Request for Research Funding for FY 2022-2023			
SPR Subpart B Project: PMO-23-01			
Requesting Office	Or District State Program Management Office	**Priority**	# of # (projects may not have the same ranking – no ties) 1 of 1
Proposed Title	All projects must have a title Updates to Estimates Pricing Algorithms and Market Areas		
Justification	Describe the current situation, why the research is needed, and how the research affects your office's mission critical focus areas Changes in the current construction market have shown that a revision to the existing formulas for the bid history pricing algorithms is needed. The key data elements included with the algorithms must be verified for accuracy to ensure the research gathered to develop new algorithms is applied properly in the analysis. For example, one subset of data looks at Market Areas and the counties that make up each Market Area have not been updated since 2007. The mission critical focus area that this research will support is the improved accuracy of cost estimates. The current, rapid changes in market conditions have shown a need to revisit the pricing algorithms that FDOT uses in estimating highway construction work items. The Estimates Section believes that there may be other factors and external data sources as well as other ways to capture additional project attributes to better estimate future costs in this fluctuating market to further the goal of producing better estimates.		
Impact	How shall the results impact practice? Consequences of not doing the research? FDOT wants to be able to produce better estimates with a focus on source data integrity. We anticipate that this research will identify if FDOT is using the correct project/contract attributes in our algorithms and if additional attributes would yield a better estimated cost. Also, this effort will identify the benefits of bringing in data elements from external sources to augment our current available data and data sources used in our calculations. The results of this research will be implemented into the new Scope, Estimates and Analysis (SEA) application. This development project is the highest priority for the Estimating Systems Support Team and began 07/01/2021. This cycle for the research project aligns with the information needed for the SEA project. Not having the research will be detrimental to the ongoing development effort and will have impact on our users' ability to analyze bid data and make informed decisions when estimating future project costs.		
Affected Offices	Identify any office and names of office personnel that will need to be involved in the scoping or conduct of the research, will be affected by implementation of the results, or will need to participate in the implementation process—including OTIT, if enterprise data/network software application will be a deliverable, and district staff, as appropriate, e.g., through statewide meetings. **If the requesting office will not be the implementing office, please identify which office and names of specific personnel which will have to serve in that capacity—have they been involved?** Central Office Preliminary Estimates and their counterparts in the districts would be providing input and be the direct beneficiaries of any implementation. Additionally, our Central Office Estimating Systems Support Team and the Office of Information Technology would be involved in any implementation of recommendations and/or acquisition of products needed to support the effort.		
Existing Work	Learning About and Using the Research in Progress (RiP) Database http://www.trb.org/main/blurbs/176215.aspx		

There are a variety of ongoing and completed studies related to estimating the cost of construction projects. Many that were reviewed involved developing written guidance related to preparing a cost estimate and some were related to the creation of cost indices for use in determining future costs. The list shown below is the most relevant ongoing and completed studies that parallel our needs; however, these DO NOT meet our scope in that none of these provide pricing algorithms that are appropriate for inclusion within our new application. Additionally, none of these existing efforts provide for analysis of determining Florida counties grouped into various market areas relevant to like conditions.

The below list of partially relevant studies is provided as an artifact of the evaluation effort of any existing research studies:

- *Top-down Construction Cost Estimating Model/Guide Using a Neural Network* (2017)

- *Enhancing the Accuracy of Construction Cost Estimates for Major Lump Sum (LS) Pay Items and Generating a More-Accurate List of Pay Items Throughout the Design Development Process* (2020)

- *Improving Mid-Term, Intermediate, and Long-Range Cost Forecasting for State Transportation Agencies* (2020)

- *Contingency Factors to Account for Risk in Early Construction Cost Estimates for Transportation Infrastructure Projects* (2020)

- *A Preliminary Cost Estimating Model for Transportation Projects* (2021)

- *Development of an Automated Tool for Cost Estimation of Transportation Projects* (2021)

Keywords Used In Existing Work Search **(Cannot leave blank)**	Estimates; Estimating; Bid History; Cost History; Pricing; Algorithm; Average Cost; Price Search; Pricing Library; Price Forecasting; Forecast
Related Contracts (Give contract numbers)	N/A

Funding Request	Estimated cost $200,000.00	**Anticipated Duration**	Estimated length of time to complete work 18 months
Project Manager	Proposed technical manager to oversee research Karen Veenstra	**Contracting Method**	Anticipated procurement method (e.g., supplement to existing project, RFP to all registered vendors, direct contract with university) Direct contract with university

Equipment	Estimated equipment cost (or N/A) N/A	Comments* (understanding leases are preferred, include the proposed use of the equipment, whether lease options are feasible, whether work to be done with equipment could instead be procured through service expenditure, etc.)
Urgency	Score 1-5 1= highest, most immediate need 1	Comments* (elaborate as appropriate on justification/impact comments to explain the urgency of the need . . . is a solution needed immediately, needed within a certain period of time or by a known or anticipated deadline, desired for enhancement, etc.) The new estimating application design will be made to accommodate and support the research results to be implemented. The research results will be timely to the current application development effort and will therefore be a high priority for the project and will be an integral part of the functionality to be implemented with the new estimation application.
Implementability	Score 1-5 1=greatest likelihood of and proximity to implementing results 1	Comments* (consider both the likelihood of implementation and the length of time and resources required to implement the results of the research.) Identify any prerequisites to, requirements for, or barriers to implementing the anticipated results of this research (e.g., new or change to existing specifications, development of production units of prototype device, legislative change); please indicate if multiple phases of work shall be required Results could be implemented immediately in our current applications as deemed appropriate. Reports can be written to extract and analyze estimating data if this is a more appropriate means of immediate implementation. The updated Market Area designations and improved data quality recommended practices will also be considered for immediate implementation as appropriate. The migration plan for moving estimating source data and attributes from the current applications to the new application will leverage the improvements in data quality and will be more efficient and offer improvements to expected results upon completion of the migration effort. The new estimating application design will be made to accommodate and support the research results to be implemented. The research results will be timely to the current application development effort and will therefore be a high priority for the project and will be an integral part of the functionality to be implemented with the new estimation application.

Project Benefits (Succinct, complete explanation)

The project itself would benefit the Department in that the current staff do not have the time, knowledge, resources, or tools to properly perform the research and statistical analysis required to re-evaluate our current practices for estimation.

The outcome of the project should result in recommendations as to how the Department can improve our estimating algorithms. Included in those recommendations should be a cost benefit analysis for each recommendation which should allow the Department to evaluate which recommendations should be implemented to get the biggest return on investment.

Subsequent implementation of those recommendations should result in greater accuracy of our estimates which should provide for more resilient Work Program budgets.

Project Benefits (Select all that apply and explain)	Quantifiable Benefits (units, dollars, etc…if applicable)	Methodology or Data Sources Used to Determine Quantifiable Benefits. If not applicable, please give justification of project benefits
o Materials Enhancement	If the quality of the estimates is improved, this will result in a more accurate, stable work program budget.	Reports comparing the estimate to the bids at the contract level and at each item level will show whether there is improvement or not. Models run with the old algorithms against the new algorithms and compared against the historical bid or the estimators' determined prices.
o Materials Savings	Material savings is related to the time saved in reletting projects where the bids are not within tolerance. Resources are also expended in researching significant discrepancies between the estimate and the bids.	A review of the number of contracts readvertised and/or the amount of time per resource (at x rate of pay) expended on research into estimate/bid discrepancies will give an indication on the material savings.
o Time Savings	Time saved by estimators because the automated solutions would be more in line with what the estimator is now required to do manually. It would create efficiency because a better more representative estimating cost would be calculated as a better starting place for further refinement as needed. Less manual adjustments would be needed. Time saved if bids are within tolerance and relets are avoided. Expense and time saved is unknown as it largely depends on the specific projects involved.	N/A
o Lives Saved/Injuries Prevented	N/A	
o Other (Explain)	N/A	

*Comments should explain and support urgency, financial benefit, and implementability scores