

Grant Proposal

Low-Carbon Transportation Materials Program Inflation Reduction Act Section 60506

Volume 2: Budget Application

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1. Introduction

This Budget Application has been prepared in accordance with the Federal Highway Administration (FHWA) Request for Applications (RFA) for the Low Carbon Transportation Materials (LCTM) grant program <https://www.fhwa.dot.gov/lowcarbon/funding.cfm>. The activities defined are scalable and should additional funding be made available, can be increased to support further implementation. Contingencies associated with unanticipated cost increases are included. The costs contained in this application are the best estimates that could be made at this time given the uncertainty in costing out a multi-task, multi-year project. Updated budget information, including estimated hours and labor rates, equipment costs, itemized travel costs, and other costs, will be provided as part of subsequent Implementation Process Reports (IPRs) to be prepared and submitted to FHWA for approval as discussed in Volume 1. In accordance with Section 5 of the RFA, the Kentucky Transportation Cabinet (KYTC) will target submitting all IPRs within one (1) year of when the funds become available for obligation, but no later than June 30, 2026. In accordance with Section 5 of the RFA, all LCTM funds shall be expended prior to September 30, 2031.

Per the current understanding of the RFA, costs have been broken down by eligible material (i.e., concrete/cement and asphalt) and task. These costs are tallied using a master spreadsheet that is organized by eligible material and activities under each task. The spreadsheet summarizes the cost for each material and all tasks and provides the total estimated project cost. In addition to support provided by KYTC personnel, KYTC will utilize LCTM grant funding to support the involvement of university and consultant personnel in accomplishing the identified activities.

As noted above, the costs provided reflect the best understanding of project activities at this time. Many later activities are estimated and may necessarily be adjusted based on initial findings and results. To account for unexpected costs (e.g., inflation, extreme weather events, material supply issues), a contingency of 15% has been included. For ease of consideration, the contingency is only applied to the overall requested amount.

In total, as shown in the Project Total Budget Table as depicted on the spreadsheet attached to this application, KYTC requests \$40.0 Million from the LCTM Grant Program to conduct the activities described in Volume 1 and achieve the objectives of the Program.

2. Budget Justification

The budget tables in Attachment A of this Volume 2 present the cost estimate for each task identified in Volume 1. For convenience, the tasks are divided into several “activities” for each of the eligible materials being pursued, as described in Volume 1 of this application. Expected costs have been grouped into the following general budget items:

- KYTC labor.
- Consultant labor.
- Academic labor, including funding students.
- Direct costs.
- Construction-related costs.

Each of these general budget items are discussed in the following sections.

2.1 KYTC Personnel

The KYTC labor costs have been estimated based on using a single loaded labor rate (\$150/hour), representing a best estimate of a weighted rate for all classes of KYTC personnel expected to work on the LCTM program, incorporating annual increases in the labor rate over the duration of the program. This rate is multiplied by estimated hours for each LCTM program activity as shown in Attachment A. KYTC anticipates that these estimated costs will be charged to LCTM program funding. Further detail on staffing costs, both direct-charged and in-kind, will be documented in project IPRs for FHWA approval.

2.2 Consultants

The consultant labor costs have been estimated based on using a single loaded labor rate (\$300/hour), representing a best estimate of a weighted rate for all classes of consultant personnel expected to work on the LCTM program, incorporating annual increases in the labor rate over the duration of the program. This rate is multiplied by estimated consultant hours for each LCTM program activity as shown in Attachment A.

A variety of consultants will be required to execute the Tasks in the proposed LCTM project. In Kentucky, consultants are expected to play an integral role throughout program development and implementation. It is expected that consultants will be immediately needed to assist in preparing the IPRs. If necessary, the initial consultant work will be completed using existing on-call contracts that followed 23 CFR 172.7 procurement methods and procedures for qualifications-based selection (QBS). KYTC assumes grant funding will be made available to cover the initial IPR development.

Consultants are expected to play key roles in most other tasks, including developing a system to track and analyze EPDs for benchmarking, identifying viable LCTM technologies, assisting with life-cycle accounting (LCA) needs, stakeholder outreach, training, assessment of LCTM technologies (e.g., laboratory testing), and other activities as discussed under each Task. A request for proposals will be issued to procure a consultant/s using QBS methods to continue the LCTM program development and execution.

2.3 Universities

The academic labor costs have been estimated based on using a single loaded labor rate (\$180/hour), representing a best estimate of a weighted rate for academic personnel expected to work on the LCTM program, incorporating annual increases in the labor rate over the duration of the program. This rate is multiplied by estimated university staff hours for each LCTM program activity as shown in Attachment A.

KYTC has strong relationships with the University of Kentucky (Kentucky Transportation Center), the University of Auburn (Auburn University Transportation Research Institute), as well as other universities, and will rely on university personnel for numerous activities. Examples

include developing IPRs, identifying viable LCTM technologies, assisting with life-cycle accounting (LCA) needs, stakeholder outreach, training, assessment of LCTM technologies (e.g., laboratory testing), and other activities as discussed under the Tasks. KYTC will follow its normal procedures for identifying university partners.

KYTC currently has Memorandums of Understanding for Engineering and Technical services in place with the University of Kentucky, the University of Louisville and Western Kentucky University. These existing agreements will allow KYTC to involve these universities quickly after award of the LCTM grant funding.

KYTC also participates in research efforts at the National Center for Asphalt Technology at Auburn University. This research is conducted via the FHWA Transportation Pooled Fund Program.

2.4 Other Direct Costs

Other direct costs listed in Attachment A include project-related travel, equipment, training materials, and testing, as examples. The specific needs will be documented in the appropriate IPRs. Equipment is expected to be a major component of these costs. However, equipment will be limited to augmenting capabilities to develop data that supports the use of LCTMs; generate data for specification modification; facilitate quality assurance testing; and in general, obtain the necessary data to de-risk KYTC's use of LCTMs.

2.5 Construction Costs

Construction will be a major cost, but until specific projects have been identified for LCTM use, it is not possible to provide exact estimates. At this point it is only possible to estimate construction costs based on bid item costs for existing projects and extrapolating to account for new materials and methods required for construction using LCTMs. In the attached budget, these estimated costs are largely limited to Task 7 and have been identified as either incentive-based costs or incremental costs. This distribution will be re-established as part of the IPR process.

In 2023, KYTC let projects with approximately 3.25 million tons of asphalt utilizing a wide range of traditional mixed, with an average unit bid price of \$108/ton. KYTC also let projects with approximately 60,650 square yards of concrete pavement at \$135 per square yard and 22,500 cubic yards of concrete at \$1350 per cubic yard. KYTC does not currently have any historical bid data related to the use of LCTMs in asphalt or cement/concrete.

2.6 Contingency

A 15% contingency has been included in the attached budgets to capture the reality that even with accurate estimates, as will be provided in the IPRs, unforeseen costs will arise given the experimental nature of some of these materials.

3. Task Highlights

This section of Volume 2 presents a brief summary of the cost estimated for each task. Note that the general scope of work for many tasks is similar for concrete and asphalt at this preliminary scoping stage. However, the hours and equipment differ in the detailed concrete and asphalt tables and additional detailed information will be provided during program development.

Task 1—Process for Substantially Lower Embodied Carbon

Task 1.1: Develop Task 1 Implementation Process Reports (IPRs)

- Develop LCTM-specific IPRs defining the specific activities and associated budget for Task 1
- Expected Duration: 18 months
- Costs
 - Labor: Includes costs for KYTC, consultant and university partners hours for all materials.
 - Direct Costs: Very little other than for travel costs for meetings of key team members.
 - Construction Costs: None.

Task 1.2: Identify Eligible LCTMs, training needs, data needs, and specification review

- Given current KYTC practices and priorities, product availability, and additional factors as desired, convene one or more meetings of appropriate participants (likely to include university and consultants, and could include contractors and producers) to determine candidate LCTMs, and select those for which a good faith effort to implement will be made.
- The team will identify training needs to advance implementation of the LCTM program for each key stakeholder group.
- The team will document critical aspects of KYTC's LCTM program and assess knowledge gaps for all key stakeholder groups involved in the design and construction processes (e.g., design, lab, construction, inspection).
- The team will compile information regarding current materials (e.g., specifications, cost, performance) and identify important gaps and barriers to further implementation of LCTM and how to address them.
- Expected Duration: 18 months beginning after IPR approval.
- Costs
 - Labor: Includes costs for KYTC, consultant and university partners hours for all materials.
 - Direct Costs: Very little other than for travel costs for meetings of key team members.
 - Construction Costs: None.

Task 1.3: Stakeholder Outreach

- Engage internal and external stakeholders affected by the LCTM program activities; this activity may include meetings, website content, or other outreach materials.
- Expected Duration: 18 months beginning after IPR approval.
- Costs
 - Labor: Includes costs for KYTC, consultant and university partners hours for all materials.
 - Direct Costs: Very little other than for outreach materials or travel costs for meetings of key team members.
 - Construction Costs: None.

Task 1.4: Development of a Process to Gather and Store Environmental Product Declarations (EPDs)

- EPDs are critical to both benchmarking and documenting future improvements; the team will establish a system to collect and house EPD information; the cost to develop EPDs can also be covered for the successful contractor on relevant construction projects.
- Expected Duration: Initial EPD database creation up to 24 months with updates continually through the duration of LCTM program.
- Costs
 - Labor: Includes costs for KYTC, consultant and university partners hours for all materials. Includes cost for upgrades to e-ticketing software and EPD database development, updating, and maintenance over the LCTM grant time period.
 - Direct Costs: Very little other than for travel costs for meetings of key team members.
 - Construction Costs: None.

Task 1.5: Identification of Local or Regional Embodied Carbon Thresholds

- KYTC will evaluate National thresholds and determine if they are representative of the materials typically used. Will engage assistance to develop regional or even local benchmarks based on evaluation of KYTC materials and evaluation of collected EPDs.
- Expected Duration: 36 months
- Costs
 - Labor: Includes costs for KYTC, consultant and university partners hours for all materials.
 - Direct Costs: Very little other than for travel costs for meetings of key team members.
 - Construction Costs: None.

Task 1.6: Conduct Task 1 LCTM Training

- Training is expected to include a combination of in person, web-based, and written materials, and will be delivered to the various key groups described above.
- Expected Duration: 6 years.
- Costs
 - Labor: Includes costs for KYTC, consultant and university partners hours for all materials.
 - Direct Costs: Travel costs for meetings, costs for training materials and to conduct training.
 - Construction Costs: None.

Task 2—LCTM Quality Assurance (QA) and LCTM Specifications

Task 2.1: Develop Task 2 Implementation Process Reports (IPRs)

- Develop LCTM-specific IPRs defining the specific activities and associated budget for Task 2.
- Expected Duration: 18 months ending by June 30, 2026.
- Costs
 - Labor: Includes costs for KYTC, consultant and university partners hours for all materials.
 - Direct Costs: Very little other than for travel costs for meetings of key team members.
 - Construction Costs: None.

Task 2.2: Development of QA Plan and/or Performance Monitoring Plan for the LCTM

- Team to establish key elements and approaches for QA plans used with the eligible LCTMs, and what steps are required to acquire important missing data. Develop approach to track performance over time.
- Expected Duration: 18 months
- Costs
 - Labor: Includes costs for KYTC, consultant and university partners hours for all materials.
 - Direct Costs: Very little other than for travel costs for meetings of key team members.
 - Construction Costs: None.

Task 2.3: Task 2 Stakeholder Outreach

- Follow up with internal and external Task 2 stakeholders; may include meetings, website content, other outreach materials.
- Expected Duration: 18 months.

- Costs
 - Labor: Includes costs for KYTC, consultant and university partners hours for all materials.
 - Direct Costs: Very little other than for travel costs for meetings of key team members.
 - Construction Costs: None.

Task 2.4: Update of Existing Material Specifications or Development of New Special Provision to Facilitate Use on Projects

- Work with team, and include producers and contractors to the extent practical, to revise/develop appropriate specifications for the LCTM program; it is expected this will require an iterative process to be revisited over time.
- Expected Duration: 24 months
- Costs
 - Labor: Includes costs for KYTC, consultant and university partners hours for all materials.
 - Direct Costs: Very little other than for travel costs for meetings of key team members.
 - Construction Costs: None.

Task 2.5: Preliminary Mix Design and Testing to Evaluate Material(s)

- Consider innovative materials and new/updated specifications to evaluate existing mix designs and develop new ones as appropriate and perform associated material testing.
- Expected Duration: 36 months
- Costs
 - Labor: Includes costs for KYTC, consultant and university partners hours for all materials.
 - Direct Costs: Considerable costs for testing materials.
 - Construction Costs: None.

Task 2.6: Testing Equipment to Accept and Verify LCTM

- Based on the LCTM, existing test equipment may not be able to capture important material properties related to performance; the team will examine current testing capabilities and identify where needs exist. Will result in the purchase of equipment identified in the assessment; note this would likely be equipment for KYTC but could be for a university or consultant. Depending on the equipment purchased, specialized installation may be required. Again, depending on the equipment purchased, training is likely to be required for those performing the tests; includes developing and delivering appropriate training. Will also require updating the QA Plan to account for the new information provided as part of the lab equipment purchases.

- Expected Duration: 36 months
- Costs
 - Labor: Includes costs for KYTC, consultant and university partners hours for all materials.
 - Direct Costs: Considerable costs for testing equipment, including installation and training.
 - Construction Costs: None.

Task 2.7: Construction of Task 2 LCTM Test Strips

- Team to identify appropriate project application for LCTM test strips and work with the design and construction teams to place a test strip. Must ensure someone is assigned to being on site specifically to document the placement and collect relevant construction information and material samples; testing of these samples would also be performed. Consistently collect performance information regarding the test strips and compare to both expected performance and performance relative to conventional materials used on other parts of the project; suggest annual monitoring, but other intervals could be used.
- Expected Duration: 48 months
- Costs
 - Labor: Includes costs for KYTC, consultant and university partners hours for all materials.
 - Direct Costs: Significant costs for material testing, performance monitoring, and reporting.
 - Construction Costs: Significant construction costs depending on the number, size, and location of test strips.

Task 2.8: Development of a Verification Process for LCTM Using EPDs

- Currently, EPDs are provided for materials upon request during mixture approval, but there is no way to currently track the GWP of materials as delivered to the construction site. A reliable, verifiable means to verify and track the GWP of materials delivered to the construction site is essential for GWPs to be successfully used in procurement. Team to review the construction documentation and materials test results to confirm the material placed was consistent with the LCTM EPD.
- Expected Duration 36 months
- Costs
 - Labor: Includes costs for KYTC, consultant and university partners hours for all materials.
 - Direct Costs: Cost incurred for travel for meetings of key team members and to visit with producers.
 - Construction Costs: None.

Task 2.9: Task 2 Training

- This training will be informed based on previous training activities as well as the findings to date regarding the LCTM test site placement and performance; it will address areas where issues arose throughout the process (e.g., design, construction) and is expected to be more broadly deployed.
- Expected Duration: 24 months
- Costs
 - Labor: Includes costs for KYTC, consultant and university partners hours for all materials.
 - Direct Costs: Cost incurred for travel for meetings of key team members and to conduct in-person trainings.
 - Construction Costs: None.

Task 3—Construction Project Information

Task 3.1: Develop Task 3 Implementation Process Reports

- Develop LCTM-specific IPRs defining the specific activities and associated budget for Task 3.
- Expected Duration: 18 months ending by June 30, 2026.
- Costs
 - Labor: Includes costs for KYTC, consultant and university partners hours for all materials.
 - Direct Costs: Very little other than for travel costs for meetings of key team members.
 - Construction Costs: None.

Task 3.2: Identify Construction Projects

- Identify candidate Title 23 projects for utilizing the LCTM(s).
- Expected Duration: 12 months.
- Costs
 - Labor: Includes costs for KYTC, consultant and university partners hours for all materials.
 - Direct Costs: None.
 - Construction Costs: None.

Task 3.3: Develop a Plan for Incorporation of LCTMs on Construction Projects

- With the knowledge gained in Tasks 1 and 2 the team will engage with the appropriate stakeholders to create an implementation plan for each LCTM.
- Expected Duration: 12 months.
- Costs

- Labor: Includes costs for KYTC, consultant and university partners hours for all materials.
- Direct Costs: Cost incurred for travel for meetings of key team members.
- Construction Costs: None.

Task 3.4: Development of Project-Specific Construction Contract Language

- Expand on what has been learned to date and update/create specifications suitable for adoption as appropriate for each specific LCTM project.
- Expected Duration: 36 months
- Costs
 - Labor: Includes costs for KYTC, consultant and university partners hours for all materials.
 - Direct Costs: Cost incurred for travel for meetings of key team members.
 - Construction Costs: None.

Task 3.5: Task 3 Industry Outreach and Coordination

- Follow up with industry stakeholders; may include meetings, website content, other outreach materials.
- Expected Duration: 24 months.
- Costs
 - Labor: Includes costs for KYTC, consultant and university partners hours for all materials.
 - Direct Costs: Cost incurred for travel for meetings of key team members and to visit with producers.
 - Construction Costs: None.

Task 3.6: Task 3 Training

- This training will be informed based on previous training activities as well as the findings to date regarding the LCTM test site placement and performance; it will address areas where issues arose throughout the construction project process (e.g., design, construction, data collection) and is expected to be broadly deployed.
- Expected Duration: 24 months
- Costs
 - Labor: Includes costs for KYTC, consultant and university partners hours for all materials.
 - Direct Costs: Cost incurred for travel for meetings of key team members and to conduct in-person trainings.
 - Construction Costs: None.

Task 4—Use of LCTM on Projects

Task 4.1: Develop Task 4 Implementation Process Reports

- Develop LCTM-specific IPRs defining the specific activities and associated budget for Task 4.
- Expected Duration: 18 months ending by June 30, 2026.
- Costs
 - Labor: Includes costs for KYTC, consultant and university partners hours for all materials.
 - Direct Costs: Very little other than for travel costs for meetings of key team members.
 - Construction Costs: None.

Task 4.2: Identification of Eligible Federal-aid Projects

- Based on all relevant criteria (e.g., Title 23 project, qualified LCTM), identify specific projects on which the LCTM(s) will be placed.
- Expected Duration: 12 Months.
- Costs
 - Labor: Includes costs for KYTC, consultant and university partners hours for all materials.
 - Direct Costs: None.
 - Construction Costs: None.

Task 4.3: Estimation of Costs of Eligible LCTM(s)

- Utilizing the quantity of material(s) and estimated cost of placement (particularly if learned it was different than for conventional material(s)), develop a cost estimate.
- Expected 36 months.
- Costs
 - Labor: Includes costs for KYTC, consultant and university partners hours for all materials.
 - Direct Costs: Very little other than for travel costs for meetings of key team members.
 - Construction Costs: None.

Task 4.4: Comparison of LCTM Costs and Traditional Material Costs

- Review existing bid tab information for last five years to establish range and average for conventional materials. Depending on the project and LCTM, there is considerable variation regarding the potential impacts regarding change orders and developing new bid items, but typical KYTC practices should be followed.
- Expected Duration 12 months
- Costs

- Labor: Includes costs for KYTC, consultant and university partners hours for all materials.
- Direct Costs: Cost incurred for travel for meetings of key team members.
- Construction Costs: None.

Task 4.5: LCTM Bid Items

- Based on the results of 4.3 and 4.4, include an LCTM bid item in relevant contracts. KYTC will determine how widely to implement the bid item.
- Expected Duration: 48 months
- Costs
 - Labor: Includes costs for KYTC, consultant and university partners hours for all materials.
 - Direct Costs: The majority of costs for this activity are expected to be direct material costs.
 - Construction Costs: None.

Task 5—Substantially Lower Embodied Carbon

Task 5.1: Develop Task 5 Implementation Process Reports

- Develop LCTM-specific IPRs defining the specific activities and associated budget for Task 5
- Expected Duration: 18 months ending by June 30, 2026.
- Costs
 - Labor: Includes costs for KYTC, consultant and university partners hours for all materials.
 - Direct Costs: Very little other than for travel costs for meetings of key team members.
 - Construction Costs: None.

Task 5.2: EPD Bid Item

- Following the process identified in Task 1, collect and store all EPDs. Include an EPD bid item in existing and future contracts to allow contractors to bid the cost of providing an EPD, allowing the successful contractor to be paid for these costs.
- Expected Duration: 60 months
- Costs
 - Labor: Includes costs for KYTC, consultant and university partners hours for all materials.
 - Direct Costs: Very little other than for travel costs for meetings of key team members.
 - Construction Costs: None.

Task 5.3: Collection of Energy Star Performance Score(s)

- As required in the legislation, a system will be developed to collect and store Energy Star Performance Scores for eligible LCTMs.
- Expected Duration: 36 Months
- Costs
 - Labor: Includes costs for KYTC, consultant and university partners hours for all materials.
 - Direct Costs: Very little other than for travel costs for meetings of key team members.
 - Construction Costs: None.

Task 5.4: Quality Incentives for Environmental Performance

- Utilizing the knowledge gained through Tasks 1-4, create, as appropriate, quality incentives for environmental performance associated with the use of LCTMs. Use these incentives on LCTMs Title 23 projects to incentivize contractors to use these materials.
- Expected Duration: 36 months toward end of program.
- Costs
 - Labor: Includes costs for KYTC, consultant and university partners hours for all materials.
 - Direct Costs: Travel costs for meetings of key team members.
 - Construction Costs: Assumes 12 projects at \$125,000 per project for each material type. (Considerable cost can be incurred during construction as contractor bids reflect knowledge gained and placing high-performing, low carbon materials.)

Task 5.5: Other Costs for the Use of Substantially Lower Carbon Materials

- Team to evaluate all activities associated with LCTM identification and implementation, and define any appropriate costs not already included associated with utilizing the LCTM.
- Expected Duration: 36 months
- Costs
 - Labor: Includes costs for KYTC, consultant and university partners hours for all materials.
 - Direct Costs: Very little other than for travel costs for meetings of key team members.
 - Construction Costs: None.

Task 6—Quality Assurance and Acceptance

Task 6.1: Develop Task 6 Implementation Process Reports

- Develop LCTM-specific IPRs defining the specific activities and associated budget for Task 6.
- Expected Duration: 18 months ending by June 30, 2026.
- Costs
 - Labor: Includes costs for KYTC, consultant and university partners hours for all materials.
 - Direct Costs: Very little other than for travel costs for meetings of key team members.
 - Construction Costs: None.

Task 6.2: Construction of Task 6 LCTM Test Strip

- Based on earlier work, these Task 6 LCTM test strips will be larger and more ambitious in scope, reflecting the next phase of implementation. They will reflect the most recent modifications to specifications or other changes to practices. These test strips will be rigorously documented, tested, and monitored as precursors to full acceptance of certain LCTMs.
- Expected Duration: 36 months
- Costs
 - Labor: Includes costs for KYTC, consultant and university partners hours for all materials.
 - Direct Costs: Assumes 3 test strips per material with \$25,000 in material costs/test and \$25,000 in equipment costs/test. (Significant costs for material testing, performance monitoring, and reporting.)
 - Construction Costs: Assumes 3 test strips for each material at \$300,000 per test strip. (Significant construction costs depending on the number, size and location of test strips.)

Task 6.3: Additional Testing Equipment and/or Testing Required to Accept Low Carbon Materials

- Third party sampling and testing is required for LCTMs to be accepted into practice. It is expected that new equipment and test methods will be required for QA and that third party laboratory testing will be needed. This will require a shift in industry practice that will not occur without LCTM support.
- Expected Duration: 36 months
- Costs
 - Labor: Includes costs for KYTC, consultant and university partners hours for all materials.

- Direct Costs: Assumes \$250,000 per material in equipment costs. (Considerable direct costs in purchasing equipment for a loaner program to equip commercial laboratories with newly developed performance testing equipment and to support third party testing.)
- Construction Costs: None

Task 6.4: Verification that Material Placed Meets Thresholds for Substantially Lower Carbon

- Utilizing current and newly developed regional or local GWP thresholds and GWP verification system, track project GWP on a batch-by-batch basis as a precursor to using GWP in procurement.
- Expected Duration: 24 months towards end of program.
- Costs
 - Labor: Includes costs for KYTC, consultant and university partners hours for all materials.
 - Direct Costs: Direct cost incurred in monitoring construction projects where batch-to-batch EPDs are collected.
 - Construction Costs: None

Task 6.5: Verification of Engineering Properties of the LCTM

- Utilizing QA test data and EPD information, a rigorous laboratory testing program will be executed to measure engineering properties of LCTMs needed to ensure performance. This is a final de-risking activity to build confidence amongst all stakeholders that the LCTM materials are suitable for use.
- Expected Duration: 24 months prior to end of LCTM program.
- Costs
 - Labor: Includes costs for KYTC, consultant and university partners hours for all materials.
 - Direct Costs: Assumes seven projects at \$10,000 in materials and \$30,000 in equipment per project. (Direct cost incurred in conducting testing on construction projects.)
 - Construction Costs: None

Task 6.6: Quality Incentives for Engineering Performance

- With the development of new QA test methods, an opportunity exists to combine quality incentives for environmental performance with quality incentives for engineering performance. This will be the true measure of demonstrating that LCTMs are suitable for use, providing as good if not better performance than conventional materials.
- Expected Duration: 36 months.
- Costs

- Labor: Includes costs for KYTC, consultant and university partners hours for all materials.
- Direct Costs: Travel costs for meetings of key team members. Considerable costs may be incurred by accredited testing laboratories capable of running newly developed performance tests for QA to establish incentive targets.
- Construction Costs: Assumes up to \$250,000 in incentive costs. (Considerable cost can be incurred during construction as contractor bids reflect knowledge gained and placing high-performing, low carbon materials.)

Task 7—Use of LCTM on Construction Projects

Task 7.1: Develop Task 7 Implementation Process Reports

- Develop LCTM-specific IPRs defining the specific activities and associated budget for Task 7
- Expected Duration: 18 months ending by June 30, 2026.
- Costs
 - Labor: Includes costs for KYTC, consultant and university partners hours for all materials.
 - Direct Costs: Very little other than for travel costs for meetings of key team members.
 - Construction Costs: None.

Task 7.2: Develop Project-specific Performance Monitoring Plan

- This task will work with the results Task 2.2 and more newly gathered information to finalize the Performance Monitory Plan for LCTM projects in the future. This plan should account for regular performance assessments performance over time, to be carried on after the LCTM program sunsets.
- Expected Duration: 12 months
- Costs
 - Labor: Includes costs for KYTC, consultant and university partners hours for all materials. Assumes 12 total projects per material.
 - Direct Costs: Very little other than for travel costs for meetings of key team members.
 - Construction Costs: None.

Task 7.3: Construction & Placement Costs of Using Eligible Materials

- Team to establish the construction and placement costs using eligible LCTM(s) on eligible project(s)
- Expected Duration: 24 months prior to LCTM program ending.
- Costs

- Labor: Includes costs for KYTC, consultant and university partners hours for all materials. Assumes 12 total projects per material.
- Direct Costs: Very little other than for travel costs for meetings of key team members.
- Construction Costs: None.

Task 7.4: Results from Long-Term Performance Monitoring Plan

- In addition to performance data, this activity will also consider documentation of construction as described in Task 2; as LCTM projects can be in different locations, consistent data collection practices are critical both in terms of how and when performed; analyses comparing performance of the LCTM to conventional materials are highly valuable, as is developing quality reports and updating over time. Multiple team members are expected to be involved in sharing what has been learned; publications and presentations are expected to be informed by not only the LCTM performance, but by all other opportunities for learning throughout Tasks 1-7 (e.g., specifications, training, new equipment).
- Expected Duration: 24 months.
- Costs
 - Labor: Includes costs for KYTC, consultant and university partners hours for all materials.
 - Direct Costs: Travel costs for meetings/conferences/workshops of key team members, and costs associated with hosting meetings (including potential field visits).
 - Construction Costs: None.

Task 7.5: Incentives and Incremental Costs

- The legislation provides for a 2% incentive on the bid item for the placement of a qualifying LTCM or the incremental funding necessary for that qualifying LTCM.
- Expected Duration: 60 months
- Costs
 - Labor: Includes costs for KYTC, consultant and university partners hours for all materials.
 - Direct Costs: Travel costs for meetings/conferences/workshops of key team members.
 - Construction Costs: Considerable cost can be incurred during construction as contractor bids reflect knowledge gained and placement of qualifying LCTM materials.

Attachment A

Budget Tables