC2B Contractor to quantify impacts at the site-scale level with and without the benefits of varying management scenarios. Therefore, the GLEC Team will coordinate with the FDC2A project team to ensure it is working in compatible software and that the necessary level of detail associated with the Concept Plans is sufficient to support modeling simulations by the FDC2A project team.

Municipal practitioner understanding and appreciation is a critical goal of this Project

All conceptual site-development site plans will be designed for a target audience of engaged lay persons, municipal volunteers and municipal staff with an appropriate scale and with sufficient user-friendly information to facilitate understanding of key design aspects and take-away messages related to alternative local control requirements. EPA envisions the conceptual site design plans could employ rendering techniques used by landscape architects. The plans will also provide an overall summary of quantified impacts and potential benefits for the site (to be provided by the FDC2A team). The GLEC Team has extensive experience in both developing conceptual designs and working with the target audience to ensure an appropriate match of problems, solutions, and local community. The Project Team will include a graphic designer to ensure ACPs are both technically accurate and visually understandable and capable of clearly conveying the intended information.

Technical Memorandum

EPA appreciates that the GLEC Team may seek clarification on the number and types of Alternative Concept Plans scenarios as specified above. For this purpose, the GLEC Team will develop a brief draft Technical Memorandum (TM) summarizing the requirements of this Task. This draft will be employed to clarify and/or resolve questions on the numbers and types of concept scenarios to be developed for this and other Tasks below, and for FDC2A modeling purposes which iteratively feed the FDC2B Alternative Concept Plans.

Table 3. Summary of concept site-development plans for Task 4

Concept Plan	Management Scenario	Management Practices	Development Type	Land Use Type
1	MA MS4	Conventional Development Practices	New Development	Low Density
2				Medium Density
3				High Density
4			Redevelopment	Low Density
5				Medium Density
6				High Density
7		GI and CD Practices	New Development	Low Density
8				Medium Density
9				High Density

Subtask Lead: Robert Roseen

Key Support Staff: Khalid Alvi

Schedule: Within four (4) months of TO award

Deliverable(s): Conceptual Site-Development Plans for Hypothetical New and Redevelopment Projects. In addition,

- Technical Memorandum (TM) describing the work under this Task, and
- Draft Concept Plans and Alternative Concept Plans for each new and redevelopment project site design scenario developed under this task (a total of nine (9) site plans). Designs will include relevant information about sizing, pretreatment, plan and detail designs, general specifications, and estimated costs per unit construction.

Task 5: Local Site–Development Regulatory Control Alternatives Analysis

The purpose of this task is to identify and evaluate alternative local regulatory control requirements (i.e., bylaws, municipal policies) focused on site design and development practices and on-site SW management for new and redevelopment projects that communities may consider for adoption as specific bylaw/ordinance provisions in municipal regulations. The process of developing and evaluating alternative levels of local regulatory control shall involve incorporation of FDC1 and FDC2A findings for enhanced SW management and next-generation CD Practices (i.e., nD/rD CD Practices outlined in Task 4). For budgetary purpose, the GLEC Team has provided line-item cost estimates for each **Subtask** under this Task (see below)

Subtask 5A. Local Bylaw Review

The GLEC Team will review and consider SW management requirements, local wetland protection bylaws beyond the Wetlands Protection Act standards and site development design standards in existing local bylaws/ordinances for those municipalities that may participate in this Project to identify all bylaws which impact watershed health and function. The GLEC Team will conduct a streamlined review of the local regulations focused on SW management and site-development design practices and shall prepare a summary of the findings for sharing with the Project’s municipal partners. For budgeting purposes, EPA anticipates that up to three (3) municipalities may participate in this Project.

Subtask 5B. Best Practice Bylaw/Ordinance Research

The GLEC Team will conduct research of existing local bylaws/ordinances to identify provisions across New England (and elsewhere) that may represent the most protective or otherwise innovative site-development practices suitable for next-generation watershed management and are aligned with findings of FDC1 and modeling outputs of FDC2A. The MA Metropolitan Area Planning Commission is currently conducting an evaluation of existing local regulations of its member communities related to water resource management that should substantially facilitate the Contractor’s research under this subtask. A primary goal of this research will be to identify existing local regulations that effectively minimize hydrologic and water quality impacts associated with IC conversion.

This subtask shall culminate in the GLEC Team developing a draft Technical Memorandum (TM) outlining such provisions along with examples (as appropriate or available), discussion of how, why or to what extent such provisions are currently employed or may be best employed and shall correlate those practices to the findings of FDC1 and FDC2A as applicable to tie into the visual and quantitative benefits of the approaches outlined therein. For instance, as the Project Team is currently informed, it would be very worth considering the City of Portland, Maine’s, incentives for incorporating green roof technology into new development/redevelopment. Additionally, it will be important for the GLEC

Team to identify those sets of State and federal regulations that most directly control the local-regulatory elements of site-development activities and stormwater management and also to provide best examples of functional and protective bylaw language that exists. The TM shall also provide a summary of findings from subtask 5A. Finally, the GLEC Team will highlight preliminary potential areas for improvements to local regulations, provide recommendations for how best to implement updates based on review of existing model bylaw language conducted under subtask 5B. Depending on the availability of LOE, this TM may be finalized.

Subtask 5C. Alternative Next-Generation Municipal Bylaw Requirements for Enhanced Stormwater Management and Conservation Development Design Standards

Based on the review of local bylaws (Subtask 5A), the review of best practices (Subtask 5B), and modeling outputs from FDC2A related to Task 4 of this TO, the GLEC Team will propose an alternative level of local regulatory control suitable for implementation through local regulatory mechanisms (e.g., bylaw/ordinance provisions that focus on SW management and site-development practices aligned with CD). The alternative level of control to be developed under this subtask will represent an increased level of water resource protection over the baseline scenario of applying MS4s (Task 4). In developing this alternative, the GLEC Team will consider the results of the subwatershed optimization modeling simulations performed by the FDC2A Contractor. Considerations will include requirements for new development, redevelopment, trigger condition thresholds for areas of disturbance, minimum standards, areas for prioritization specific to coastal watershed communities, waiver criteria, inspections and maintenance requirements, checklists, and recommendations for streamlining implementation.

The GLEC Team will coordinate with the Project's Municipal Partners through a working meeting (Task 3) to share information on local bylaw reviews under Subtask 5A, research of bylaws as specified in Subtask 5B, and the baseline alternative scenario evaluated with site and subwatershed scale modeling results from FDC2A (Task4). The goal of this exchange is to thoroughly inform the Municipal Partners of the wide range of water resource and watershed impacts associated with IC conversion and the level of management provided by the baseline level of control. Similarly, the goal is to receive feedback and recommendations from the Municipal Partners as to local considerations to maximize successful implementation. The GLEC Team will also introduce the proposed additional alternative local level of control for discussion with the Municipal Partners and to solicit impressions and feedback.

The GLEC Team will next finalize selection of the alternative level of regulatory control for Concept Plan development. EPA Region 1 envisions that this recommended level of regulatory controls shall involve engagement with the municipal project partners (Task 3), the Project Team, and the FDC2A project team. More specifically, EPA Region 1 expects that the GLEC Team will propose this recommended level of regulatory control based on consideration of the research conducted in subtask 5B and the results of subwatershed optimization modeling analysis being conducted under the FDC2A project (Subtask 6A of FDC2A).

For this recommended level of regulatory control, the GLEC Team will develop Alternative Concept Plans (Table 4) for:

- **New development**

- SW management only, and
- CD practices including GI SCM as needed. The GLEC Team will consider including reductions of on-site IC footprints (e.g., buildings and parking area) compared to the conventional development site; and

- **Re-development.** The GLEC Team will develop one Alternative Concept Plan for each of the three (3) redevelopment project concepts (Table 4) focused on application of SW controls, and incorporating CD Practices, if feasible, to meet the alternative level of regulatory control for redevelopment.

Similar to Task 4 then, EPA Region 1 expects that the CD Practices scenarios shall emphasize minimization of untreated IC (e.g., underground parking garages, dispersed GI including green roofs and passive hydrologic disconnection of IC to undisturbed natural vegetated areas, less parking area, use of overflow permeable parking areas etc.; and to include consideration of enhanced post-construction permeable vegetated areas through soil augmentation and tree plantings). This will include readily implementable and standardized designs that can be pulled from a shelf and that do not involve substantial additional analysis or engineering. The focus will be on simple, low-maintenance systems that are identified by the TSC as feasible to implement for common nD/rD applications. Designs will include relevant information about sizing, pretreatment, and plan and detail designs and specifications, and estimated costs per unit construction. Systems will balance the ease of maintenance and the cost to construct with optimal performance for recharge and water quality treatment.

In total, the GLEC Team will develop a total of six (6) new development Alternative Concept Plans (ACP) for the three new site-development project concepts (i.e., 2 per hypothetical project) and a total of three (3) ACPs for the three (3) redevelopment project concepts developed under Task 4 (totaling nine (9) redevelopment ACPs). The GLEC Team will coordinate with FDC2A project team to ensure that these ACPs are suitable for conducting model simulations using Opti-Tool under FDC 2A. The GLEC Team will coordinate with the FDC2A team to obtain modeling output for sub-watershed and baseline alternative site-development scenarios for all example site-development plans and designs.

Municipal practitioner understanding and appreciation is a critical goal of this Project. The GLEC Team has extensive experience in developing conceptual designs and working with the target audience to ensure an appropriate match of problems, solutions, and local community. Similar to the Task 4, all Concept Plan designs will be developed for a target audience of engaged lay persons, municipal volunteers and municipal staff with an appropriate scale and with sufficient user-friendly information to facilitate understanding of key design aspects and take-away messages related to alternative local control requirements. The Project Team will include a graphic designer to ensure ACPs are both technically accurate and visually understandable and capable of clearly conveying the intended information. Also consistent with Task 4, the GLEC Team will incorporate into all final concept site plan designs estimates of water resource and watershed health impacts associated with the development activities such as conversion of permeable vegetated surface to IC (i.e., IC conversion), as well as estimates of the benefits associated with enhanced SW management and or CD site design practices that could be required or incentivized in local bylaws (estimates provided by FDC2A). The GLEC

Team will also develop planning level cost estimates of site work including SW management and GI SCMs (excluding costs for buildings) for each conceptual site design developed under this task.

Table 4. Summary of concept site-development plans for Task 5

Concept Plan	Management Scenario	Management Practices	Development Type	Land Use Type
1	Alternative next-generation Municipality by-laws	Conventional Development Practices	New Development	Low Density
2				Medium Density
3				High Density
4			Redevelopment	Low Density
5				Medium Density
6				High Density
7		GI and CD Practices	New Development	Low Density
8				Medium Density
9				High Density

Task Lead: Robert Roseen

Key Support Staff: Khalid Alvi

Schedule:

- Subtask 5A: Within three (3) months of TO award
- Subtask 5B: Within three (3) months of TO award
- Subtask 5C: Within seven (7) months of TO award

Deliverable(s):

- Subtask 5A: Local Bylaw Review
- Subtask 5B. Best Practice Bylaw/Ordinance Research and Technical Memo
- Subtask 5C1. Alternative Next-Generation Municipal Bylaw Requirements for Enhanced Stormwater Management and Conservation Development Design Standards
- Subtask 5C2. Alternative Concept Plans - Nine (9) total, 3 new conventional development, 3 new conservation development, and 3 redevelopment.

Task 6. Final Report and Outreach Materials

The purpose of this task is to:

- Prepare a brief **Final Report** that synthesizes project findings, outcomes, lessons learned, and identifies recommended improvements for outreach methods to support local decision making on adopting protective local site-development regulations;
- Prepare a brief draft and final **Project Summary** (not to exceed 4 pages including figures and tables) describing the project, its highlights, and key findings; and
- **Concept Plans Package** - package the Concept Plans developed under Tasks 4 and 5 to serve as a useful reference for demonstrating impacts and benefits associated with site development activities and for comparing the “business as usual” site development practices with differing levels of next-

generation local regulatory controls incorporating CD Practices (i.e., no control, baseline, and enhanced).

Prior to preparing this final report, the GLEC Team will, through the final Task 3 Working Meeting, present results of the Alternative Concept Plans to the Municipal Partners including subwatershed and site scale modeling results from FDC2A. During this final meeting the GLEC Team will document feedback and facilitate discussions on the effectiveness of the Project's Municipal Engagement process and the types of information generated (under both FDC2A and 2B) for informing local officials and fostering their consideration of adopting more protective local regulatory provisions for water resource health. The GLEC Team will also solicit input on the types of outreach information that would likely be most useful for supporting local decision makers in their consideration of adopting more protective local requirements for land use site-development requirements. The GLEC Team will consider the Municipal Partners' input in the development of a list of project recommendations for outreach materials and promising next step actions.

Task Lead: Robert Roseen

Key Support Staff: Khalid Alvi

Schedule:

- Final Project Report
 - Draft: Within eleven (11) months of TO award
 - Final: Before TO expiration
- Outreach Materials: Project Summary and Series of Conceptual Site Plans for Site- Development Designs
 - Draft: Within eleven (11) months of TO award
 - Final: Before TO expiration

Deliverable(s):

- Final Project Report
 - Draft
 - Final
- Outreach Materials: Project Summary and Series of Conceptual Site Plans for Site- Development Designs
 - Draft
 - Final

Task 7. Phase 2B Project Webinar to SNEP Region

The GLEC Team will prepare for and participate in a webinar to present the FDC2B study results and findings. The webinar will be targeted appropriately for the Municipal Partners to convey the critical information about Concept Plans, Next Generation Municipal Bylaws, and Enhanced Stormwater Management and Conservation Development Design Standards. This will include an appropriate bal-

ance of artistic graphics, technical design information, watershed health data, BMP performance, costing, and maintenance. The GLEC Team assumes that the webinar logistics will be provided by the SNEP.

Task Lead: Robert Roseen

Key Support Staff: Khalid Alvi

Schedule: Before TO expiration

Deliverable(s): Webinar presentation

Task 8. Compendium of nD/rD Conservation Development Practices (Optional)

The GLEC Team will develop a compendium of current and/or next-generation site-development nD/rD Conservation Development (CD) practices for site-development activities and will include existing and potential new landscape architecture practices/approaches for water resource protection. The GLEC Team will also develop a compendium that complements and where appropriate incorporates the findings of this project (Task 6 deliverables) and the FDC1 and FDC2A projects. This task will be optional depending upon availability of LOE. A wide range of exceptional CD practices will be considered based on successes from progressive communities around the country. The Chesapeake Bay Program, Washington Department of Ecology, Minnesota Pollution Control Agency, UNH Stormwater Center, and others have tremendous examples of CD practices, designs, and specifications which could be readily adopted/adapted for inclusion in the compendium.

The GLEC Team will develop the compendium to be suitable as a reference document for primarily informing local government officials and decision makers related to land use site-development standards, and secondarily for informing developers, site-development engineers, landscape architects, and other watershed management practitioners within and beyond the SNEP region. The GLEC Team will collaborate with representatives from landscape architecture organizations (e.g., Boston Society of Landscape Architects) to compile current effective standards and guidance for nD/rD conservation design practices for protecting local water resources and watershed health. Additionally, the GLEC Team will work with such organizations to outline how site development design practices could be strengthened and eventually updated to reflect FDC1 and FDC2A and 2B findings and to better protect water resource and watershed health. The Project Team will assist in establishing contact and participation with such architecture organizations.

Task Lead: Robert Roseen

Key Support Staff: Khalid Alvi

Schedule: *Optional:* Within eleven (11) months of TO award

Deliverable(s): nD/rD CD Practice Compendium: Draft and Final