

ATTACHMENT 1

EPA Region 1 Blanket Purchase Agreement, BPA-68HE0118A0001-0003

RFQ _____

PERFORMANCE WORK STATEMENT

FDC Phase 2, Task Order B: Next-Generation Watershed Management Practices for Conservation Development PERIOD OF PERFORMANCE 10/1/21 – 9/30/22

TASK ORDER CONTRACTOR OFFICER REPRESENTATIVE (TOCOR):

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I. OBJECTIVE AND PURPOSE

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 / subwatershed 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.¹ 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”.

FDC Phase 2 will employ two separate but related task orders: (a) FDC application modeling and (b) development of a toolbox to inform local government officials including next-generation bylaws/ordinances, state-of-the-art approaches and techniques for architecture and/or landscape architecture, and principles for site-scale design that help to conserve/preserve ecology and hydrology (e.g., site design and soil management approaches to promote better

¹ It is interesting to consider a 1975 report funded by EPA's Office of Research and Development (ORD) proposed an “ecologically responsible land use decision-making system for local, regional and . . . state governments.” The fundamental premise of this methodology was “*environmentally responsible land use planning and control must be based on valid ecological information combined with enlightened and informed public opinion.*” [Emphasis in original]. USEPA, A Land Use Decision Methodology for Environmental Control, EPA-600/5-75-008, available at <https://nepis.epa.gov>.

geospatial distribution of nD/rD site runoff, preservation of natural vegetated areas, etc.) using the FDC and modeling results. Each task order will include specific tasks to disseminate and promote the technical transfer of the FDC, including the development of technical support documents (TSD) and webinars and trainings. Results from both task orders will be presented at a simple workshop for the SNEP Technical Assistance Network (STAN) to facilitate transfer of the project outputs.

II. SCOPE OF WORK

This following scope of work is predicated on the development of continuous simulation modeling and application of flow duration curves (FDC) for the headwaters and/or other low-order stream systems of the Taunton River watershed.² Much of the development of these models, FDCs and possible watershed management solutions is happening currently, or recently occurred, in the first phase of this work, FDC1 Project. For this task order, and consistent with the discussion above, the Contractor shall develop four deliverables that will become a ‘toolbox’ of next-generation SW management and CD practices that contemplate future land use management strategies designed to protect water resources from future watershed development activities. The four deliverables include:

1. Conceptual site-development plans representing a range of hypothetical new and redevelopment projects that are representative of realistic MA development projects for illustrating site management scenarios including “business as usual” (i.e., conventional) site design practices and CD practices.
2. Next-generation model ordinance and bylaw language addressing local government requirements for SW management and site-development practices that incorporate the findings of FDC1 Project and concurrent FDC2A work.
3. A compendium of advanced SW management and conservation-based site-scale design approaches / practices to primarily inform local municipal government officials and decision makers, and secondarily, site-development practitioners (architects, site engineers, landscape architects) of potential management opportunities for addressing water resource impacts associated with future nD/rD activities.
4. Communications materials and deliverables that demonstrate the efficacy of continuous simulation modeling outputs including use of FDC at the watershed and site-scale levels to inform local land use regulatory decision making, and that are tailored to the needs of the municipal governments partnering on FDC2A and SNEP.

To this end, the project shall evaluate a wide range of potential watershed scale and site-scale nD/rD management measures including incorporation of GI SCMs, de-emphasis and/or removal

² A brief discussion outlining the flow duration curve (FDC) and its use for describing impacts and benefits of watershed management approaches is reproduced from FDC1 Project as an [Appendix](#) to this work scope.

of existing IC, next-generation municipal bylaws / ordinances that incentivize green technologies, and other site-scale nD/rD CD development practices that can be realistically supported by the FDC1 and FDC2A project results.

Note that because application of the continuous simulation modeling at the site-scale level will occur under a contemporaneous and complementary task order, FDC2A, the Contractor will need to coordinate as appropriate with the FDC2A project team (assuming FDC2A and FDC2B are awarded to different Contractors).

Task 0: Work Plan, Budget and Schedule

The Contractor shall prepare a detailed work plan and budget response to the following work scope describing its proposed approach to completing all of the tasks in this PWS. Its response shall include a description of all assumptions and contingencies made by the Contractor, a proposed schedule including a list of deliverables with due dates and schedule for deliverables, an estimated budget, and special reporting requirements (if any). The Contractor's response will include a description of proposed staff and the number of hours and labor classifications proposed for each task.

Task 0 Deliverables

The Work Plan, Budget and Schedule is due within three (3) weeks of Task Order (**TO**) award.

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 1 Deliverables

Not applicable³

³ Although not applicable, task numbering is preserved to compliment and avoid confusion with FDC1 and FDC2A projects.

Task 2: Project Management and Administration

This task includes subtasks related to administration, management and coordination of the project.

Mark Voorhees and **Michelle Vuto** (Stormwater Permitting), **Ray Cody** (Surface Water Branch, NPS Unit) and **Sara Burns** of The Nature Conservancy (TNC) will serve as the Project Team (Project Team) and/or Project Technical Leads (PTL) for this project (“the Project”). In addition, **Ray Cody** will serve as the Task Order (TO) Contracting Officer Representative (**TOCOR**) and **Steven Winnett** will serve as the Alternate TOCOR (**Alt. TOCOR**). Except as provided (e.g., invoicing, contract-related correspondence), the Contractor shall direct all draft and final deliverables to the Project Team and copy (i.e., cc) the TOCOR and Alt. TOCOR.

Invoicing, generally

Provisions for invoicing are generally set forth in the GSA Contract and/or the BPA. To the extent the following is not inconsistent with either, then to ensure timely administration, invoices shall be submitted promptly within the first or second week of each calendar month. Invoices shall be directed to the TOCOR. The TOCOR will distribute as appropriate to the Project Team Leader and/or the Project Team for review and consideration, as appropriate. Invoices shall, among other things, summarize the Contractor’s work for the billing month, project anticipated work for the next billing period(s), identify and anticipate any problems that may impact the project or its schedule, and specify and identify the billable hours and other direct costs on a Task and Subtask basis. In its response to this PWS, the Contractor may add one or more specific Subtasks or line items under this Task for its general administration of the project.

In addition, to ensure timely processing of invoices, the Contractor shall copy the TOCOR on invoice submittals (by email as *.pdf) and any and all correspondence to the EPA Servicing Center (presumably, Research Triangle Park (RTP) Financing Center at RTPReceiving@epa.gov) and the subject line or body of such email submittals shall include the following pertinent information:

- Project Name (in this case, “FDC2B”)
- Contract No. (i.e., BPA-68HE0118A0001-003)
- Order No. (TBD)
- Billing/Invoice No.
- Billing Period
- Total Amount Billed for the Billing Period

Deliverables, generally

Provisions for Deliverables are generally set forth in the GSA Contract and/or the BPA. To the extent the following is not inconsistent with either, EPA intends to provide any and all formal reports produced under this contract for public dissemination, in whole or in derivative documents, as appropriate. The Contractor shall always provide draft versions of any spreadsheets, calculations or reports. EPA and its stakeholders may review and comment on draft deliverables / submittals. If so, then the Contractor shall incorporate any such comments

into a final version(s). For communiques and reports, the Contractor shall use standard computer software (e.g., Adobe Acrobat, MS Word, MS Excel, MS PowerPoint). All other software (e.g., computer models) must utilize publicly available non-proprietary code. In addition, software application files, if delivered to the Government, must conform with Section 508 of the Rehabilitation Act of 1973, as amended (29 U.S.C. § 794(d)).⁴ Refer to <http://www.section508.gov/>.

Subtask 2A. Kickoff Meeting

The Contractor shall initiate a project kick-off meeting with the project team. Due to the continuing Covid-19 pandemic, it is assumed this meeting will use a videoconference application. Currently, EPA has a license and uses Microsoft Teams™ for videoconferencing. Teams™ should 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”.

As it is uncertain Covid-19 travel restrictions will continue into and through the POP for this TO, the Contractor may provide a separate line item as a contingency for one (1) to two (2) in-person meeting(s) and assume travel, lodging (if applicable), logistics and coordination for managerial and technical personnel. Under an assumption the task order award includes the in-person meeting contingency, and it becomes reasonably clear during the course of the task order these funds will not be expended, the budget line item may be re-allocated by the TOCOR using Technical Direction.

For the Kickoff Meeting, EPA will make available any additional technical references not already provided herein, or other supplemental data or information that may assist the Contractor.

A week following this meeting, the Contractor shall summarize its understanding of the project kick-off meeting (e.g., action items; scheduling adjustments) and transmit these by email to the COR.

Subtask 2A Deliverables

- Kickoff meeting within two weeks of Task Order Award
- Kickoff meeting summary (incl. action items, scheduling adjustments, etc.) within one (1) week of kickoff meeting

⁴ In 1998, Congress amended the Rehabilitation Act of 1973 to require Federal agencies to make their electronic and information technology (EIT) accessible to people with disabilities. The law applies to all Federal agencies when they develop, procure, maintain, or use electronic and information technology. Under Section 508, agencies must give disabled employees and members of the public access to information that is comparable to access available to others.

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

Following the Kickoff Meeting, the Contractor shall provide for monthly video or teleconference calls (as needed) to keep the project team updated as to the status of the project. These calls may utilize EPA's teleconferencing facilities and EPA can provide video/teleconferencing details in advance of each call. The Contractor shall briefly summarize its understanding of each call (e.g., action items; scheduling adjustments) and/or meeting and transmit these by email to the TOCOR.

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 Contractor shall include reasonable provisions for incorporating such review into the development of final deliverables.

Assuming FDC2A and 2B are awarded to different Contractors, it will be important for the Contractors to coordinate for TSC Meetings (FDC2A, Task 3), Municipal Working Meetings (Task 3), for development of webinar (Task 8), 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). Based on its understanding of the work scope provided below, the Contractor shall provide a separate line item cost for *inter* FDC2A/2B task order coordination.

Subtask 2B Deliverables

- Monthly Conference Calls, as needed
- Monthly Conference Call Summaries, as needed
- Reasonable provisions for incorporating EPA and/or stakeholder review and input, if any
- *Inter* FDC2A/2B task order coordination

Task 3. Municipal Engagement Process Through Working Meetings

The Contractor shall 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 shall 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 should 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 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 Contractor shall 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 the award:

1. Introduction to project and selection of hypothetical site-development project concepts (Task 4) – 1 month.
2. FDC2A TSC meeting 1 outlining scope of FDC2A and modeling outputs that will support this project – 6 weeks.
3. 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) – 6 months.
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.
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 – 10 months.

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 Contractor shall assume 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. Consistent with the discussion of travel provided above under Subtask 2A, the Contractor may provide separate line item contingency for such travel for this task.

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**"). EPA expects the Contractor to derive these initial Concept Plans from either (a) actual completed projects (having as-built design plans (or equivalent)) the Contractor may have completed itself or (b)

from completed projects that may be available from one or more municipalities (e.g., [Appendix C](#)). 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 are to 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 Contractor shall also develop planning level **cost** estimates (if needed, based on a generalized cost/unit management area, e.g., cost per square or cubic ft) of site work including SW management and GI SCMs (excluding costs for buildings) for each Concept Plan further developed under this task (described below). EPA Region 1 will provide the Contractor with cost information for use of green roof technologies and passive IC disconnection with storage.

The initial Concept Plans shall 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 shall 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 shall be used by FDC2B to inform the Municipal Partners of the cumulative outcome of applying MA SW standards to applicable new and redevelopment project across a watershed.

Accordingly, the Contractor shall 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 shall 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 Contractor shall 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 Contractor to seek input from the Municipal Partners on the selection of these new and redevelopment concept projects.

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 Stormwater Standards and
- (ii) an **Alternative Scenario** to be developed under Task 5.

MA SW Stands Baseline Scenario: The Contractor shall create **two (2)** Concept Site Plans for each of the three (3) new development project sites using:

- 1) **conventional development** with SW management only, and
- 2) **CD practices** with GI as needed (CD Practices for MA SW Standards). The Contractor shall consider including reductions of on-site IC footprints (e.g., buildings and parking area) compared to the conventional development site.

The Contractor shall develop **one** site plan each for the three (3) redevelopment project concepts focused on application of SW management controls to comply with MA SW Standards.

The purpose of the CD Practices for MA SW Standards scenarios is to understand whether or to what extent the MA SW Standards may be achieved via use of CD Practices. Consequently, these 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; and to include consideration of enhanced post-construction permeable vegetated areas through soil augmentation and tree plantings).

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 Contractor shall 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 shall 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 shall also provide an overall summary of quantified impacts and potential benefits for the site (to be provided by the FDC2A team).

Technical Memorandum

EPA appreciates that the Contractor may seek clarification on the number and types of Alternative Concept Plans scenarios as specified above. For this purpose, The Contractor shall 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.

Task 4 Deliverables

- Technical Memorandum (TM) describing the work under this Task including a description of the process of selecting the initial hypothetical Concept Plans and the Alternative Concept Plans incorporating CD Practice alternatives as well as SW management evaluations. The Contractor shall describe the design approach applied including a description of the SW control measures and site design standards considered for each the two (2) site design scenarios, as well as the basis of cost estimates for site work. Also, the TM shall include a discussion of the level of site design detail required by the FDC2A project team to perform representative site scale modeling and for conveying key design aspects and design practices of the various alternatives to the municipal partners.
- 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). The

Contractor shall provide a written summary of the site design details including tributary drainage areas and design specifications for each SW control and GI SCM identified on each site plan sufficient to support model development by the FDC2A project team.

- Final Concept and Alternative Concept Plans and written summary of design details and specifications for each site.

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 Contractor shall provide line-item cost estimates for each Subtask under this Task.

Subtask 5A. Local Bylaw Review

The Contractor shall 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 Contractor shall 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 Contractor shall 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 shall be to identify existing local regulations that effectively minimize hydrologic and water quality impacts associated with IC conversion.

This subtask shall culminate in the Contractor 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 Contractor 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 Contractor shall highlight preliminary potential areas for improvements to local regulations based on the research findings and the 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 Contractor shall 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 shall represent an increased level of water resource protection over the baseline scenario of applying MA SW standards (Task 4). In developing this alternative, the Contractor shall consider the results of the subwatershed optimization modeling simulations performed by the FDC2A Contractor.

The Contractor shall 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. The Contractor shall also introduce the proposed additional alternative local level of control for discussion with the Municipal Partners and to solicit impressions and feedback.

The Contractor shall next finalize selection of the alternative level of regulatory control for Concept Plan development. EPA R1 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 R1 expects that the Contractor shall 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 Contractor shall develop Alternative Concept Plans for:

- **New development**

- SW management only, and
 - CD practices including GI SCM as needed. The Contractor shall consider including reductions of on-site IC footprints (e.g., buildings and parking area) compared to the conventional development site; and
- **Re-development.** The Contractor shall develop **one** Alternative Concept Plan for each of the three (3) redevelopment project concepts 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 R1 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).

In total, the Contractor shall 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 Contractor shall coordinate with FDC2A project team to ensure that these ACPs are suitable for conducting model simulations using Opti-Tool under FDC 2A. The Contractor shall 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. Similar to the Task 4, all Concept Plan designs shall 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. Also consistent with Task 4, the Contractor shall 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 Contractor shall 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.

Task 5 Deliverables

- Subtasks 5A and 5B: TM of Bylaw/Ordinance Research and culminating in Contractor's recommended level of regulatory control incorporating next-generation CD Practices
- Subtask 5C: ACPs for new and redevelopment scenarios (as described above)

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).

In its cost response to this work scope, each of these deliverables shall be presented as line item costs.

Prior to preparing this final report, the Contractor shall, 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 Contractor shall 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 Contractor shall 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 Contractor shall consider the Municipal Partners’ input in the development of a list of project recommendations for outreach materials and promising next step actions.

Task 6 Deliverables:

- Draft and Final Report
- Draft and Final Project Summary
- Conceptual Plans Package

Task 7 Phase 2A Project Webinar to SNEP Region

The Contractor shall prepare for and participate in a webinar to present the FDC2B study results and findings. The Contractor may assume webinar logistics will be provided by the SNEP.

Task 7 Deliverable:

- SNEP Webinar

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

The Contractor shall develop a compendium of current and/or next-generation site-development nD/rD Conservation Development (CD) practices for site-development activities and shall include, existing and potential new landscape architecture practices / approaches for water resource protection. The Contractor shall 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 shall be optional depending upon availability of LOE.

The Contractor shall 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 Contractor shall 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 Contractor shall 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 8 Deliverable

- The Contractor shall develop a draft nD/rD CD Practice Compendium containing current and next-generation CD practices (incl. standards, guidance and references (i.e., citations, websites, etc.)) for practitioners. The draft compendium should highlight areas for improvements and, as appropriate, recommendations for updates and/or new site-design practices and standards. This compendium should optimize brevity and share existing links and language rather than developing a new report, context, and text, as much as possible. Final Compendium

IV. SCHEDULE

The following table provides an estimate of the project schedule. EPA understands that this schedule may change as a result of discussions with the Contractor or with the natural course of the project. In addition, the Contractor may propose modifications or an alteration of this

schedule in its response to this PWS. **However, the schedule must presume completion within one year of Task Order (TO) award.**

Deliverables	Delivery Dates
Task 0. Workplan, Budget and Schedule	Within three (3) weeks of TO award
Task 1. Prepare QAPP <ul style="list-style-type: none"> • N/A 	N/A
Task 2. Project Management and Administration <ul style="list-style-type: none"> • Subtask 2A Kickoff Mtg • Subtask 2B Monthly Conference Calls and Summaries 	Within 2 weeks of TO award As Needed
Task 3. Municipal Working Meetings <ul style="list-style-type: none"> • Five Municipal Engagement Working Meetings (2 mtgs coordinated with FDC2A TSC Meetings) 	To Be Determined: See Task 3 for EPA Estimates of approximate time of meetings from date of TO award
Task 4. Conceptual Site-Development Plans for Hypothetical New and Redevelopment Projects	Within four (4) months of TO award
Task 5. Local Site-Development Regulatory Control Alternatives Analysis <ul style="list-style-type: none"> • Subtask 5A: Local Bylaw Review • Subtask 5B. Best Practice Bylaw/Ordinance Research • Subtask 5C. Alternative Next-Generation Municipal Bylaw Requirements for Enhanced Stormwater Management and Conservation Development Design Standards 	Within three (3) months of TO award Within three (3) months of TO award Within seven (7) months of TO award

<p>Task 6. Final Report and Outreach Materials</p> <ul style="list-style-type: none"> • Final Project Report <ul style="list-style-type: none"> ○ Draft ○ Final <p>Outreach Materials: Project Summary and Series of Conceptual Site Plans for Site- Development Designs</p> <ul style="list-style-type: none"> ○ Draft ○ Final 	<p>Within eleven (11) months of TO award</p> <p>Before TO expiration</p> <p>Within eleven (11) months of TO award</p> <p>Before TO expiration</p>
<p>Task 7: FDC2B Project Webinar to SNEP Region</p>	<p>Before TO expiration</p>
<p>Task 8. nD/rD CD Practice Compendium</p> <ul style="list-style-type: none"> ○ Draft ○ Final 	<p>Optional: Within eleven (11) months of TO award</p>

V. REFERENCES

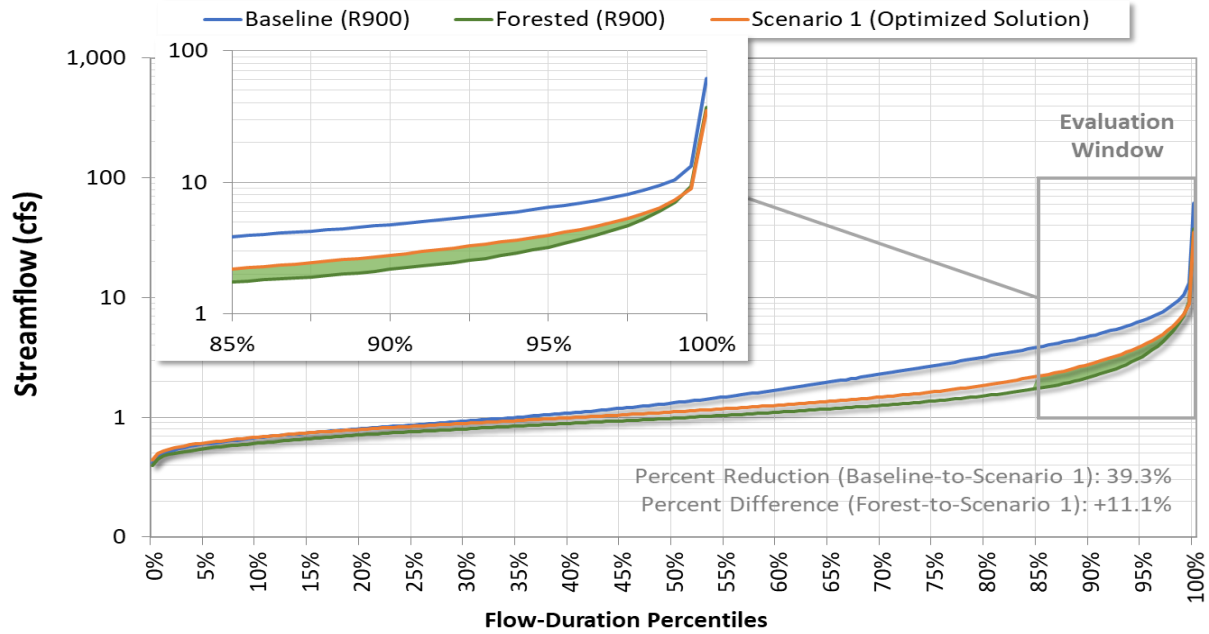
Appendix A: QAPP. “Quality Assurance Project Plan for Phase 2 Mystic River Watershed Eutrophication Analysis” dated September 7, 2017, prepared for EPA by Eastern Research Group under Contract EP-C-16-033, Work Assignment No. 1-35.

Appendix B. PROJECT BACKGROUND
(Reproduced from FDC1 Work Scope)

Conventional development approaches and existing stormwater management standards (where applicable) do not adequately address the full range of hydrologic, water quality and aquatic life impacts associated with human development and impervious cover (“IC”). The weight of evidence is clear that human development and urbanization have had a profound impact on water resources in multiple ways. The paving of vegetated land disrupts the natural hydrologic cycle at a site scale that has ramifications for the larger watershed. Recent research assessing the health and integrity of watersheds indicates that efforts to restore the hydrological and ecological function of our watersheds are not likely to offset the combined impacts of 1) past and future development that expands watershed impervious cover (IC), and 2) changing climate conditions. For instance, “billions of dollars continue to be invested in the physical restoration of urban channels. [However,] post-construction studies generally show . . . [these streams are in fact biologically] unrestored [except where stormwater control measures have been extensively implemented].” (Hawley; 2015). Watershed management needs to consider the magnitude, frequency, and timing of various flow events – and incorporate new insight on the role of lesser permeability soils (e.g., tills) which indicate such soils provide a primary mechanism for maintaining hydrological balance (Boutt; 2017). As human populations continue to grow, and population centers shift in response to changing natural hazards associated with climate change impacts, appropriate guidance on resource protection is a fundamental need for humans and ecological communities. The Flow Duration Curve encapsulates the full spectrum of hydrologic and hydrogeologic balance needed for assessing and preserving the future health of watersheds.

In brief, the FDC describes the frequency and duration of stream flow rates for a given location that occur over a long period. The FDC is a powerful diagnostic tool for evaluating impacts of watershed development and potential benefits of future management alternatives across the full spectrum of in-stream flow regimes:

- **FDCs Quantify Impacts.** FDCs can be used to quantify the impacts (change in frequency and duration) to critical flow regimes (e.g., bank-full flow (i.e., flooding), scouring flows (i.e., channel destabilization), base flow (i.e., aquatic life), high pollutant export flows, etc.) for varying levels of development and IC.
- **FDCs Quantify Benefits.** FDCs can be used to quantify anticipated benefits of alternative development practices and watershed stormwater management alternatives including:
 - relevance of existing stormwater standards;
 - enhanced Low Impact Development approaches;
 - optimized stormwater management solutions emphasizing green infrastructure (stormwater control measures (GI SCM) for both existing and future development conditions; and
 - identifying high-value hydrologic/ecological resource areas in which development should be avoided to maintain natural watershed functions essential for future watershed and water resource resiliency.



The above figure is an example flow duration curve for predevelopment and existing watershed development conditions, as well as an alternative conservation development management solution. The figure provides an example optimized solution for a given subwatershed after incorporating specific development and management practices in order to normalize the FDC towards the natural hydrologic condition of the forested state. Except for the smaller percentage of larger storm events, the optimized solution demonstrates that the watershed can be hydrologically restored, a condition that translates overall into less geomorphic distortions, reduction in flooding events, and improved water quality. Hydrologic normalization is a precursor for ecological health and restoration.

Appendix C: Example Neighborhood Site Plans

<https://tnc.box.com/s/g74s2u15hhxt5mdn1lw404omc32svolc>

<https://tnc.box.com/s/mtl62ryqa0z7yznf9jnf9pnwbpszrv1i>