IDAHO TRANSPORTATION DEPARTMENT

RESEARCH REPORT

Idaho Qualified Products List System Needs Study

RP 297

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Prepared for

Idaho Transportation Department

ITD Research Program, Contracting Services

Highways Construction and Operations

April 19, 2022

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Technical Report Documentation Page

1. Report No. FHWA-ID-22-297	2. Government Accession No.	3. Recipient's Catalog No.
4. Title and Subtitle Idaho Qualified Products List System Needs Study		5. Report Date March 2022 6. Performing Organization Code
7. Author(s) Jake B. Smithwick, https://orcid.org/0000-0002-6260-3670 Jeff T. Sawyer Kenneth T. Sullivan		8. Performing Organization Report No. [Billing code]
9. Performing Organization Name and Address Simplar Sourcing Solutions PO Box 27565 Tempe, AZ 85285		10. Work Unit No. (TRAIS) 11. Contract or Grant No. T002470
12. Sponsoring Agency Name and Address Idaho Transportation Department (SPR) Highways Construction and Operations, Contracting Services, Research Program PO Box 7129 Boise, ID 83707-7129		13. Type of Report and Period Covered Final Report 04/19/2021 - 03/08/2022 14. Sponsoring Agency Code RP-297
15. Supplementary Notes Project performed in cooperation with the Idaho Transportation Department and Federal Highway Administration.		
16. Abstract The primary objective of ITD's Qualified Products List management group is to streamline the product evaluation process and increase the ITD's capability to evaluate and identify high performance products. The team has an existing software solution, but future developments require specific guidance on product type inputs, nomenclature, and other product evaluation workflows. The goals of this project were to evaluate ITD's current software evaluation tool and to synthesize the best practices and lessons learned from other State Transportation Agencies. The research team created a summary workflow process map of how the QPL program is generally administered. Six new features or enhances were also identified, primarily centered on automation of certain components of the recertification process. Surveys were conducted of three stakeholder groups: Product Reviewers, Product Manufacturers, and State Transportation Agencies. Four potential options for ITD's QPL software replacement emerged: 1) enhance or update ITD's existing tool, 2) purchase off-the-shelf software, 3) develop a custom application integration with AASHTOWare SiteManager, and 4) automate the evaluation process and post a static approved product list. All options presented could meet ITD's needs, whether they are an off-the-shelf solution, a completely custom-built solution, or somewhere in between. If ITD opts to seek an external contractor to replace the QPL program, it is strongly recommended that the procurement process allow the proposers to suggest any solution that best meets the State's needs.		
17. Key Words Product evaluation, procurement, product reviewers, technology automation	18. Distribution Statement Copies available from the ITD Research Program	
19. Security Classification (of this report) Unclassified	20. Security Classification (of this page) Unclassified	21. No. of Pages 76 / 22. Price None

Acknowledgments

The research team expresses tremendous gratitude for the Technical Advisory Committee and members of the State Transportation Agencies who participated in the interviews and survey data collection.

Technical Advisory Committee

Each research project is overseen by a Technical Advisory Committee (TAC), which is led by an ITD project sponsor and project manager. The TAC is responsible for monitoring project progress, reviewing deliverables, ensuring that study objectives are met, and facilitating implementation of research recommendations, as appropriate. ITD's Research Program Manager appreciates the work of the following TAC members in guiding this research study.

- Project Sponsor: Tom Furrer
- Project Manager: Tom Furrer
- TAC Members: Kevin Sablan, Ken Sereduk, Suzie Weddle, and Tyler Zundel
- FHWA-Idaho Advisor: Kyle Holman

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List of Abbreviations and Acronyms

APL	Approved Products List; equivalent to a QPL
DOP	Division of Purchasing
ETS	Enterprise Technology Services
FHWA	Federal Highway Administration
FTE	Full-time Equivalent
IDAPA	Idaho Administrative Code
IT	Information Technology
ITD	Idaho Transportation Department
ITN	Invitation to Negotiation
MS Access	Microsoft Access
NTPEP	National Transportation Product Evaluation Program
PRT	Product Review Team
QPL	Qualified Products List
RFI	Request for Information
RFP	Request for Proposals
SOW	Statement of Work
STA	State Transportation Agency
TAC	Technical Advisory Committee

Executive Summary

The Idaho Transportation Department (ITD) Qualified Products List (QPL) provides an avenue for manufacturers to submit proprietary products for evaluation, and if successful, receive approval to be listed for use on ITD projects. Products are categorized based on their use as defined in the ITD Standard Specification for Highway Construction (Standard Specifications). Evaluation consists of comparing ITD lab reports or published test results against category criteria published in ITD's Standard Specifications. Product evaluators are enabled to restrict usage by disapproval, or by granting provisional use, and/or adding restrictions as necessary.

As of 2021, ITD maintains a list of approximately 1,800 approved products from 340 product manufacturers. There are approximately 20 ITD evaluation committee members who represent a variety of technical areas, including pavements, erosion and sediment control, illumination, traffic control, traffic signals, and concrete. Typical product evaluation time is two weeks, or longer depending on scope and level of technical detail provided by the manufacturer.

The QPL is supported by a software application that facilitates product review and a public-facing website of all approved products. The current software application was developed in-house in the 1990s and was written in the VisualBasic 6 programming language. ITD's Enterprise Technology Services (ETS) has identified that the current program is no longer supported. By today's software standards, support and management are extremely labor intensive, and adds an unnecessary hinderance to the State's overall ability to deliver an effective QPL program.

The objectives of this research project were to evaluate ITD's current QPL management tool and to identify software update or replacement options. ITD partnered with a research team (Simplar Sourcing Solutions) to evaluate ITD's current QPL structure and processes, conduct surveys of stakeholders (internal staff and product manufacturers), summarize new features or system enhancements, evaluate practices at other State Transportation Agencies (STAs), and recommend next steps.

A detailed QPL Program Workflow Overview (similar to a software user guide) was prepared to document current practices. This document aided in the survey development of the product review team. Three-quarters of the product reviewers stated that while the current system is easy to use, there were opportunities for improvement. The suggested improvements centered on streamlining actual product review (documentation) and the ability to adjust reviewer assignment (to optimize workloads).

Six new features or enhancements were identified that, if implemented, would save substantial staff time. These enhancements included the addition of alternate reviewers, system interface updates (for the publicly facing webpage), and annual automated recertification of products.

Surveys and detailed interviews were conducted with 22 State Transportation Agencies (STAs). Four software update or replacement options were identified, namely:

1. Enhance or update ITD's existing tool. This approach would involve rewriting the QPL program's core programmatic structure to be updated with the latest best practices and current technologies available. This option would enable QPL management workflow to remain mostly unchanged, with the addition of new or additional features. To be clear, this option would require a complete rewrite of ITD's QPL core application as the current system cannot be supported any further. This option could be completed with in-house resources or with an external third-party contractor.

2. Purchase off-the-shelf software. This option involves purchasing a solution that is primarily ready to go "out of the box," meaning that implementation should require minimal modifications specific to ITD's QPL management environment. While some customizations were required to meet the unique needs of each STA interviewed, the core functional elements of each application were largely unchanged and appear to meet ITD's needs. This option would be developed (and hosted by) a third-party contractor.

3. Develop a custom application integration with AASHTOWare SiteManager. This approach would result in the development of a software application integration with SiteManager (or other AASHTOWare products). The main benefit would be a closer integration of the State's AASHTOWare solution by including QPL Management. However, a significant drawback as identified by several states is the high level of technical complexity in developing an integrated QPL program. Furthermore, it was identified that development on the SiteManager tool has stalled or ended altogether. This option would likely be completed by in-house personnel.

4. Automate the evaluation process and post a static approved product list. This option is a special use case of Option 1 and 2, wherein the STA automates the submission and evaluation of the products, but a static QPL (a PDF or Excel file) is posted to a public-facing website. Users do not have any ability to interact with or sort the posted QPL, other than what is provided in the native file format (i.e., Find and Search tool). Note that this approach automates almost all of the review management process, but almost none of the product management. This option would be supported by a third-party contractor (product review tool) and in-house staff (posting of the static PDF / Excel file)

The report concludes with a discussion on best practices related to software procurement options within the context of the State of Idaho's purchasing rules. All options presented could meet ITD's needs, whether they are an off-the-shelf solution, a completely custom-built solution, or somewhere in between. If ITD opts to seek an external contractor to replace the QPL program, it is strongly recommended that the procurement process allow the proposers to suggest any solution that best meets the State's needs. The state should clearly communicate to their potential industry partners of their sincere interest in soliciting the best ideas and solutions to update or replace ITD's QPL program. Proposers should explain how their solution will meet the state's needs, where it has been used successfully, and what potential challenges may occur in implementing their proposed solution (and how they will overcome these challenges).

1. Introduction

The Idaho Transportation Department (ITD) Qualified Products List (QPL) provides an avenue for manufacturers to submit proprietary products for evaluation, and if successful, receive approval to be listed for use on ITD projects. Products are categorized based on their use as defined in the ITD Standard Specification for Highway Construction (Standard Specifications). Evaluation consists of comparing ITD lab reports or published test results against category criteria published in ITD's Standard Specifications. Product evaluators are enabled to restrict usage by disapproval, or by granting provisional use, and/or adding restrictions as necessary.

As of 2021, ITD maintains a list of approximately 1,800 approved products from 340 product manufacturers. There are approximately 20 ITD evaluation committee members who represent a variety of technical areas, including pavements, erosion and sediment control, illumination, traffic control, traffic signals, and concrete. Typical product evaluation time is two weeks, or longer depending on scope and level of technical detail provided by the manufacturer.

The QPL is supported by a software application that facilitates product review and a public-facing website of all approved products. The current software application was developed in-house in the 1990s and the program application is written in the VisualBasic 6 language. ITD's Enterprise Technology Services (ETS) has identified that the current program is outdated, making it difficult to maintain or upgrade. By today's standards, program support and management are labor intensive, and adds burden to the State's overall ability to deliver an effective approved products structure.

The objective of this research project was to evaluate ITD's current QPL program and assess alternative QPL solutions at other State Transportation Agencies (STAs).

Research Methodology and Report Organization

ITD partnered with a research team, Simplar Sourcing Solutions, to evaluate software replacement options for the QPL. There were five main phases to this study:

1. Analyze ITD's current QPL structure and processes.
2. Conduct a survey of internal Staff and product manufacturers.
3. Summarize ITD-requested new features or enhancements.
4. Conduct a survey of other STAs and summarize QPL management software solutions.
5. Discuss QPL software update or replacement procurement options, including opportunities for workflow automation

The remainder of this report is organized by the following sections:

- QPL Structure and Processes: program background, internal survey of stakeholders and external product manufacturers.
- Findings: feature requests and enhancements, summary of available software solutions, procurement analysis of QPL software purchase / upgrade options, technology automation synthesis and feasibility.
- Conclusions and Recommendations: summary of key report findings and recommended next steps.
- Work cited: relevant reference information pertaining to the research project.

Current QPL Structure and Processes

The ITD QPL provides an avenue for manufacturers to submit proprietary products for evaluation, and if successful, receive approval to be listed for use on ITD projects. Products are categorized based on their use as defined in the ITD Standard Specification for Highway Construction (Standard Specifications). Evaluation consists of comparing ITD lab reports or published test results against category criteria published in ITD's Standard Specifications. Evaluators are enabled to restrict usage by disapproval, or by granting provisional use, and/or adding restrictions as necessary.

The first part of this section summarizes the current QPL approval and recertification process (see also Figure 1 for a visual representation of the current process). Appendix 1 provides a QPL Program Workflow Overview, which contains screenshots, instructions, and commentary on the software's current operating procedures. The current ITD QPL program is managed and supported by one staff member.

The current QPL Product Review Process is as follows:

1. A new product application is submitted for review by ITD.
2. The QPL Manager reviews the application for accuracy and completeness. If any revisions or additional information is required, the manufacturer is notified.
3. Once an application has all required information, the QPL Manager assigns product reviewers / product reviewer team (PRT), and they begin their evaluation. It is possible that the product reviewers will request information, which the manufacturer would need to provide (or explain why it is not available) to continue the evaluation.
4. Once the review is complete, product reviewers will recommend that the product be approved (with or without restrictions) or not approved.
    a. If a product is not approved, the QPL Manager sends a rejection notice to the manufacturer and this completes the product review.

b. Products that are approved will be added to the QPL database and available for use by other ITD personnel (i.e., construction projects).

Current approved products are required to be recertified every five years. The product recertification process is as follows:

1. An analyst from Enterprise Technology Services (ETS) exports from the QPL Database all approved products.
2. The QPL Manager will identify any products that have not been recertified in five years or more.
3. The QPL Manager will manually generate a letter addressed to the manufacturers of products that require recertification. The letter asks the manufacturer to identify if there are any relevant technical or other substantive changes to the product. Manufacturers are also requested to provide updated contact information.

    a. If the manufacturer does not respond to the letter, the product status is changed to "Disapproved."

    b. If there are no substantive changes to the product, the QPL Database is updated accordingly, and this concludes the recertification process.

    c. If there are substantive changes, the product must go through a review (see the aforementioned Product Review Process).

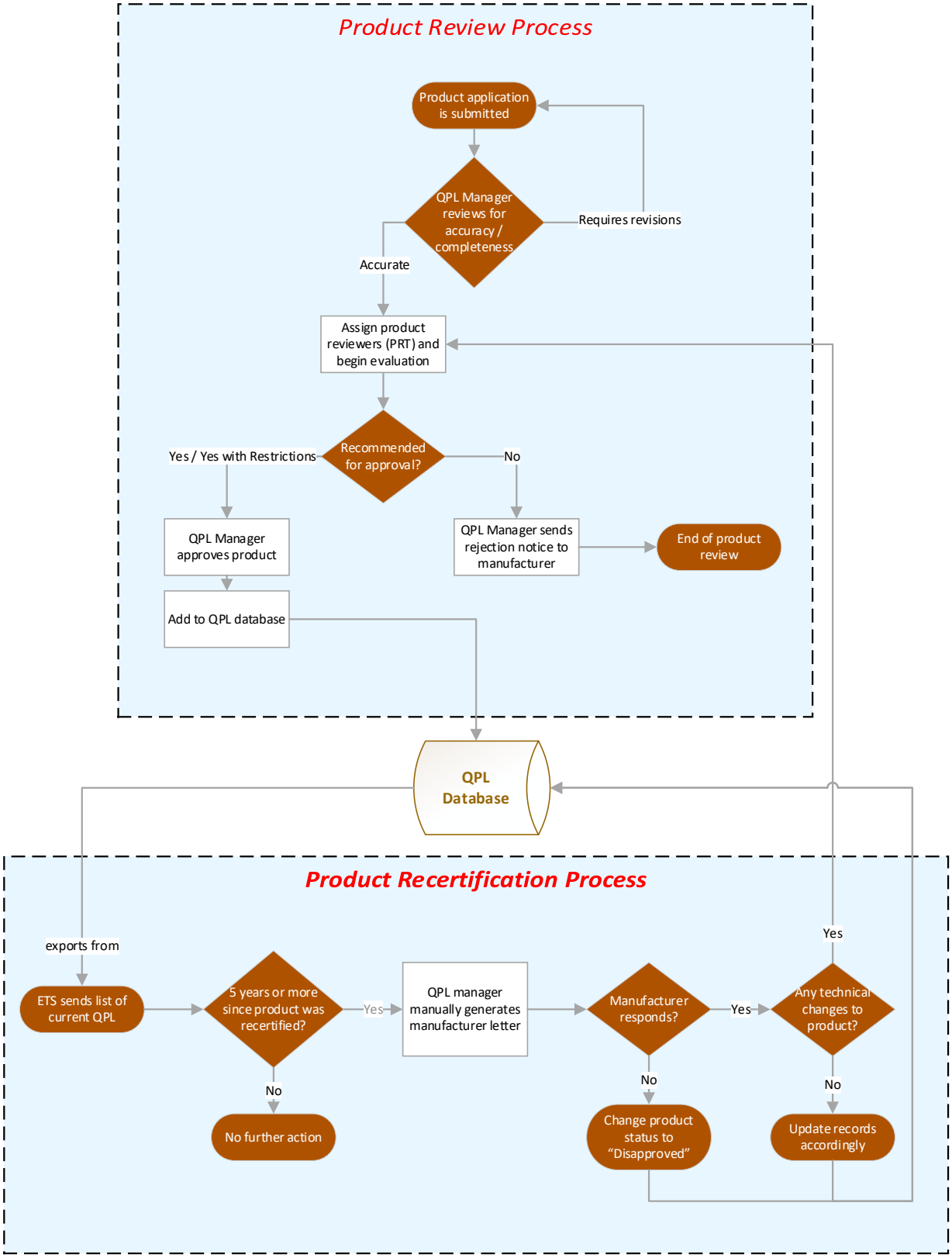


Figure 1 Current ITD QPL workflow

Survey and Interviews of QPL Stakeholders

The next phase in the research study was to conduct surveys of 1) ITD product reviewers and 2) product manufacturers. Though not part of the research project's initial scope of work, these surveys were included to better understand how different stakeholders engage with ITD's current QPL program.

Feedback from Product Reviewers

Product Reviewers were asked to provide feedback on the QPL's user interface (see the survey in Appendix 2). Respondents rated the current system in two areas: ease of submitting their technical product evaluations (rated on a scale from 1 to 5, with "1" being easiest) and the overall quality/adequacy of the information provided from the manufacturers. Twelve Product Reviewers responded to the survey. Nine of the Product Reviewers report that the current system is easy to use (see Figure 2), with about half suggesting that the ability to provide comments could be enhanced.

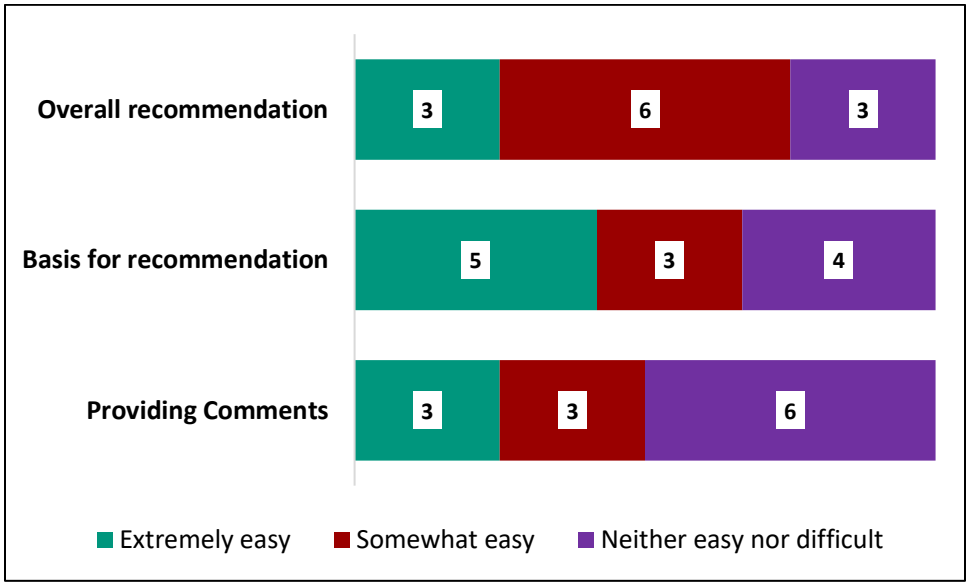


Figure 2 Summary of product reviewers' ability to provide recommendations in current QPL program

Product Reviewers offered constructive feedback on the current system, as noted in the following comments:

- The system needs to provide better organization of the technical product materials. Currently, documents are placed into the same location on the network server and evaluators must sort through them to determine what information is relevant. For example, the email with the product application, product brochure, certifications, and letters of approval from other states are all stored in the same place. Company websites are on a different screen and clicking on the

link takes them out of the product review webpage. The product link should open a new webpage window or tab.

- Allow for alternate evaluators to share the workload.
- Add an interface or search functionality with the National Transportation Product Evaluation Program (NTPEP).
- Share general comments and restrictions to personnel within ITD as well as the manufacturers. Currently, all information is provided under one category, “Product Restrictions” as shown in Figure 3. Product approvers need to be able to separate out general comments from product restrictions or limitations.
- The manufacturers’ technical product materials are what is most valuable; reviewers typically do not give much consideration to the application form. Prior research (Kasana et al. 2020) has provided recommended changes to the product application forms, including statements of intended use by the owner, examples of past successful installations, past performance information, among other relevant data.

Figure 3 Current "Product Restrictions" textbox

Feedback from Product Manufacturers

The manufacturers who have submitted products included on ITD’s QPL were sent a survey to solicit feedback on their experiences with the product submission process (see Appendix 3). Twenty manufacturers responded to the survey. Overall, across all questions asked, 18 of the respondents reported that the system is easy to use (see Figure 4). The ability to explain the technical details of the proposed product is somewhat of a challenge (as was also noted by some of the Product Reviewers).

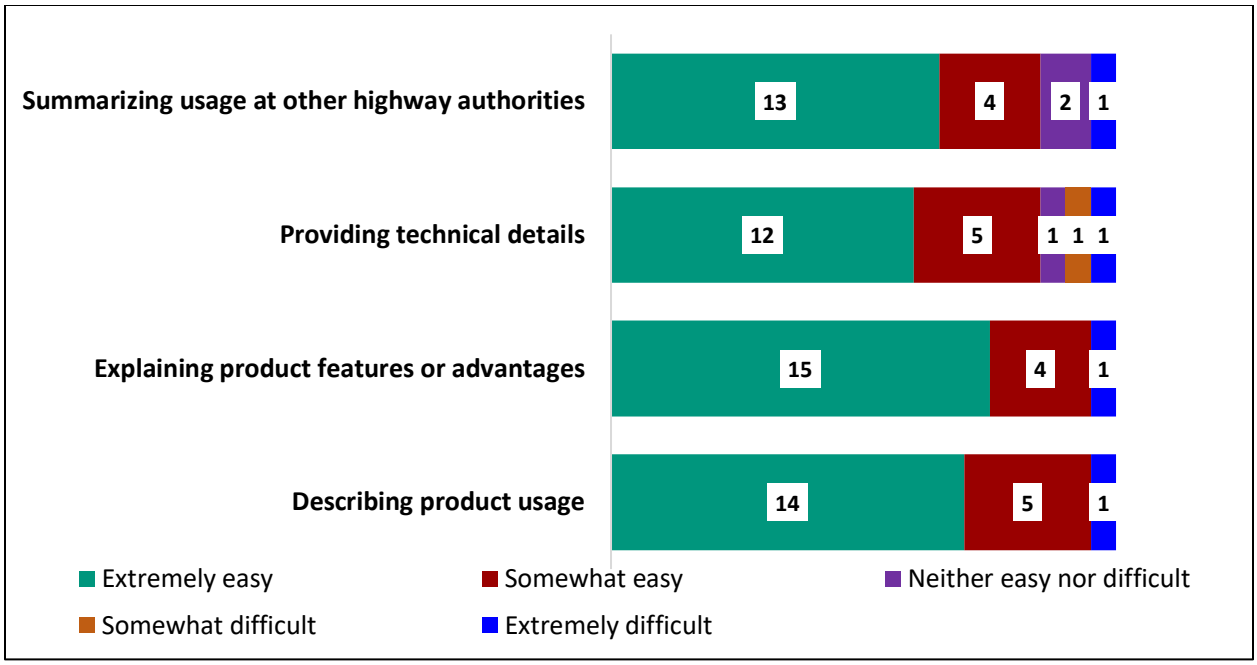


Figure 4 Manufacturers' feedback of ITD's current QPL program

Understanding that the success of rolling out any new software solution requires buy-in from the key stakeholders who interact with the system, the research team also asked the manufacturers for their overall reaction to ITD implementing a new web-based tool that automates certain components of the product evaluation process. More than half of the respondents were strongly supportive of this option (and preferred it over the current process). The other respondents did not express a preference (web-based or word document was acceptable for them).

The manufacturers offered the following comments as ITD evaluates new options to manage their QPL:

- Most state transportation agencies require product manufacturers to submit an application. While each agency may request slightly different information, the product manufacturers report that the information is essentially the same. It was suggested to have a single unified structure for the submission of product details across all state transportation agencies ("one form, one submission"). Note that this level of cross-agency coordination may be best managed at the federal level (see suggestions in Kasana *et al.* 2020).
- ITD should provide regular updates as to the progress of a manufacturer's product evaluation. This could include feedback such as estimated time to completion, which stage the evaluation is in, and other related information.
- If a web-based solution is adopted, the application should be supported on all major internet browsers. Some DOTs have forms that do not save properly or allow the efficient upload of technical documentation. Some states have extremely cumbersome product applications that

are difficult to fill out on an online form. Any web-based forms should be designed by keeping the type of information being collected in mind.

- The new system should be thoroughly tested and reviewed before “going live.” Invite representatives from manufacturers to be part of the system development and/or trial process.

2. Findings

The major findings of this report are organized into the following three sections:

- Summary of ITD-Requested New Features or Enhancements
- Survey results of other State Transportation Agencies QPL software management solutions
- Discussion of Software Update / Replacement options

ITD-Requested New Features or Enhancements

As the research team reviewed ITD's current QPL program, special attention was given to identify frustrations or opportunities to add functionality. While the following new or enhanced functionalities were identified by ITD, it should be noted that these are based on how the system operates as of "today." If, or when, ITD engages an entity to develop the new system, new (or even better ideas) may be identified.

1. **Add Alternate Reviewer Functionality**
   Product reviewers sometimes have periods of unavailability. The current system has buttons and instructions for the assignment of alternate reviewers, but they currently are not functional. The new system should allow the QPL Manager to assign other reviewers. This will reduce evaluation time or delays since each product would allow multiple reviewers in instances when the main product reviewer is unavailable or does not respond in a timely manner.

2. **Redefine "production restrictions" to "production information"**
   On the current "Status" page, relevant technical information for ITD staff is sometimes provided. In the current system, there are three text boxes on the status page. The first box is used for evaluator's notes and comments. The second text box is labeled "Product Restrictions" which becomes publicly accessible (see Figure 3). These restrictions are based on the analysis of the product reviewers. These product restrictions (and other guidance) should be utilized as an information window from the evaluator to the public (not just ITD staff). The new term should be something more encompassing such as "Product Information." The third text box is labeled "Reason for recommending disapproval." Information placed in it used when notifying manufacturers why their products were not approved. Note that it is important to continue having the "reason for recommending disapproval" box so that the QPL Administrator has an explanation should the manufacturer or others ask.

3. **Synchronization of QPL Catalog Numbers with Standard Specifications**
   QPL categories have always been assigned numbers corresponding to the section of ITD's Standard Specifications. Inconsistently, the QPL subcategories were assigned catalog numbers according to an estimator program with no mechanism to be kept current with the estimator catalog numbers. As categories are modified or new categories are added, the QPL

administrator changes the number assignments to the Standard Specification subcategory that provides material specifications for that type of product. ITD currently has a mix of the two numbering systems. Ideally, changes to the specification book would automatically update the QPL catalog numbering system. Substantial further analysis (beyond the scope of this project) is required to better understand the need for this functionality, and the cost versus benefit of such a feature.

4. **Recertify Products Annually**

   Currently, products are recertified every five years. It is suggested that products should be instead recertified annually. Changes happen in the business world too quickly to expect a 5-year recertification to be sufficient. Outdated information reduces the credibility of the program. If ITD instituted an automated annual requirement for recertification, there is a much better chance that the information would be accurate. If the products have not changed, then the product would be approved and would not require review by the evaluation team. The new software solution should allow for adjusted timeframes for recertification processes (1 year vs. 5 years). An additional enhancement would allow product manufacturers to update their contact information.

5. **Automated Recertification of Products**

   The QPL manager has to manually initiate and monitor the recertification process. The system should process recertifications automatically. Additionally, a dashboard that presents the following information would be helpful to the QPL Manager: 1) products that were recertificated, 2) products that should be "suspended" due to lack of response, and 3) products that were otherwise not recertified (and the reason). The current process for recertification is as follows:

   a. IT will send a list of products in the QPL to the QPL administrator.
   b. QPL manager will identify any products that have not been recertified in 5 years or more.
   c. QPL manager will manually generate an email to the manufacturers, requesting that they recertify their products.
   d. If the manufacturer does not respond, then the product is disapproved and the QPL is manually updated accordingly.

6. **Introduce a new "Product Suspended" status**

   Manufacturers must recertify their products every five years. In the current system, if a manufacturer does not respond to ITD's request to recertify, the product will be "Disapproved" with the reason for disapproval being "did not respond to recertification requests." Most often the reason the manufacturer does not respond is outdated contact information. A new "Product Suspended" status should be introduced while QPL staff manages the recertification process. This new status would identify that a product was removed because of lack of recertification, not that it no longer meets ITD's specifications.

Survey of Other State Transportation Authorities

The research team reached out to gain feedback from other State Transportation Agencies. Surveys and subsequent phone interviews were administered to identify any innovative solutions used by other agencies. The survey was sent to 39 different STAs, with 22 STAs responding (see Appendix 4: Survey of State Transportation Authoritiesfor a copy of the survey and Appendix 5 for the contact list). Not all agencies were surveyed due to lack of contact information posted on publicly available websites. Note that while the survey used the terms “APL” (approved product list) or “QPL” (qualified products list), this report exclusively uses the QPL term.

A majority of the STAs (16) contacted for this report have some sort of formal tracking tool for product lists. Agencies that do not have a tool reported that they have one under development, or just post a simple list of products on their website with no additional interactivity.

Nine of the respondents have a QPL program that has been in place for 10 years or more (see Figure 5). The most common solution implemented was a Microsoft Access database (or similar database tool), being used by six of the agencies. Adaptions of AASHTOWare Project SiteManager was the second most common solution and was adopted by four of the agencies. These two solutions were most commonly used for systems that have been in place for five years or longer. Newer solutions tend to be custom in-house software implementations. Ten of the current solutions were developed by in-house personnel, while the others were developed by external partners/software vendors.

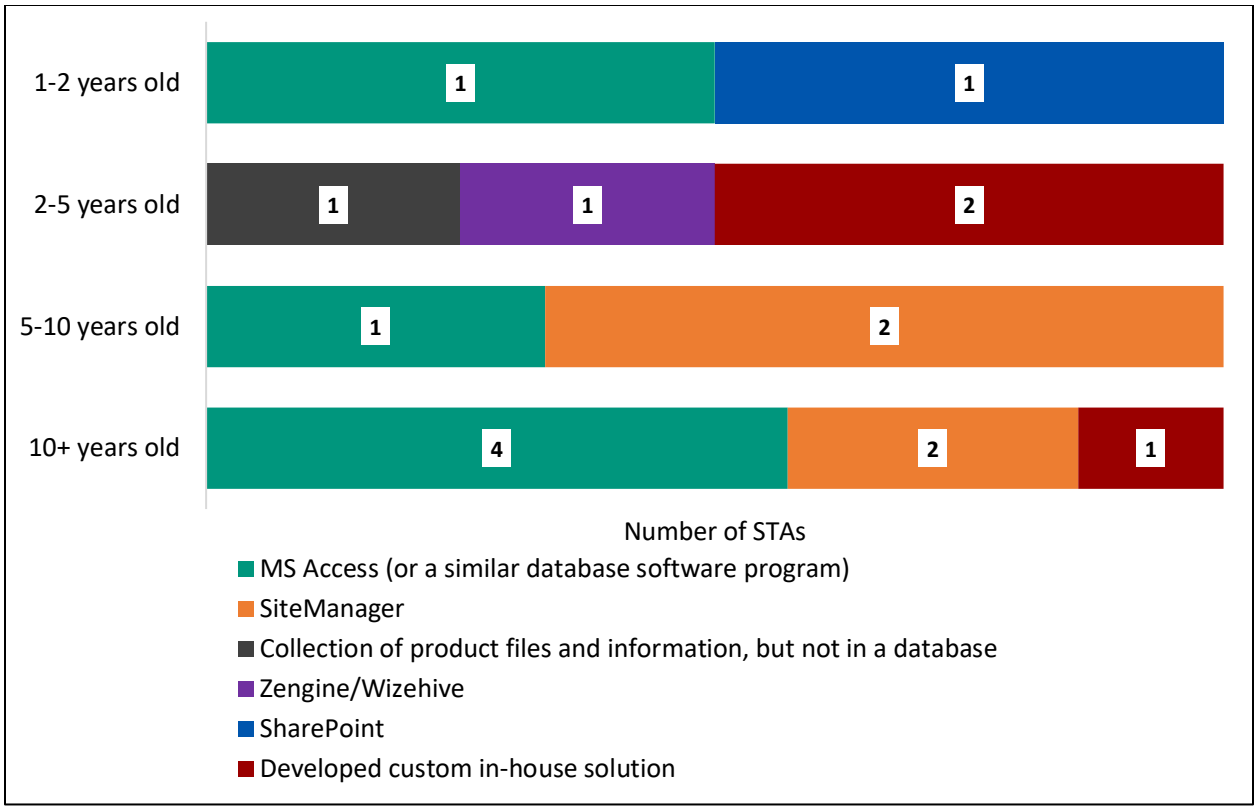


Figure 5 STAs' reported product lifecycle for different QPL solutions.

Respondents were also asked to rate their overall level of satisfaction with different QPL tools (see Table 1). In general, STAs with custom in-house solutions reported the highest levels of satisfaction, while users of SiteManager reported moderate levels of dissatisfaction. The research team further analyzed the reasons behind the satisfaction ratings, as summarized in Table 2.

Table 1 Satisfaction with Different QPL Management Tools

QPL Management Tool	Satisfaction Rating	# of STAs
Custom in-house solution	95%	3
SharePoint	86%	1
Collection of product files	86%	1
Zengine / Wizehive	86%	1
MS Access (or similar tool)	74%	6
SiteManager	68%	4

Table 2 Reasons for Satisfaction Ratings

High Satisfaction	Low Satisfaction
• Ability to convert manual processes to online or digital tools • Increase automation of tools and functionality • Enhanced accessibility for in-house or external users • Ability to provide a quality review or investigate applicant submittals • Efficiently create and develop status reports	• Need to create in house (custom built) reporting off the back-end database solution • Difficult-to-use administrative tools • Limited software functionality, such as limiting product names to 40 characters

Though not directly applicable to this project, STAs were also asked to report the number of Full-time Equivalent (FTEs) staffing levels who manage their agency's QPL (see Table 3). A previous study from 2019 shows similar levels of FTE allocations (Kasana et *al.* 2020). Note that there is one FTE assigned to manage ITD's QPL program.

Table 3 FTE Staffing for QPL Management

Less than 1 FTE	1 FTE	2 FTEs	3 or more FTEs
• Alaska • Connecticut • Florida • Rhode Island • Vermont	• Colorado • Idaho • Kentucky • Maine • Nevada • Oregon • Utah	• Arizona • Louisiana • North Carolina	• Minnesota • Tennessee

Software Update or Replacement Options

The research team conducted several detailed phone/Zoom interviews with STAs to better understand the options available for ITD's QPL software update/replacement. The interviewees were selected to ensure a representative sample of the available software implementation options. Representatives from the following STAs were interviewed: Alaska, Arizona, Connecticut, Delaware, Louisiana, and Wisconsin. Note that while each STA's implementation of their QPL program (supporting software, policies, overall management) is different, they are quite similar in goals and purpose: facilitate an effective review of software and provided a centralized resource for approved products. The research team identified four potential software update or replacement options:

1. Enhance or update the existing tool
2. Off-the-shelf software
3. Custom application integration with AASHTOWare SiteManager (or other AASHTOWare tools)
4. Automate the evaluation process and post a static approved product list

Option 1: Enhance or update the existing tool

SUMMARY: This approach would involve modifying the QPL program's core programmatic structure to be updated with the latest best practices and current technologies available. This option would enable QPL management workflow to remain mostly unchanged, with the addition of new or additional features. This option would require a complete rewrite of ITD's QPL core application as the current system cannot be supported any further. Additionally, Microsoft has stated that support for the Visual Basic 6 integrated development environment ended more than 14 years ago (on April 8, 2008; see https://docs.microsoft.com/en-us/previous-versions/visualstudio/visual-basic-6/visual-basic-6-support-policy). This option would largely maintain ITD's current QPL business processes (e.g., see Figure 1 and Appendix 1) and would add various enhancements and automated workflows, but would require writing an entirely new software program. These services could be provided by in-house staff or a third-party contractor.

STATE INTERVIEWED:

- Delaware

COST FACTORS: One of the most common reasons that STAs moved towards enhancing or updating their existing platform was the need to automate existing processes. Much like ITD, several agencies reported that they receive Excel files from product manufacturers. These files are manually processed by state technicians who manually send it to evaluators, coordinate the reviews, and provide status updates to the manufacturer. Thus, the primary cost factor to update the existing processes is a "cost versus benefits" analysis: what is the cost of state resources (i.e., hours) versus the fees to hire a software vendor to automate certain aspects of QPL management? This option for ITD would require full-time resource(s) to develop the new program.

KEY CONSIDERATIONS:

- One of the biggest drawbacks of this approach is accurately specifying what needs to be done, especially for STAs that will be utilizing in-house resources to complete the updates. Demonstrations of other similar functional QPL tools was noted to be particularly helpful. ITD and other state personnel would need to be dedicated to developing the system, capturing all key processes, requirements, and procedures.
- Updating the existing tools will likely leave the current approval workflows as is. While there are certainly advantages to this approach (i.e., time savings of not having to relearn processes), updating the current structure may continuing propagating inefficiencies in the system.

- Custom in-house solutions will likely require internal server resources to be maintained by the STA. Several states noted that these internally hosted server requirements were risky (as the state has to bear the responsibility of maintaining security, patches, updates, etc.).
- While specific estimates are not available, the time required to complete a total rewrite of the program could be substantial, depending on the level of resource allocation and clarity of required developments.

Option 2: Purchase off-the-shelf software

SUMMARY: This option involves purchasing a solution that is primarily ready to go "out of the box," meaning that implementation should require minimal modifications specific to ITD's QPL management environment. While some customizations were required to meet the unique needs of each STA, the core functional elements of each application were unchanged and appears to meet ITD's needs. *Note:* Alaska's tool (eQPL) appears to have been initially a custom application but is potentially available as an off-the-shelf solution. The off-the-shelf solutions were not hosted on the State's internal IT infrastructure. Certain parts of the workflow, especially the product review and manufacturer notifications, can be automated.

STATES INTERVIEWED

- Alaska (eQPL including full product review and product posting)
- Arizona (only product review via Zengine/WizeHive)

COST FACTORS: There are three primary cost factors with an off-the-shelf solution: 1) data conversion and migration, 2) implementation or customization, and 3) monthly service fees. Some state agencies reported that data conversion costs approximately $50K, or more. Note that these costs were estimates by the interviewees and are highly dependent on the unique needs of ITD. These values should not be used for budgetary purposes.

KEY CONSIDERATIONS:

- The general expectation is that ITD's internal processes, rules, requirements, and workflows will be modified according to the purchased system's requirements. This may include a myriad of changes including new terminology or nomenclature, graphical user interfaces, revised forms, etc. The product applications may need some basic updating, but ITD would be able to still collect the same product information as it does now on its current product applications.
- Migrating existing practices will require substantial user training. It is ideal to implement the changes gradually over a period of time, monitor adoption of the new system, collect feedback, and evaluate performance metrics. The research team's white papers on organizational change ("5 Essential Strategies for Successfully Implementing Organizational

Change in the Construction, Architecture, and Engineering Industries" 2020) and IT Project Delivery ("IT Project Delivery: Is It Really So Tough?" 2021) offers additional insights.
- A committee of personnel from QPL, IT, and other relevant groups would be needed to provide technical insights on the implemented solution.

RECOMMENDATIONS FROM OTHER STAs:

- This option allows STAs to benefit from the standardization that comes with an off-the-shelf system that is not new to market and that other STAs have successfully implemented.
- The software landscape is changing incredibly fast, which makes it difficult to for transportation agencies to keep current on the latest trends and best practices. Vendor-managed solutions would allow ITD to stay current with software advancements / updates / patches as these are coordinated by the vendor.
- STAs should focus on their core expertise and have limited involvement in technical software development. User preferences and resistance to change may drive some towards customizing the software, but that is typically costly and unnecessary to execute the core process/intent of the system.

Option 3: Develop a custom application integration with AASHTOWare SiteManager

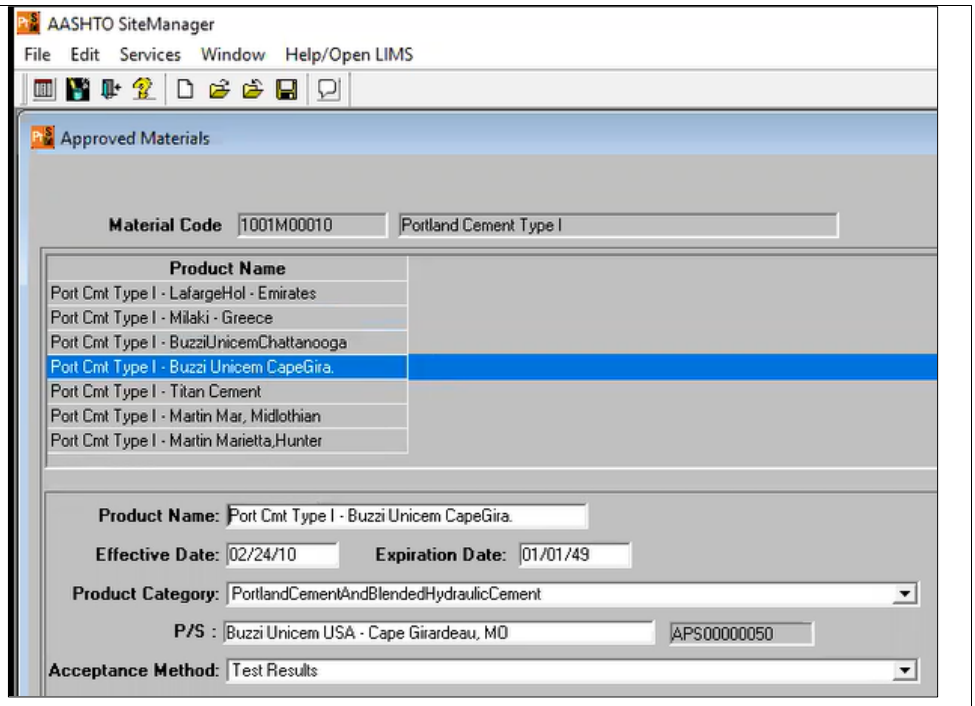
SUMMARY: The AASHTOWare platform offers some excellent features, especially for construction management. Key functionality includes contract records, contract administration, vendor payment, and materials management (see https://www.aashtowareproject.org/smr). While the survey respondents and interviewees were complementary of AASHTOWare's broad enterprise capabilities, many expressed concerns specific to QPL management requirements for overall product evaluation. The primary benefit of developing a software application with SiteManager (or other AASHTOWare products) is that it would allow a tighter integration with the State's other non-QPL management activities that already use AASHTOWare products. A significant drawback, as identified by several states, is the high level of technical complexity in (and resources required to) developing an integrated QPL program. It was identified that AASHTOWare tools are not designed to manage QPLs. Workflow automation (e.g., review management or product manufacturer) is possible, but is extremely cumbersome to implement given the technical challenges already present in developing an integration with SiteManager.

STATE INTERVIEWED:

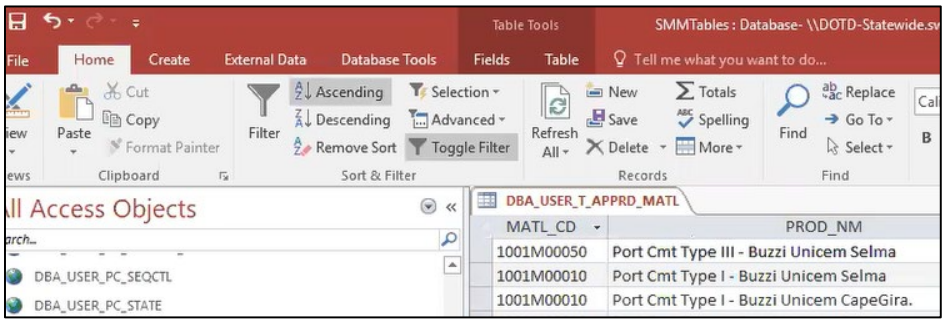
- Louisiana
- Wisconsin

COST FACTORS: The implementation of SiteManager for QPL management requires the development of a custom application that integrates into the owner's enterprise implementation of AASHTOWare. For example, Figure 6 shows a State's AASHTOWare SiteManager and the intermediate MS Access application that provides connectivity to the state's AASHTOWare oracle database. The custom MS

Access interface had to be developed to enable the state's integration with its overall implementation of SiteManager. While specific cost factors are not available, typical fees may include scoping, development, data migration, user training, and follow-on support and updates.



AASHTO SiteManager user interface



MS Access interface (linked to an Oracle database)

Figure 6 MS Access tool connect to an Oracle database and the AASHTOWare database

KEY CONSIDERATIONS:

- Louisiana (and other agencies) has a full-time programmer to manage the AASHTOWare application interface (including QPL / materials management). While some agencies have investigated using SiteManager for QPL management, the cost and technical challenges were significant.
- Changes to the AASHTOWare application could potentially require additional changes to the QPL custom application.
- Several STAs identified frustrations with the time, cost, and overall technical complexity of integrating with SiteManager. Development of a robust custom application has had limited sustained success at other STAs.
- AASHTOWare has no integrated process for automating product submittal / categorization / evaluation / approval routines (a key necessary functionality for ITD).

RECOMMENDATIONS FROM OTHER STAs:

- While there was at some point in the past an interest in developing a dedicated QPL tool for AASHTOWare, development has slowed or ended altogether.
- If an agency will be seeking to integrate their QPL management with AASHTOWare, it is important to have full staff commitment to make the project successful.

Option 4: Automate the evaluation process and post a static approved product list

SUMMARY: This option is a special use case of Option 1 and 2, wherein the STA automates the submission and evaluation of the products, but a static QPL (a PDF or Excel file) is posted to a public-facing website. Users do not have any ability to interact with or sort the posted QPL, other than what is provided in the native file format (i.e., Find and Search tool). Figure 7 shows Arizona's product application interface via WizeHive where manufacturers would submit products for review. Much like ITD, the state QPL Manager would then assign product reviewers would then review a product (all through the WizeHive interface). If a product is approved, the QPL Manager would add the product to a central MS Excel (or similar) file. The updated list is exported to a PDF file and posted to a website on a periodic basis (see Figure 8). Note that this approach automates almost all of the review management process, but almost none of the product management.

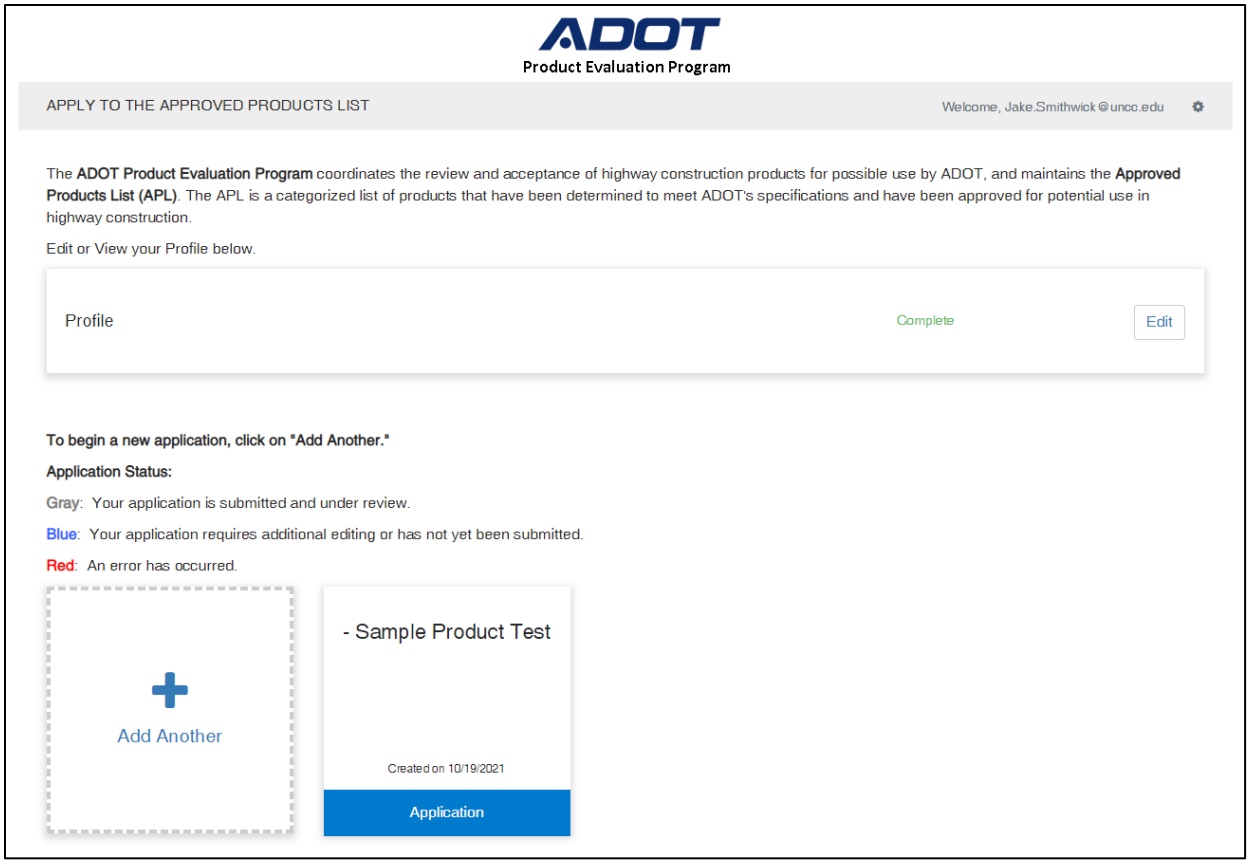
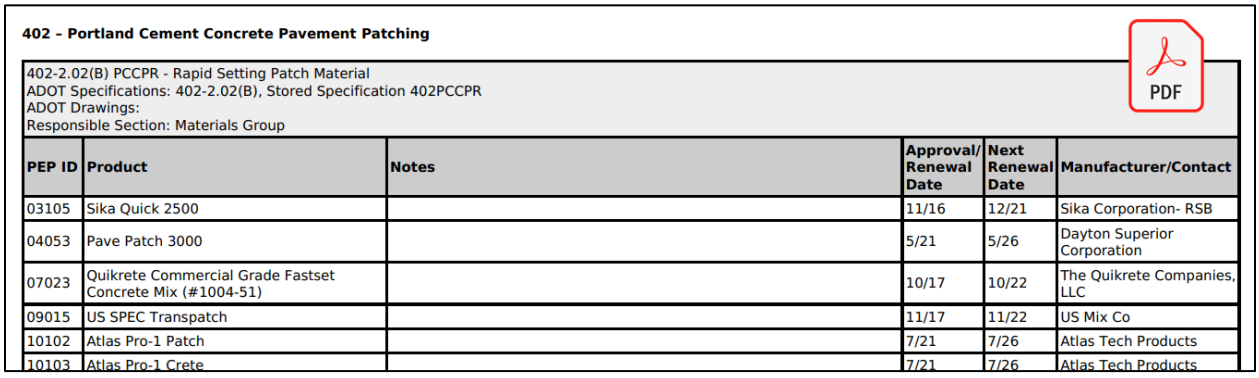


Figure 7 Arizona's product review dashboard



402 - Portland Cement Concrete Pavement Patching

PDF

402-2.02(B) PCCPR - Rapid Setting Patch Material
ADOT Specifications: 402-2.02(B), Stored Specification 402PCCPR
ADOT Drawings:
Responsible Section: Materials Group

PEP ID	Product	Notes	Approval/ Renewal Date	Next Renewal Date	Manufacturer/Contact
03105	Sika Quick 2500		11/16	12/21	Sika Corporation- RSB
04053	Pave Patch 3000		5/21	5/26	Dayton Superior Corporation
07023	Quikrete Commercial Grade Fastset Concrete Mix (#1004-51)		10/17	10/22	The Quikrete Companies, LLC
09015	US SPEC Transpatch		11/17	11/22	US Mix Co
10102	Atlas Pro-1 Patch		7/21	7/26	Atlas Tech Products
10103	Atlas Pro-1 Crete		7/21	7/26	Atlas Tech Products

Figure 8 Static list of approved products

STATES INTERVIEWED:

- Arizona
- Connecticut

COST FACTORS: The primary cost consideration with this approach is evaluating ITD's internal needs for an interactive product listing tool. If the ability to have an online interactive product list (e.g., searchable, sortable, etc.) is important to ITD, this option in its current form would not be viable. The upfront development work required to enable automated product application review is straightforward (or nearly complete if adapting Arizona's implementation of WizeHive). However, the potential increase in staff time and the cost associated with managing post-approval products / questions / user experience may be substantial.

KEY CONSIDERATIONS:

- Several states commented on the need to evaluate the time required to automate the entire (or most of) QPL workflow versus the effort of just posting a static list of approved products. Some STAs noted that the amount of time required to automate (program) their QPL would outweigh the benefits it would bring.
- A challenge with automating the reviews is the level of assurance that may be required for different types of products. Some products required the submission of different technical items (i.e., lab tests) while others do not. The variety of technical requirements made review automation challenging.
- On the other hand, some STAs approach product review as a much more simplistic process – the manufacturers should submit whatever information they feel is necessary upfront as part of their application to enable the owner to successfully evaluate their product. Figure 9 shows an online application of a simplified initial submittal. Other demographic details are also collected (company address, name, email, phone number, etc.). While this form does not explicitly identify the submission requirements for every technical product evaluation, it does not preclude the owner from requesting additional information from the product manufacturers.

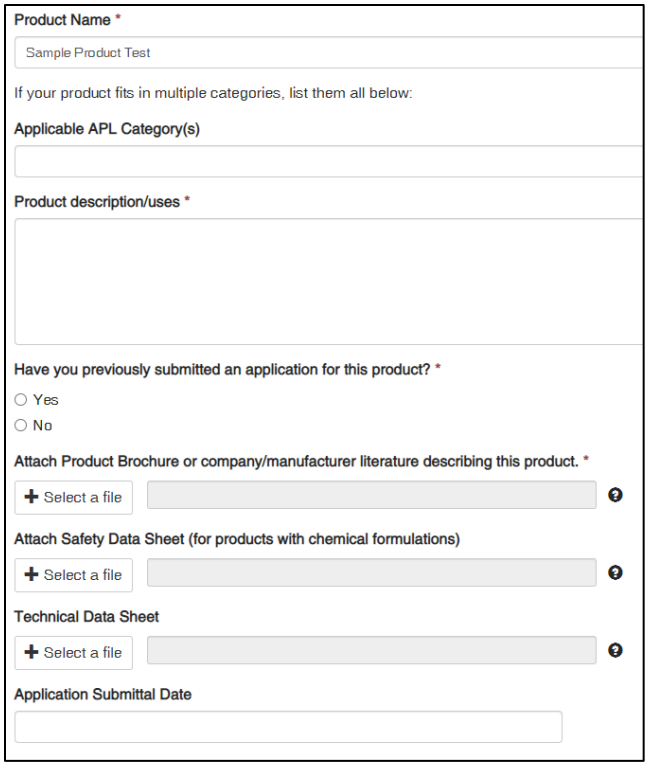


Figure 9 Simplified Initial product application form

Procurement Analysis of QPL Software Purchase Options

Unless ITD selects a fully in-house solution for its software update / replacement project, a formal procurement or purchasing process may be required. This section focuses on recommendation for executing a successful software procurement process, should it be necessary. Software procurement can be extremely challenging, as research has identified that only 20 percent of software implementations are considered a success (Kappelman, McKeeman, and Zhang 2006). Failures can be attributed to poor scoping, inadequate procurement processes, or failure to address change management and adoption requirements.

Purchase Options

If ITD is required to engage in a formal procurement process (i.e., hire a third-party contractor or purchases a software solution), the following section describes some key considerations. An important factor for this approach is to use a procurement process that leverages the industry's expertise. This chapter will focus on these practices within the context of Idaho's procurement law.

Idaho Code

Idaho Administrative Code (IDAPA 38.05.01) allows agencies to use formal solicitations processes that do not require the award to the lowest bidder. This includes a "Request for Proposal" (RFP) solicitation or a "Invitation to Negotiation" (ITN) solicitation.

RFP vs ITN Solicitations

The RFP approach provides flexibility to award to the overall best value, but scope cannot be changed or negotiated prior to award. The ITN approach is similar to the RFP approach, but it also provides the ability to negotiate areas of the scope (so exact scope can be adjusted prior to award). The ITN process is very rarely used (compared to the RFP), so this section of the report will focus more on the RFP approach. Both solicitations require involvement and oversight by the Division of Purchasing (DOP).

Avoid Scoping Mistakes

The RFP approach will provide ITD with the opportunity to partner with a higher-quality solution provider (compared to the traditional lowest-priced award process). However, many RFP solicitations can still result in failure. One of the most frequently overlooked components of an IT RFP is the Statement of Work (SOW). Preparing the SOW is the first critical activity for a successful implementation. The statement of work defines what "success looks like." This includes identifying the goals, objectives, critical requirements, current or existing conditions, and unique conditions. Although many owners will hire a third-party consultant to perform this scoping activity (that is frequently not hired through a competitive RFP process), it is not strongly correlated to project success. This is due to the rapid changes in the IT environment and the fact that many consultants are not aware of all the potential options or opportunities on the market. Some consultants will simply cut-and-paste a SOW from a previous project, without even knowing if the project was successful. This common mistake can result in a SOW that is inaccurate, lacks 'best-in-breed' technology, and will also cost ITD more money and time (that is spent on hiring the consultant).

A better way to develop the SOW will be to perform most of this internally. Once a draft scope has been prepared, ITD should issue an informal Request for Information (RFI) to the software community to inform them about the upcoming project, and also to schedule a one hour discussion session (see Figure 10). This session will be used to review the existing SOW and identify if there are any gaps and items that the software vendors will need in the future RFP. This approach will provide ITD with the most optimal content that must be included in the SOW for the solicitation.

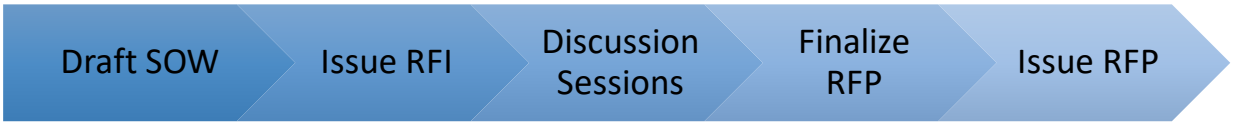


Figure 10 Effective RFI process leads to a better RFP

RFP Approach

Once the statement of work has been prepared, ITD will need to execute the RFP. This commonly includes activities such as:

- □ Preparing a project schedule
- □ Hosting a pre-proposal presentation for software vendors/developers
- □ Establishing an evaluation committee
- □ Educating and training the evaluation committee
- □ Preparing evaluation instructions and forms
- □ Identifying the evaluation criteria & weights
- □ Identifying the interview strategy (what positions to interview, what questions to ask)
- □ Identifying the demo strategy (demo script, who can run demo, etc.)

Along with these common RFP activities, it is also important to set an overall structure that:

1. Attracts the 'best' software vendors to ITD's RFP
2. Encourages vendors to assign their most qualified individuals to the RFP
3. Provides the best opportunity to give the greatest advantage to the best people.

Although these three tasks appear to be simple, they can be difficult for clients (or procurement buyers) that do not have an extensive history with successfully delivering complex IT procurements.

Technology Automation Synthesis and System Requirements

This chapter summarizes the workflow processes, and specifically escribing how each major workflow can be automated. Table 4 presents the major workflows in ITD's current QPL management, along with an assessment of the ability to automate and implement each workflow. Following the table is discussion of key considerations for each workflow.

Table 4 Product Alignment Matrix

Workflow Process	Automation Ability	Implementation Feasibility
Online product application process	Full	High
Primary reviewer (PRT) assignment	Partial	High
Alternate reviewer assignment	Limited	High
Annual recertification of products	N/A (policy change)	Medium
Automated recertification and notification of product manufacturers	Partial	Medium
Add “product suspended” category	Full	High
Add “product information” category	Full	High
Connect product subcategories in the QPL to specification book	Limited	Low
User access management (e.g., account creation, password management)	Full	Medium
Public-facing product information	Full	Full
Provide post-installation product feedback (after construction	Limited	Medium

Key Considerations for Workflow Automation

This section provides discussion points to enable ITD to evaluate automation of certain components of its process. Only the logical points of automation are discussed, as not everything in the current QPL process needs to be automated (for example: automated prescreening of technical review material should not be automated – the technology available to do this is not ready for practical implementation).

Online Product Application Process

- Automating this workflow will allow for a significantly higher level of consistency in data quality. For example, ITD can set requirements for the type of data that must be submitted with the application (or the manufacturer cannot submit).
- The data from the product applications can also be parsed and integrated into the QPL database (see), thereby minimizing staff time and errors in transferring the information.
- This process is focused on the submission of new applications. Product recertification of existing product lines would be managed through a separate process. Other STAs (for example Arizona) have usernames and password for each system user, including product

manufacturers. The product application on the review website also provides contact information for the manufacturer.

- Industry best practices regarding security should be adhered to for developing this functionality.

Primary reviewer (PRT) assignment

- The assignment of reviewers can be partially automated, in the sense that product applications will identify the broad category for which they are a part of. However, the QPL program administrator will need to exercise professional judgment in making final reviewer requests contingent upon any unique features of the product to be evaluated.
- It is recommended for ITD to consider developing a simple dashboard of reviewer "load," showing metrics like the number of reviews or evaluations currently in progress, number of reviews completed, time to review, etc.

Alternate reviewer assignment

- While similar in function to the assignment of primary reviewers, the use of alternate reviewers will need to consider their current time constraints and expertise. For this reason, it is likely that the QPL administrator will need to carefully review how the alternates are selected should the need arise.

Annual recertification of products

- It is anticipated that annual recertification of products will increase the accuracy of manufacturer contact information and applicability of technical product details for ITD.
- There is no "automation" component the shift to annual recertification (away from the current 5 year review) but is instead a policy shift. Considerations should be given to notifying product manufacturers and how the policy will be implemented (e.g., does it apply to all manufacturers across the board, or will ITD implement the requirements as manufacturers come up for recertification).

Automated recertification and notification of product manufacturers

- It is anticipated that automating components of this workflow will reduce ITD staff management time. The primary aspects of automation include:
    - Emailing product manufacturers reminders to recertify their products.

- Tracking of which manufacturers have recertified.
- Updating relevant non-technical product details such as product names, contact information, availability, etc. Changes made would automatically propagate to the QPL database. Note that technical changes to product performance or characteristics would likely trigger a technical review by the PRT. It is recommended for ITD to establish policies on what technical evaluations would be undertaken in the recertification process.
- Providing status updates to manufacturers as to their product review progress.

- Other components of the recertification process cannot be automated, such as dealing with missing / bad contact information (e.g., bounced emails). The QPL administrator would need to make a phone call or otherwise investigate.

Add "product suspended" category

- As previously discussed, adding a new "product suspended" category would allow ITD to add granularity when a product, for one reason or another, has not been disqualified but is not currently approved for use. Assignment of this product status could be automated in certain conditions, such as the manufacturer not responding to recertification requests.

Add "product information" category

- As previously discussed, adding a new "product information" category would allow ITD to provide additional detail with regard to a product that is for public view. Implementing this feature is simply an additional text field along with the ability to load product brochures for products being evaluated. The current process only allows for text and makes the process cumbersome for evaluators.

Connect product subcategories in the QPL to specification book

- The intent behind this workflow is to create a stronger relationship between the QPL and ITD's spec book. Integration of seemingly disparate technology is difficult, as the nomenclature, technical processes, and workflow need to be clearly understood. The technical scope and exact details of this functionality need to be well understood prior to rolling out this functionality.

User access management

- Different stakeholders will interface with the future ITD QPL program. Some of these stakeholders include:

    - QPL Manager – manages product reviews, engages with industry partners, and ensures public (ITD staff) access to and visibility of QPL
    - Product Evaluators – provide technical product reviews including ratings, comments, and any usage restrictions (if applicable)
    - Product manufacturers – submit new product applications; recertify products including maintaining accurate contact information for ITD
- The creation of this user access system will eliminate the need to manually create user accounts but will likely introduce additional oversite tasks such as resetting passwords when manufacturers have changes in sales personnel, providing tutorials on system access, and other troubleshooting assistance.

Public-facing product information

- While ITD also has a public-facing website of its QPL (see https://apps.itd.idaho.gov/apps/materials/qpl.aspx), this will also be a feature of the new system.
- The new system should reflect in real time any updates or changes made to the QPL Database. While some state agencies only provided a static list of approved products, ITD and other similar agencies have expressed the preference to have a system that is searchable and dynamic.

Provide post-installation product feedback

- Many state agencies expressed concerns that they have limited information about how well products perform in-field. A functionality that solicits and memorializes a product's performance in-field would be highly beneficial other QPL users.
- The ability to automate the collection of product post-installation feedback would likely be quite challenging, as there would need to be a linkage between the QPL and the installation of these products. While some STAs stated AASHTOWare could provide this functionality, it was primarily focused on financial data. A better approach may be to allocate staff time to follow up with construction or maintenance engineers directly to solicit their feedback.

Technical Recommendations

Though it is beyond the scope of this report to provide a detailed discussion of the specific technical needs and specifications for the QPL software replacement / enhancement project the following recommendations should be considered:

- Most of the state agencies interviewed preferred a cloud-based (externally hosted) software solution, either fully customized or "off the shelf." The primary benefit to this approach is that is mitigates the state's internal need to provide personnel and technical resources, while also enhancing cybersecurity preparedness (in general the third-party entity would likely coordinate mitigation of these risks).
- Data Storage and Management:
    - Encryption – the system should encrypt or eliminate storage of any sensitive inactive data including personnel details, credit card info, proprietary production information, etc.
    - Monitor – the system should monitor and log sensitive data access – logs should include IP, time, data accessed, user account
- Application Programming Interfaces (API); if applicable
    - Use an API Firewall
    - Encryption – the system should encrypt any data being actively transmitted between systems or system to users.
    - Ensure that all critical and important operating system and software security patches are installed in a timely manner on a regular schedule or in the case of a 0-day exploit, as soon as possible.
    - Data validation – check for and remove any extra user generated content and check size of incoming data. Large data transfer indicates a hack is happening and the system should reject and log larger than normal requests.
    - Data throttling/quotas – the system should protect itself from distributed denial-of-service attacks and un-authorized data downloading, etc. by throttling data thru put and imposing data quotas.
- The EU General Data Protection Regulation related to data protection and privacy in the European Union and the European Economic Area. While not likely applicable to ITD and its efforts on this specific project, consideration should be given to any international relationships for manufacturers. A full legal review should be considered in the full procurement process.
- When using a cloud (third party) for hosting software, the data will also be hosted with this third party. Consideration should be given during detailed planning for the procurement contract negotiations in the next phase. Specifically, rules relating to ITD's requirements to ensure compliance with federal policies (i.e., Federal Information Security Management Act) should be evaluated as the system is developed. Data retention policies in accordance with the State of Idaho's requirements should also be considered (i.e., see Idaho Statues 50-907 Classification and Retention of Municipal Records).

Recommended System Requirements

If ITD decides to issue an RFP for the purchase of a new system, the following requirements should be considered for inclusion.

Functional Requirements

- Product database that includes:
    - Products categorized/sub-categorized by type
    - Product evaluations result in one of the following statuses:
        - Approved
        - Provisionally Approved
        - Disapproved
        - Request more information
    - Search functions:
        - Category
        - Manufacturer
        - Product Name
        - Externally facing Website
- Product review, including the ability for the QPL Manager to (see "Product Review Process" section of Figure 1):
    - Electronically review product applications and provide updates / revisions to the product application
    - Assignment reviews
    - Submit reviews and recommendations
    - Incorporate reviewer feedback to the QPL Database
- Product recertification process, including:
    - Identification of products needing recertification
    - QPL Database updates based on results of recertification
- Interfaces and processes similar to those as described in Appendix 1.

QPL Program Enhancements

The following items have been requested by ITD staff to be enhanced or updated (as compared to the current QPL process). NOTE: these items are based on how the program currently operates. The contractor may have better suggestions as to how to implement the requested functionality and may also be able to provide insights as to the technical feasibility of each idea.

- Add the ability to assign alternate reviewers
- Add additional product reviews
- Provide additional information about product details
- Provide reasons as to why products were not approved
- Synchronize QPL Catalog Numbers with ITD's Standard Specifications
- Modify the QPL program to recertify all products annually
- Enable products to be recertified automatically (with limited or no procedural involved from the QPL Manager)
- Introduce a new "Product Suspended" status

3. Conclusions and Recommendations

The ITD QPL provides an avenue for manufacturers to submit proprietary products for evaluation, and if successful, receive approval to be listed for use on ITD projects. The current software application used to support the administration of the QPL was developed in-house in the 1990s and was written in the VisualBasic 6 programming language. Microsoft has stated that support for the Visual Basic 6 integrated development environment ended more than 14 years ago. More broadly, support and management of the current software program are extremely labor intensive and adds unnecessary burden to the State's overall ability to deliver an effective QPL program.

The objectives of this research project were to evaluate ITD's current QPL management tool and to identify software update or replacement options. The research team evaluated ITD's current QPL structure and processes, conducted surveys of stakeholders (internal staff and product manufacturers), summarized new features or system enhancements, and evaluated practices at other State Transportation Agencies (STAs).

Four potential software replacement options were identified, namely: enhancing or updating ITD's existing tool, purchasing off-the-shelf software, developing a custom application integration with AASHTOWare, and automating the evaluation process and posting a static (limited interactivity) approved product list. All options presented could meet ITD's needs, whether they are an off-the-shelf solution, a completely custom-built solution, or somewhere in between. In discussion with ITD and other STAs, the most feasible option appears to be limited customization of an off-the-shelf software solution. This approach would allow ITD to make some adjustments of the purchase software to meet its own unique business processes while also reducing total software development time by utilizing the software's core functionality.

Regardless of how ITD proceeds, a clear strategy should be developed for the next phase. If ITD opts to seek an external contractor to replace the QPL program, it is strongly recommended that the procurement process allow the proposers to suggest any solution that best meets the State's needs. ITD should clearly communicate to their potential industry partners of their sincere interest in soliciting the best ideas and solutions to update or replace ITD's QPL program. Proposers should explain how their solution will meet the State's needs, where it has been used successfully, and what potential challenges may occur in implementing their proposed solution (and how they will overcome these challenges).

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Appendix 1: QPL Program Workflow Overview

This user guide includes screenshots and general step-by-step directions on how to use the QPL Software tool.

Entering Application Data and Evaluations

1. Manufacturer submit an email to QPL Manager with various PDF files and related attachments
    a. The applicant fills out word document by hand
2. QPL Administrator manually inputs the application into the system
    a. Click on to data entry (see Figure 11 Data Entry Module).

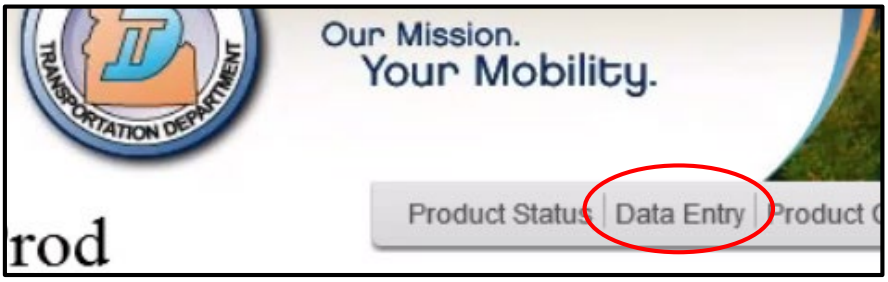


Figure 11 Data entry module

    b. Select manufacturer
        i. Create new manufacturer if the manufacturer is not listed
        ii. Select “New Product” in the “Active” products box (see Figure 12). This process associates the new product with a manufacturer.

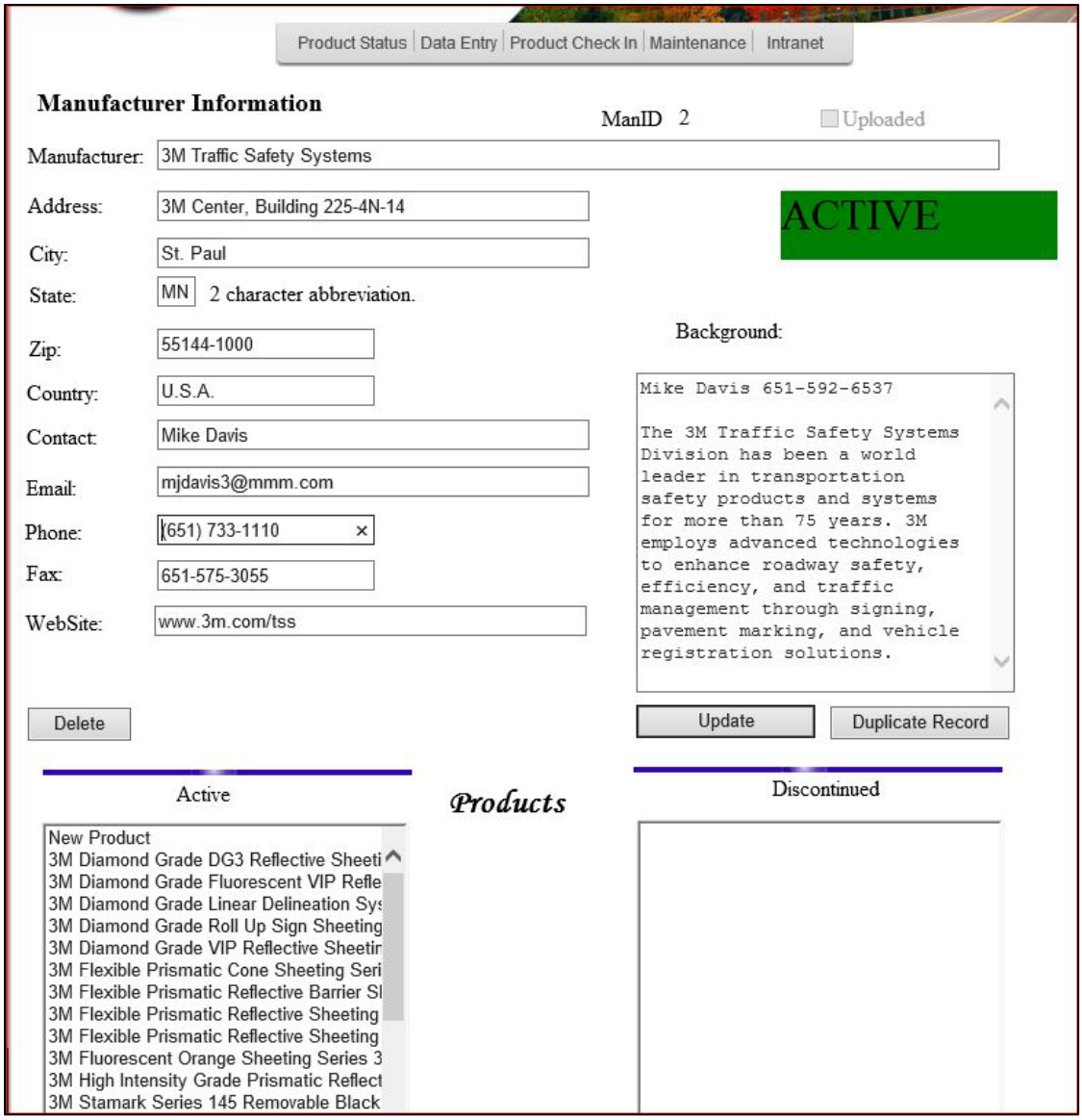


Figure 12 New production selection

c. Once added, the product is automatically associated with a manufacturer.

d. Enter product information (see Figure 13 Data Entry Screen) (copy/paste)

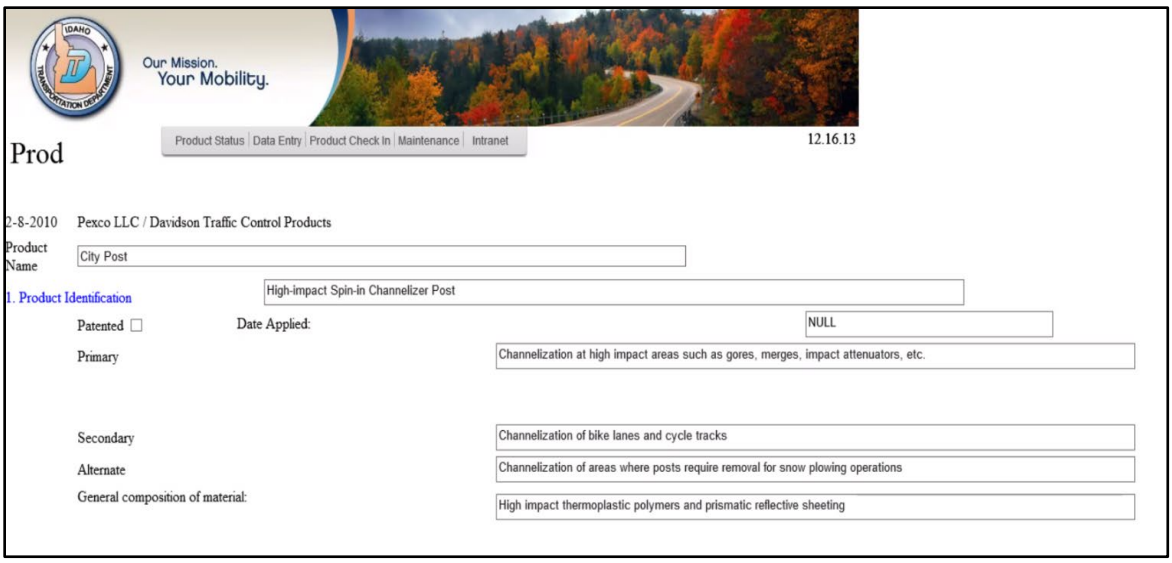


Figure 13 Data entry screen

e. Choose a category and then a subcategory for the product (see Figure 14 Category Selection). Category selections are based on standard specifications.

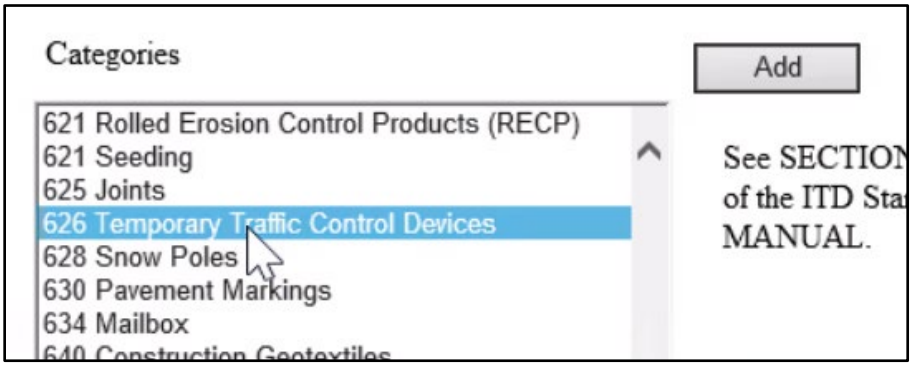


Figure 14 Category selection

i. **"626"** corresponds to the specification for that product
ii. Selecting the product categories assigned to the product generates an evaluation request which is sent to the evaluator.
    1. This is automatically generated
    2. Evaluators are assigned based on the category assignment selected in Maintenance/QPL Members
iii. Once the product is categorized, the program creates a product file on the server.
    1. QPL Administrator manually copies all of the supporting documentation (application and pdfs sent in the email) into the product file on the server. These documents are automatically shown as hyperlinks when

the Product Evaluators open the system to complete their evaluation (see Figure 15).

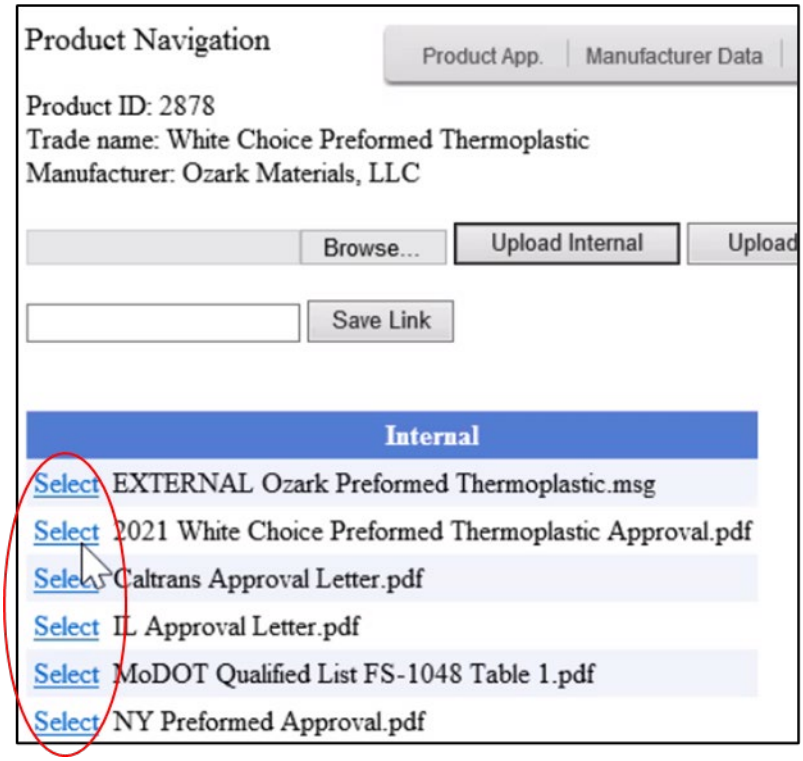


Figure 15 Links created for files on the server

f. Notes can be added to the Product information page (see Figure 16). The QPL Manager uses this to track product milestones and correspondence with the manufacturer.

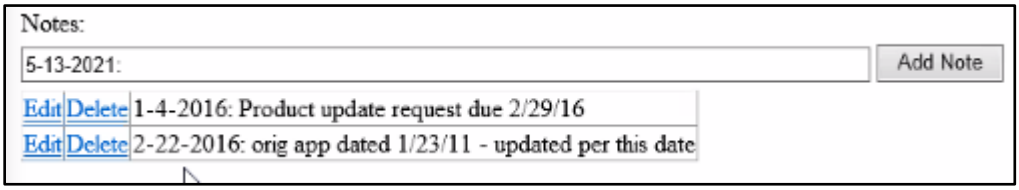


Figure 16 Notes added to a product application

i. After adding a note, then QPL Manager would update the "Date Sub." date on the Product information page to show that the 5 year recertification of that product was completed. (See product recertification process)

ii. The product brochures and technical information are saved in the product file on the server. See Figures Figure 15 and Figure 17.

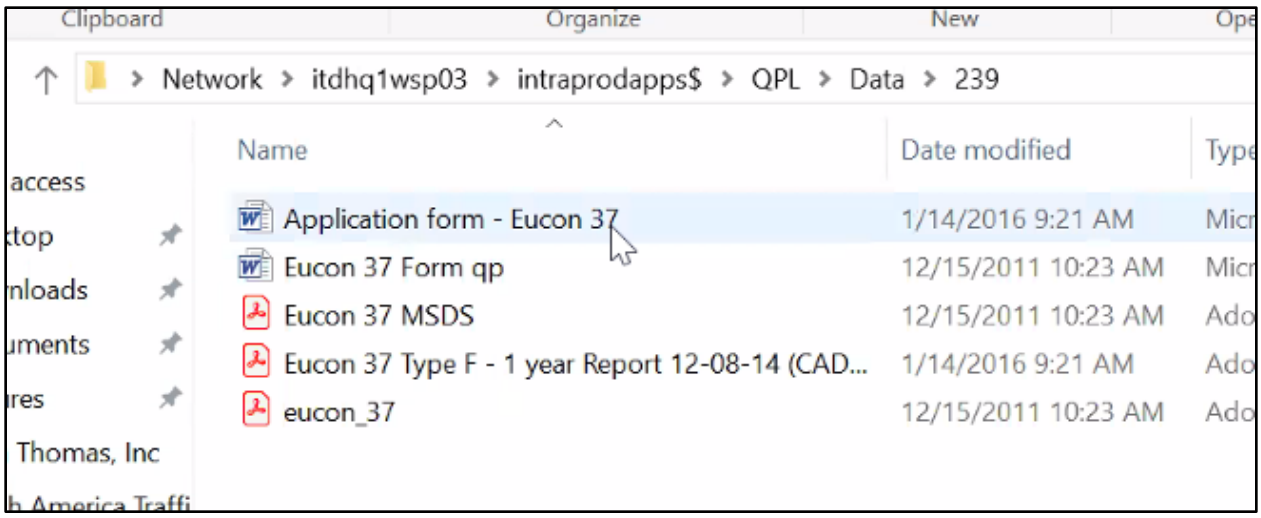


Figure 17 Updating files on the server

g. Once categories are assigned, the system sends an email to evaluators instruction them to complete their evaluation (see Figure 18). Evaluators are preassigned to product categories based on their area of expertise.

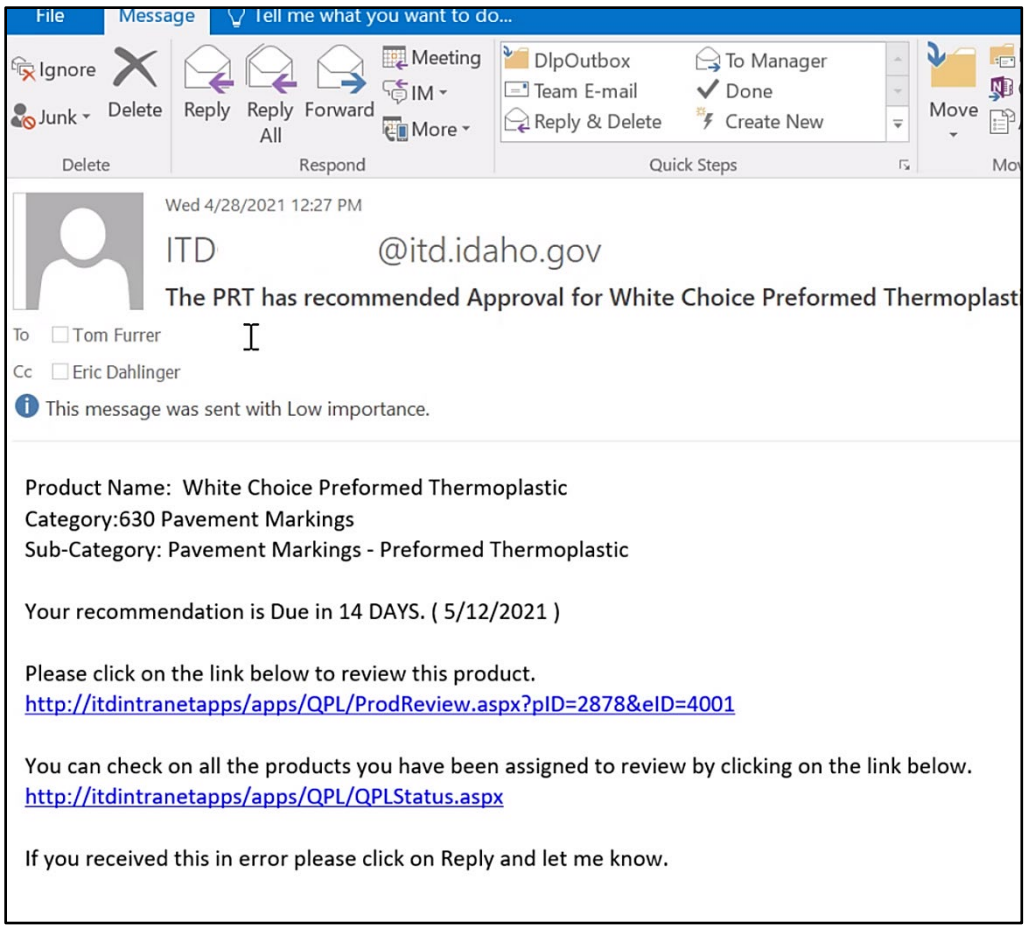


Figure 18 Screenshot of evaluator request email notification.

h. Status tab is where the evaluator does their work. See Figure 19.

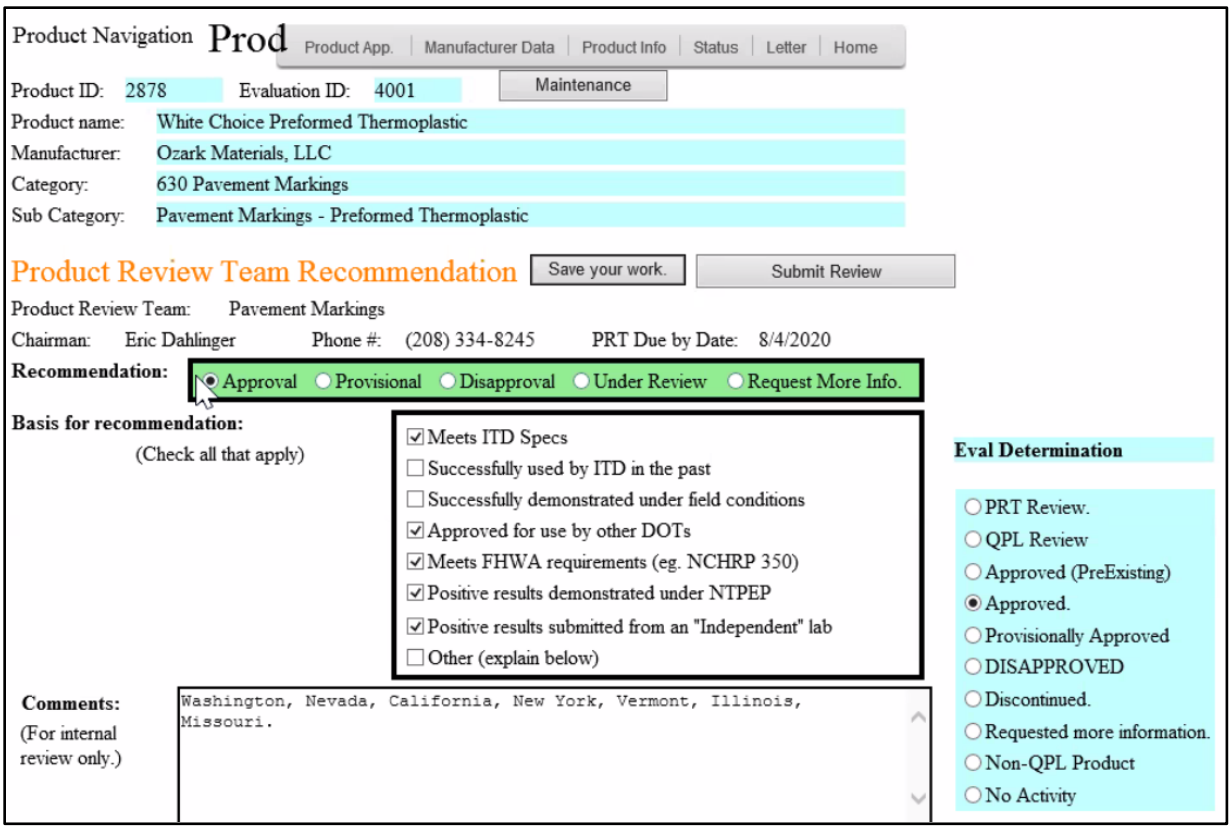


Figure 19 Evaluation completion form.

i. The “recommendation” boxes change colors based on the evaluator’s determination.
ii. The evaluator provides comments, any restriction, or any reasons for recommending disapproval.

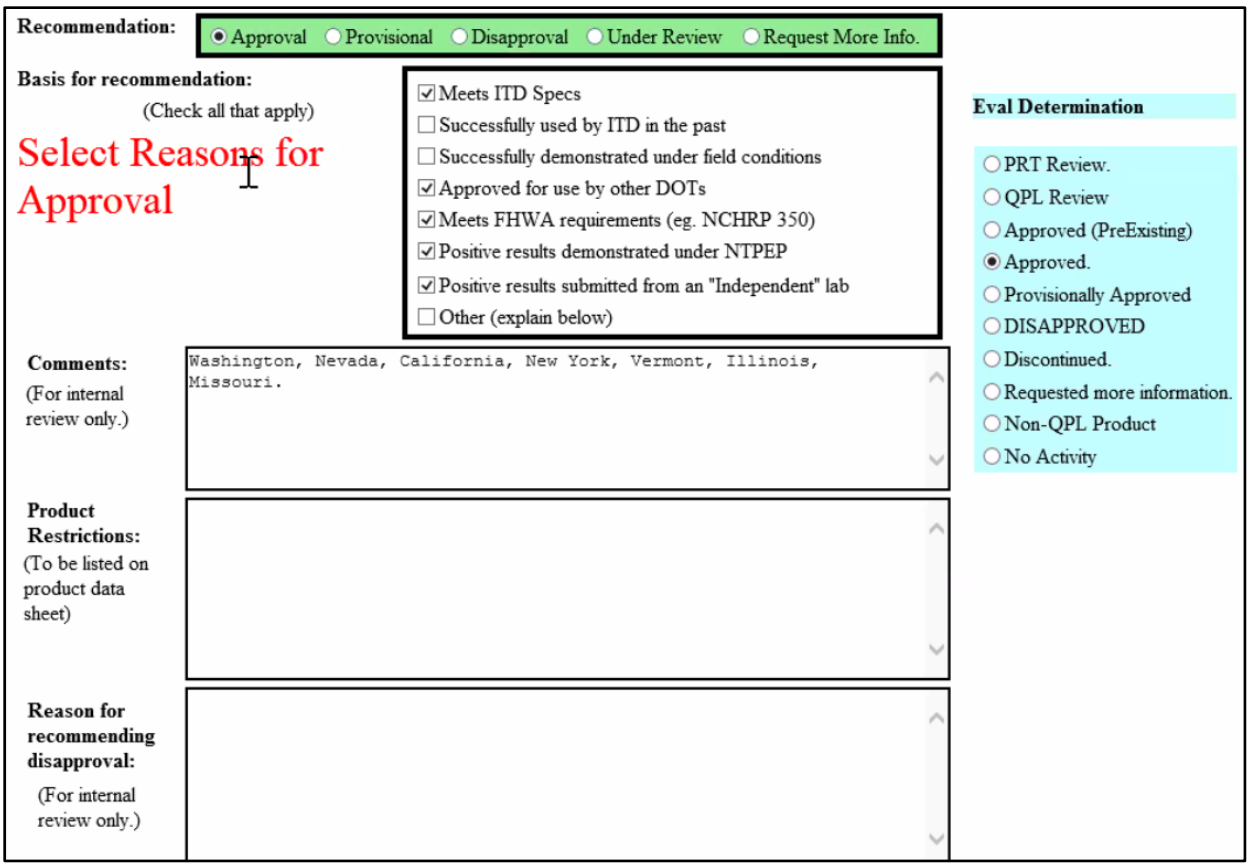


Figure 20 Evaluator determination and comments.

iii. Some product categories are not on the QPL because they are generic. The QPL Manager will review this before assigning a category.

iv. As shown in Figure 20, the “Restrictions” text box is visible on the external website

1. The “Product Restrictions” text box should be renamed with a more encompassing title, such as “Product Information.” It would detail how, and under what conditions, the product can be used. Which is useful to Contractors and other external users as well as inspectors

3. The overall process for evaluations is:
   a. Evaluators review product submissions and compare to ITD specifications. They complete their evaluation and fill out the form (see Figures Figure 19 and Figure 20).
   b. QPL Manager then gets automatic email notifying that the evaluation is complete. Similar to what is shown in Figure 18 Evaluator request email notification.

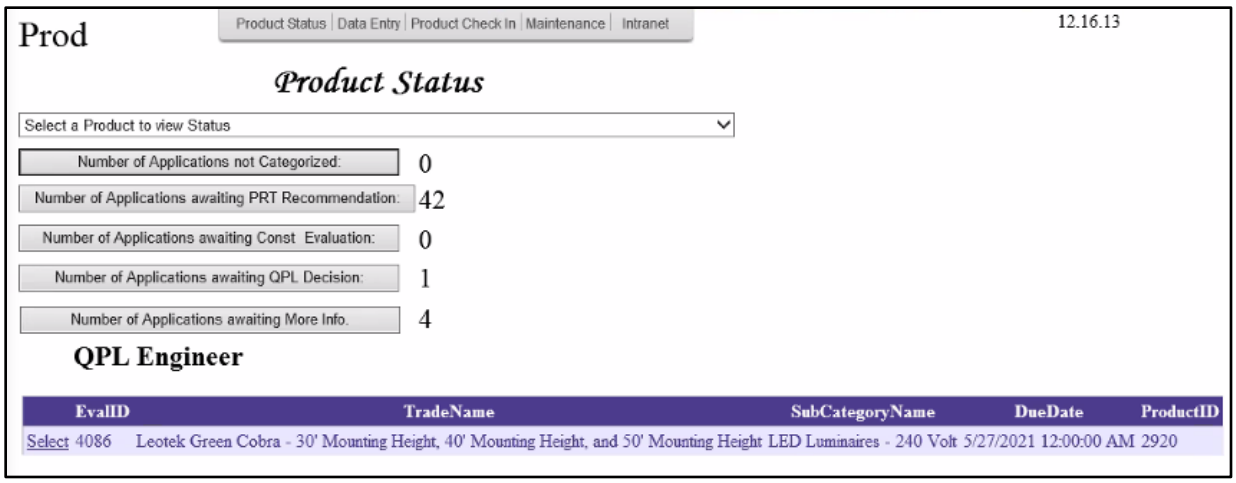


Figure 21 QPL Manager's dashboard of product reviews

c. QPL Manager then reviews the product evaluation form to finalize the product status (see Figure 22).

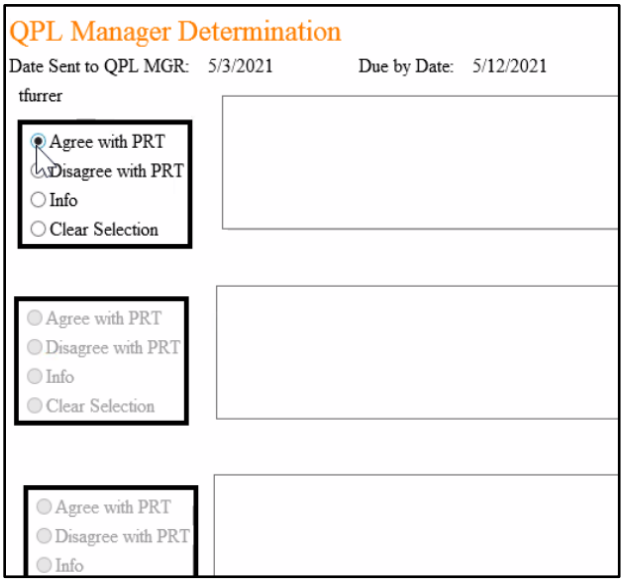


Figure 22 QPL Manager final determination

d. There is a “Letters” page, but this is not used (see Figure 23).

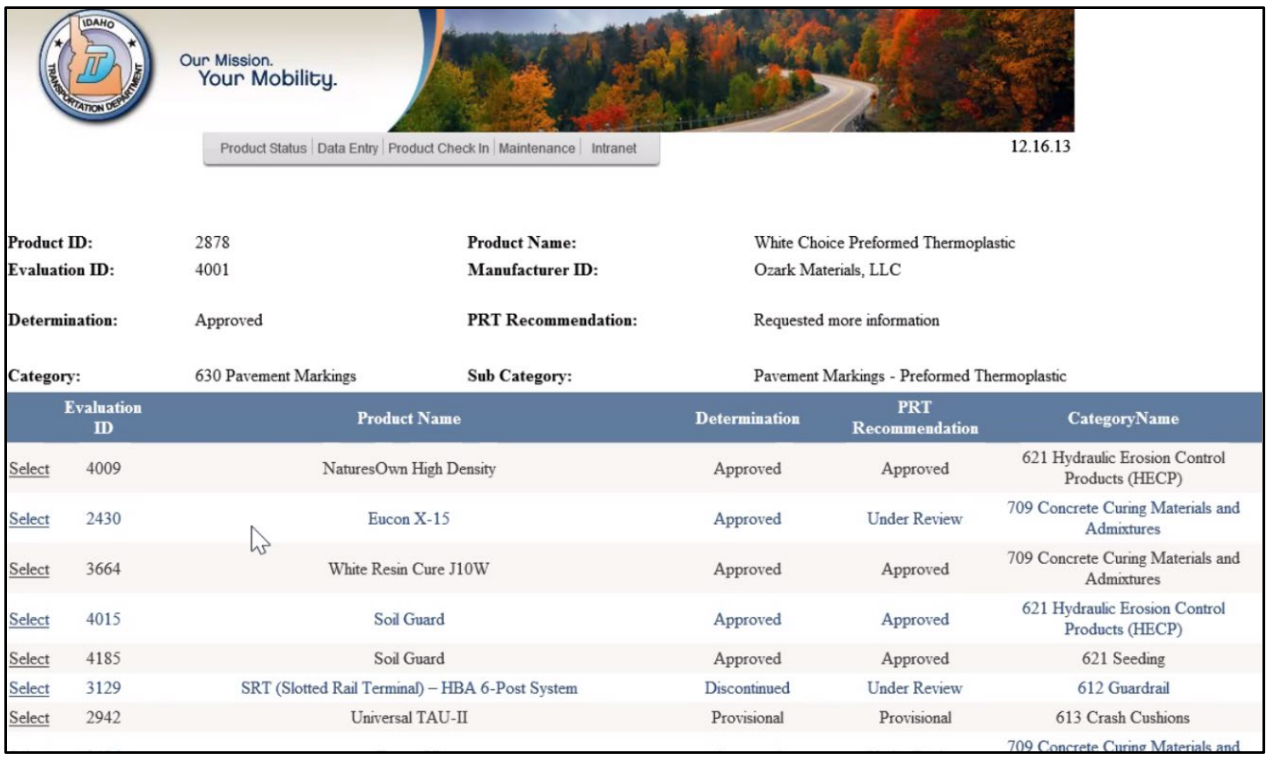
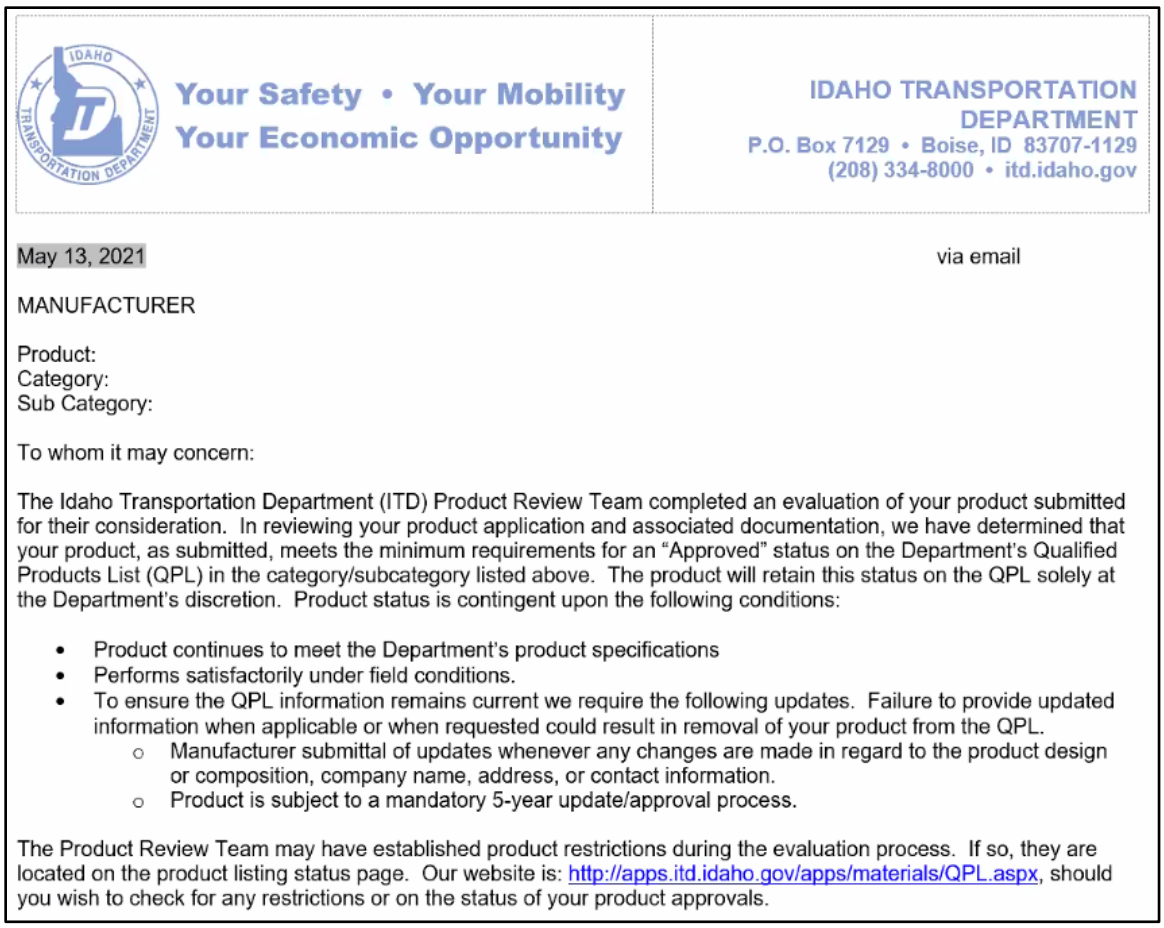


Figure 23 Manufacturer letter creation page

e. Once the product determination has been made, the QPL Manger will send a letter to the manufacturer informing them of the evaluation results (see Figure 24).



Your Safety • Your Mobility
Your Economic Opportunity

IDAHO TRANSPORTATION DEPARTMENT
P.O. Box 7129 • Boise, ID 83707-1129
(208) 334-8000 • itd.idaho.gov

May 13, 2021 via email

MANUFACTURER

Product:
Category:
Sub Category:

To whom it may concern:

The Idaho Transportation Department (ITD) Product Review Team completed an evaluation of your product submitted for their consideration. In reviewing your product application and associated documentation, we have determined that your product, as submitted, meets the minimum requirements for an "Approved" status on the Department's Qualified Products List (QPL) in the category/subcategory listed above. The product will retain this status on the QPL solely at the Department's discretion. Product status is contingent upon the following conditions:

- Product continues to meet the Department's product specifications
- Performs satisfactorily under field conditions.
- To ensure the QPL information remains current we require the following updates. Failure to provide updated information when applicable or when requested could result in removal of your product from the QPL.
  - Manufacturer submittal of updates whenever any changes are made in regard to the product design or composition, company name, address, or contact information.
  - Product is subject to a mandatory 5-year update/approval process.

The Product Review Team may have established product restrictions during the evaluation process. If so, they are located on the product listing status page. Our website is: http://apps.itd.idaho.gov/apps/materials/QPL.aspx, should you wish to check for any restrictions or on the status of your product approvals.

Figure 24 Email template to manufacturer regarding product evaluation results

Area Maintenance

1. The Area Maintenance presents the main product categories and the Chairman (person responsible for each area) (see Figure 25). The "area" is based on the product categories.

	Area	Description	
Select	A.D.A. Pedestrian Devices	Chaired by Tom Furrer. Responsible for review of A.D.A compliant pedestrian devices.	129
Select	Asphalt Modifiers	Chaired by Tracy McGillick, Chemistry. Responsible for review of proposed anti-stripping additives.	101
Select	Barrier Systems	Chaired by Marc Danley. Responsible for review of permanent and temporary guard rail items including metal, concrete and plastic rail; posts; end treatments; and miscellaneous hardware.	102
Select	Biaxial Geogrid	Biaxial geogrid used to reinforce subgrade or subbase, or similar applications.	132
Select	Biaxial Geogrid	Chaired by John Ingram. Responsible for the review of biaxial geogrid used to reinforce subgrade or subbase, or similar applications.	133
Select	Bridge	Chaired by Andrew Pack. Responsible for review of bridge concrete repair products.	3

Figure 25 List of maintenance areas and product reviewers responsible

2. The Chairman for each can be modified. New areas can also be added. See Figure 26.

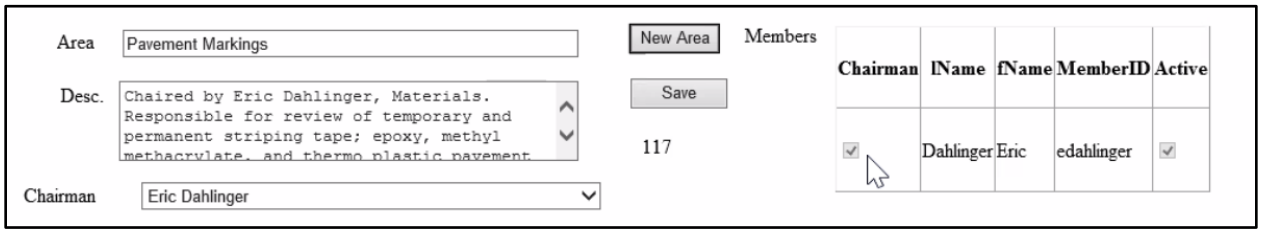


Figure 26 Area Chairman selection and change for maintenance areas

3. Clicking on “New Area” will create a new product evaluation area.
4. **Category Maintenance** allows the administrator to revise QPL categories and sub-categories.

-

    a. Evaluation area is assigned to the category in this location

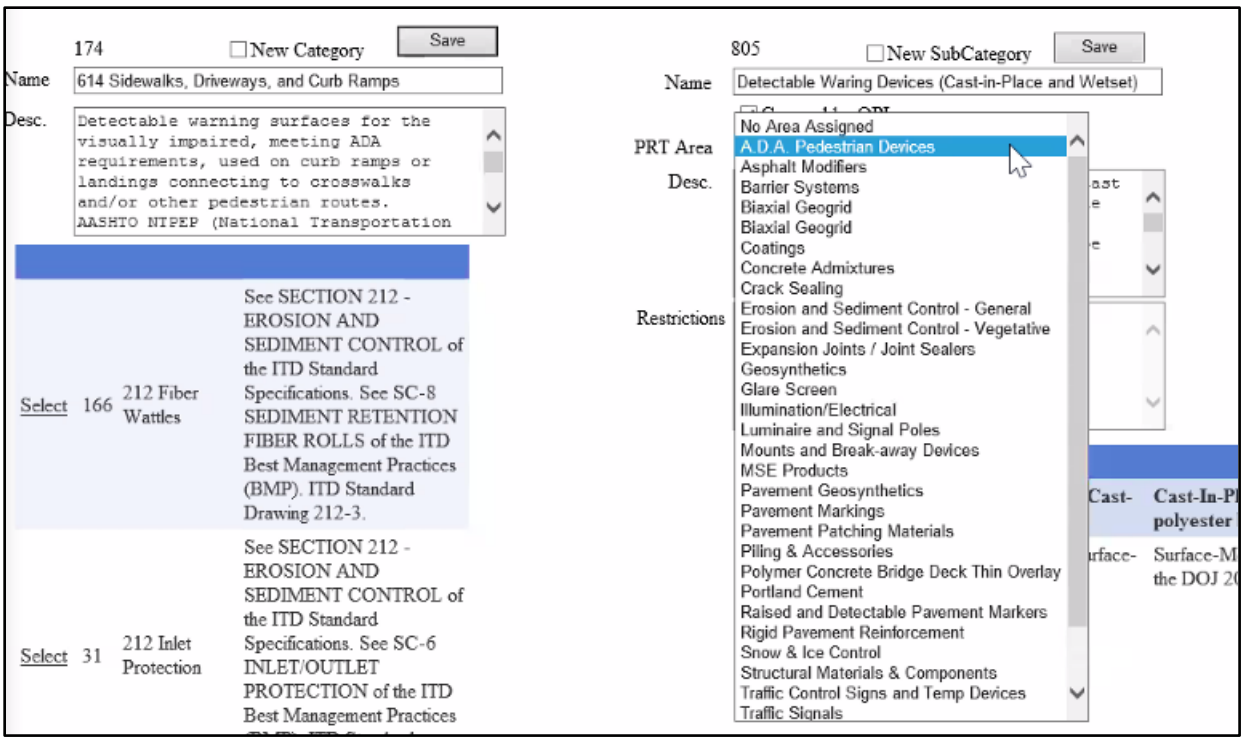


Figure 27 Evaluation area assignment

b. As shown in Figure 28, there is as least one “subcategory” in each “category”.

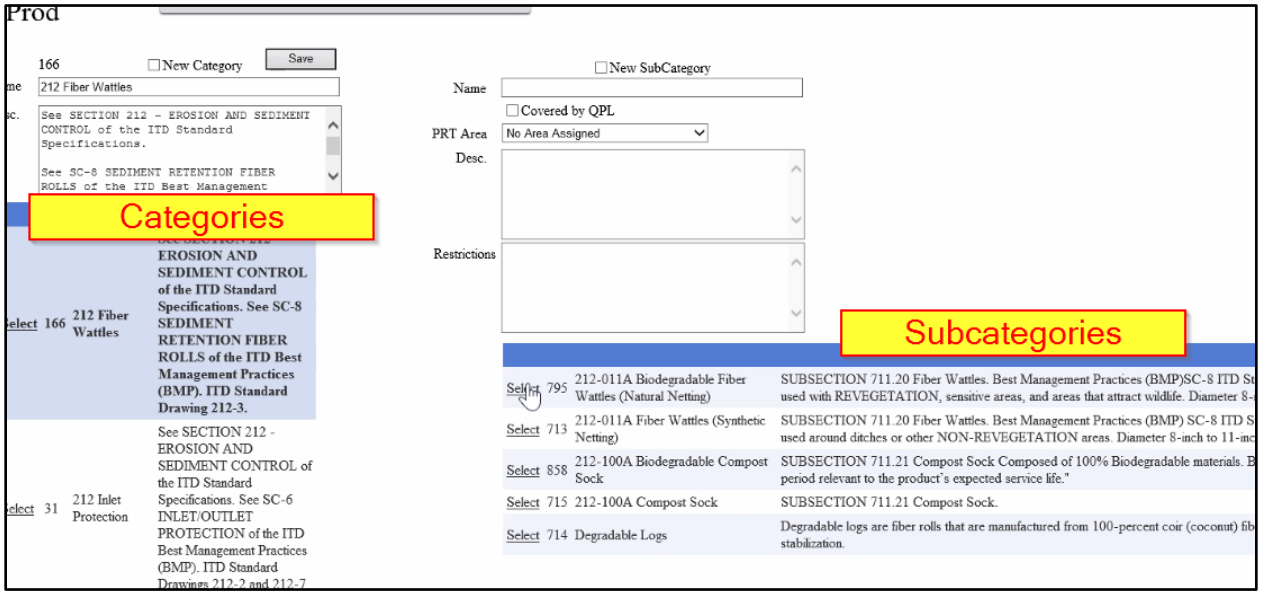


Figure 28 Product categories and subcategories

c. The category and subcategory descriptions can be modified in Category Maintenance as shown in Figure 28.
d. The Category Descriptions are then displayed on the QPL Intranet site and external website as written in Category Maintenance (see Figure 29).

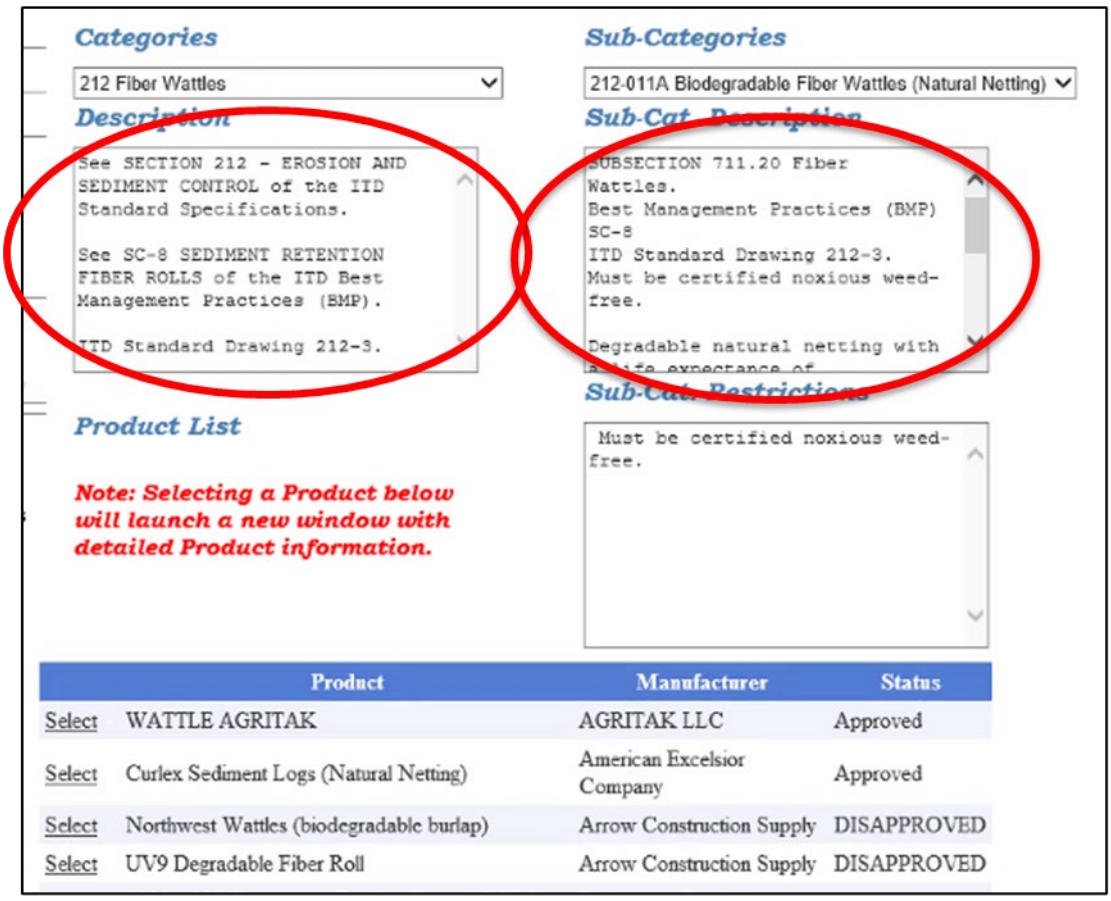


Figure 29 Category / sub-category descriptions

5. Manufacturer information occasionally changes. Minor changes (address, contact information, etc.) are managed in the Manufacturer's profile on the Data Entry tab. See Figure 30.

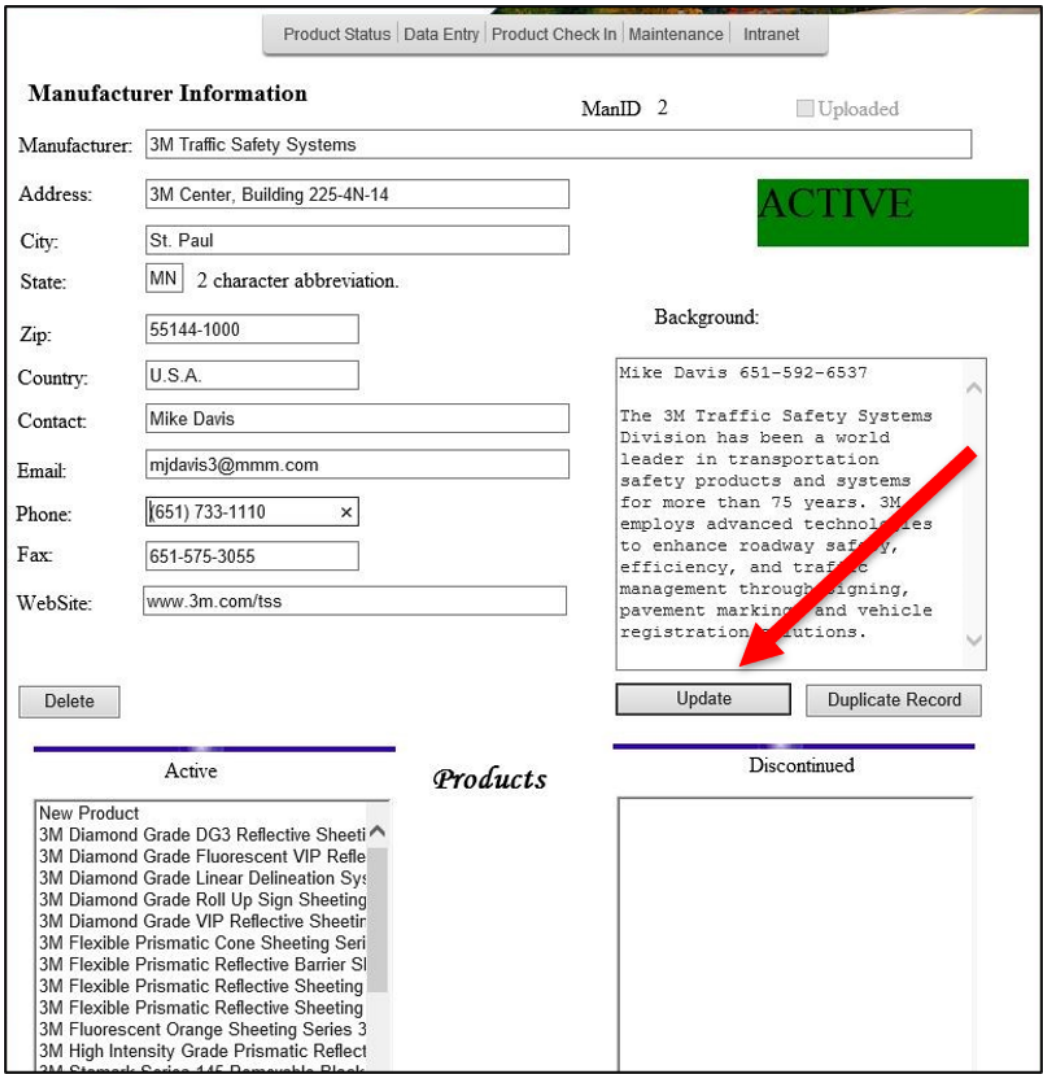


Figure 30 Screenshot of page listing of manufacturer information and related products

When a Manufacturer undergoes significant changes, such as merging with another company, or is purchased by another company, the Manufacturer Change option is used to transfer products from the former manufacturer to the new manufacturer. See Figure 31. This area also provides the means to retire a former manufacturer who is no longer in business.

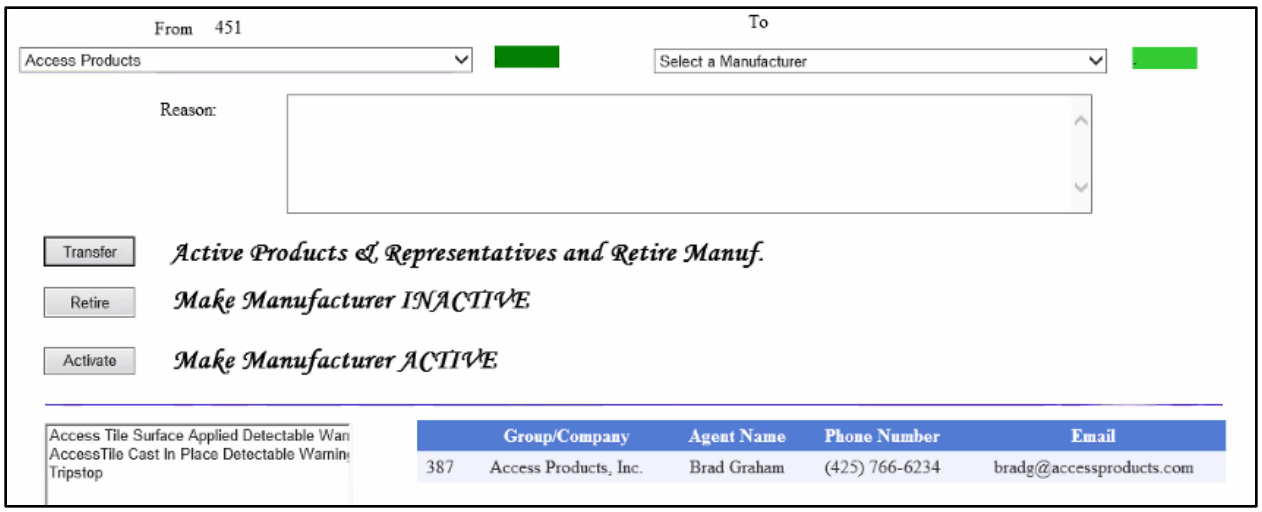


Figure 31 Process to update product manufacturer information.

i. NOTE: the current QPL program does not effectively update or transfer data for manufacturers that have many products (e.g., BASF). However, the need to complete this process is quite rare. See Figure 32.

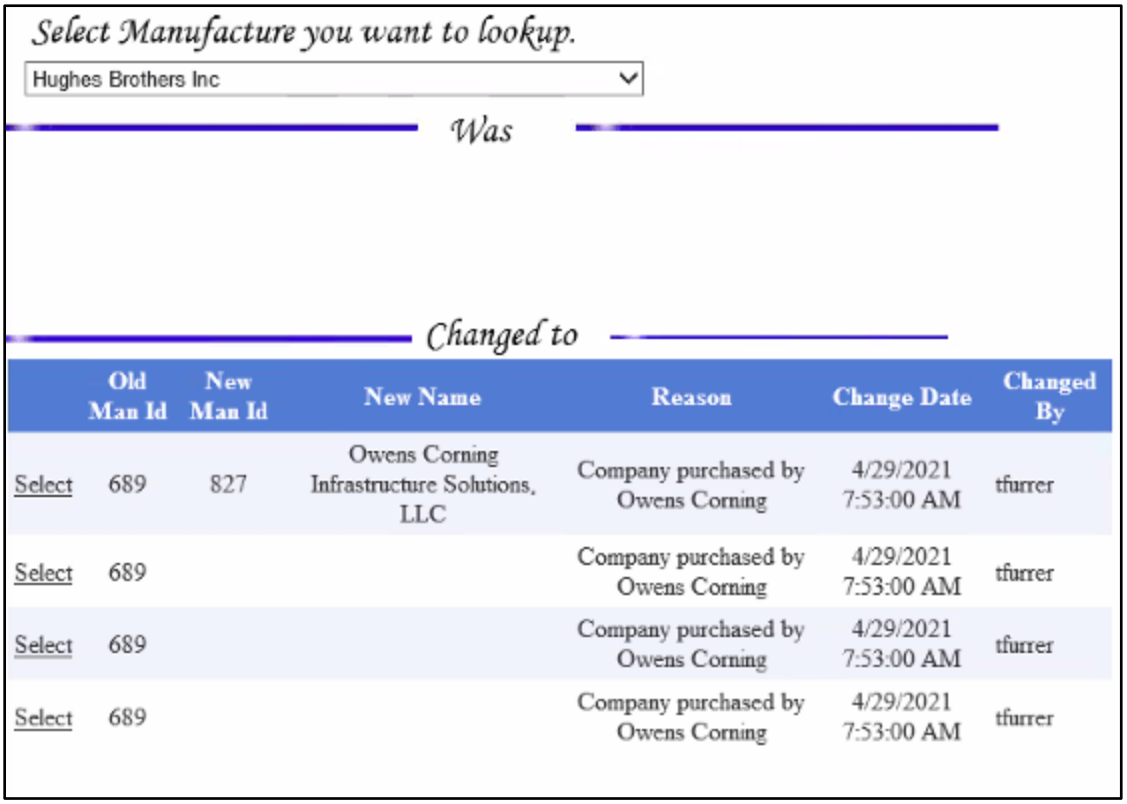


Figure 32 Transferring products between manufacturers

b. The Maintenance Module is also used to update the list of product evaluators, roles, and assigned product evaluation areas (see Figure 33).

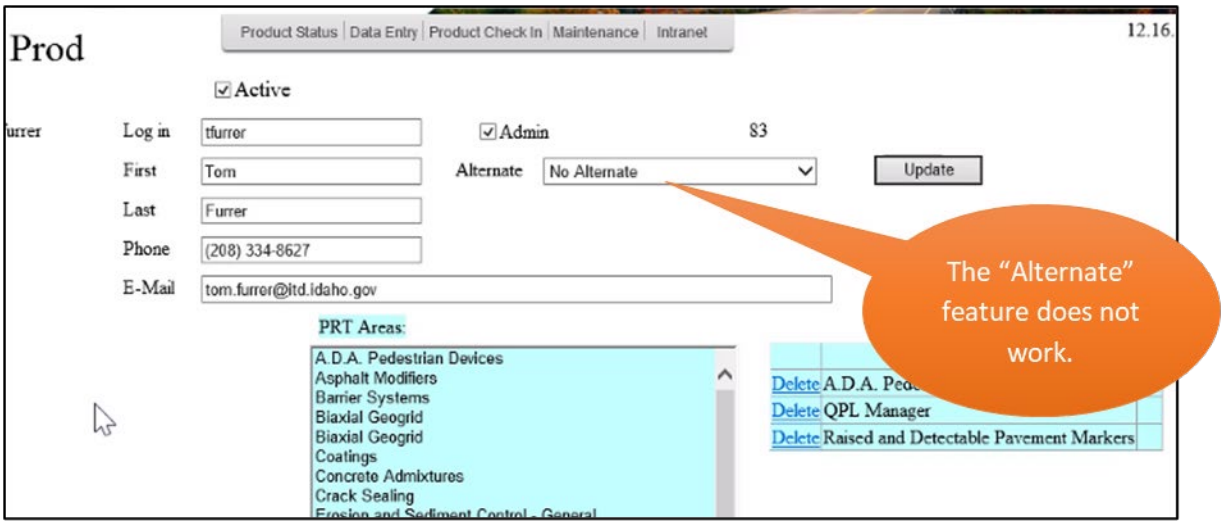


Figure 33 Updating product reviewer (PRT) information.

i. To assign someone to a new Area, click on the PRT Area, and it gets added to the right hand side. Click Delete from the right hand side to remove.

ii. NOTE: an error is generated when assigning new products and there are two people assigned already to an area (see Figure 34).

Figure 34 Error generated when assigning two people to one maintenance area

c. To add a new PRT person (product evaluator), click on the “New Member” button (see Figure 35).

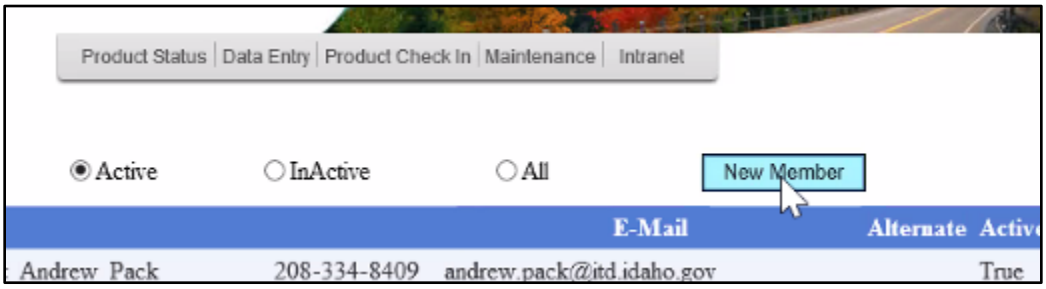


Figure 35 Creating a new PRT member button

i. A new screen appears (Figure 36) to enter the PRT member’s information.

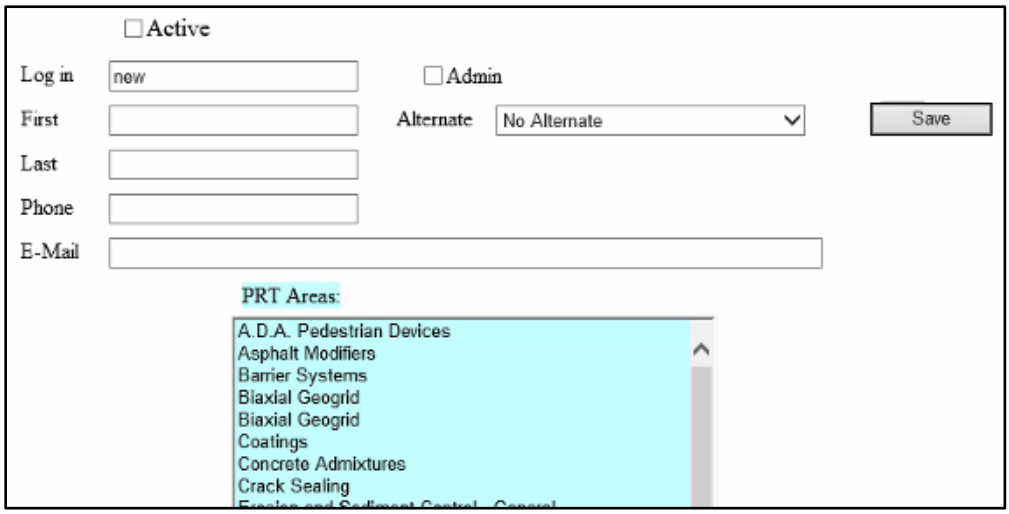


Figure 36 Entering new PRT member contact information and assigned maintenance areas

ii. NOTE: it is required to give each evaluator “Admin” privileges. Users with “Admin” privileges have “Save your work” and “Submit Review” features. Without the Admin privilege, they will not be able to do this (see Figure 37).

Figure 37 All Product Reviewers must be Admins to save and submit reviews

6. The Maintenance module can used to modify the Manufacturer representatives and contact information. This information is shown at the bottom of the product information page (see Figure 38).

Figure 38 Manufacturer rep contact information shown

a. The overall list of manufacturer reps can be adjusted in the "Rep Lookup" page under the "Maintenance" menu (Figure 39).

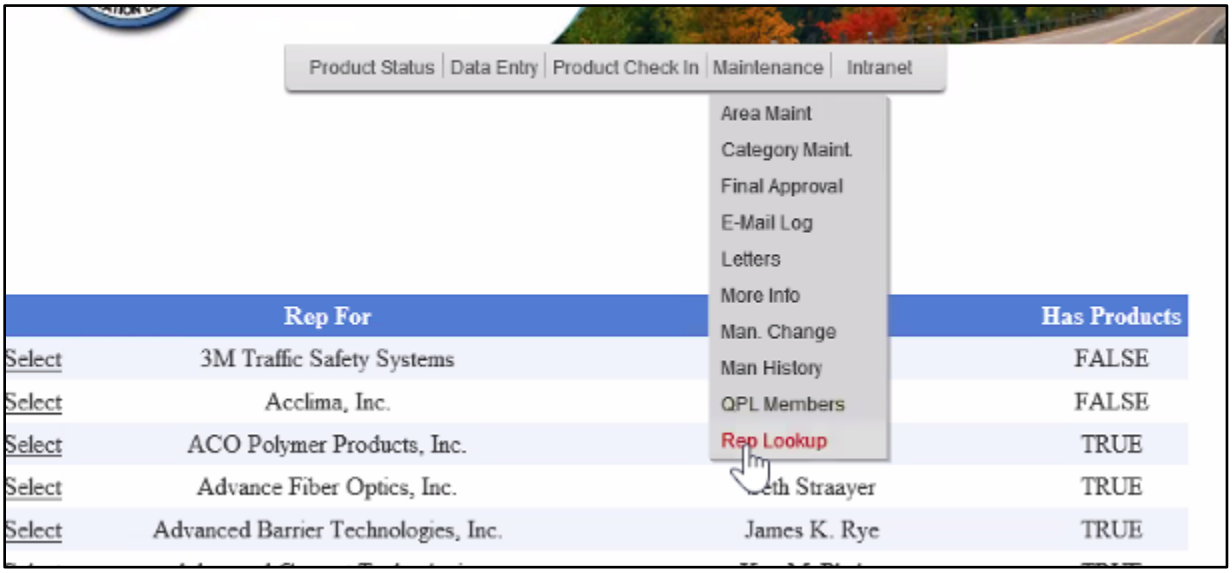


Figure 39 List of manufacturer representatives by company

b. Select a manufacturer rep to modify their contact information (see Figure 40).

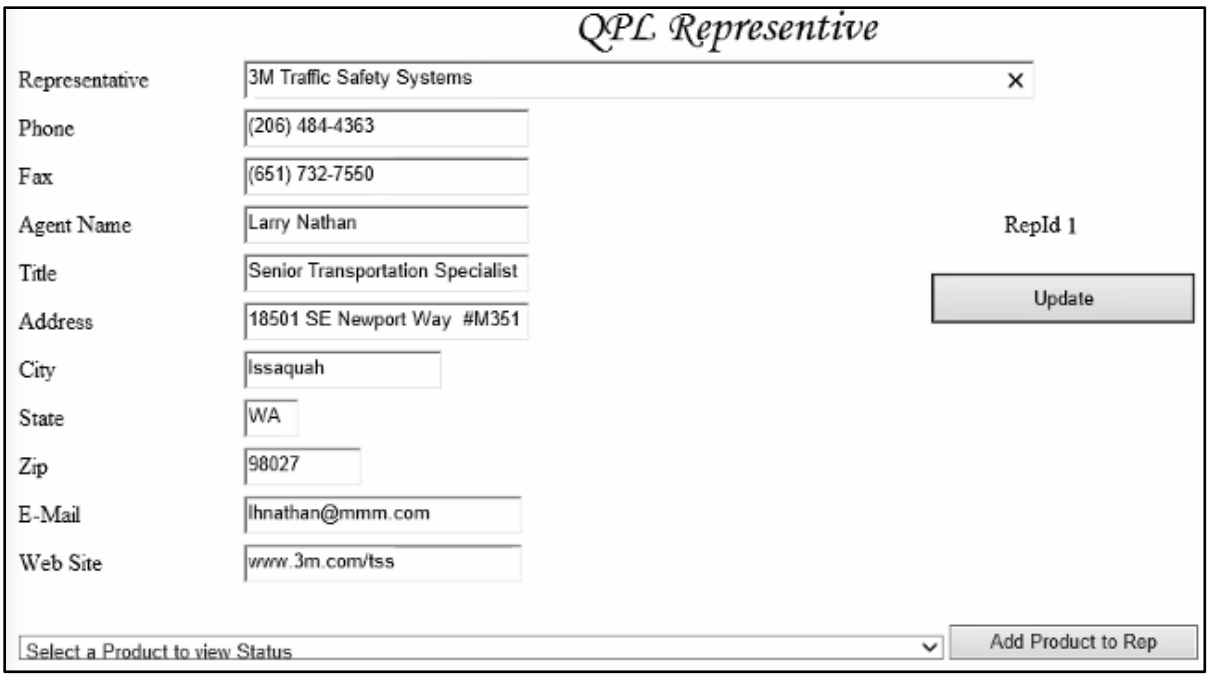


Figure 40 Screen for modifying the manufacturer rep for the QPL program

Intranet Site Access

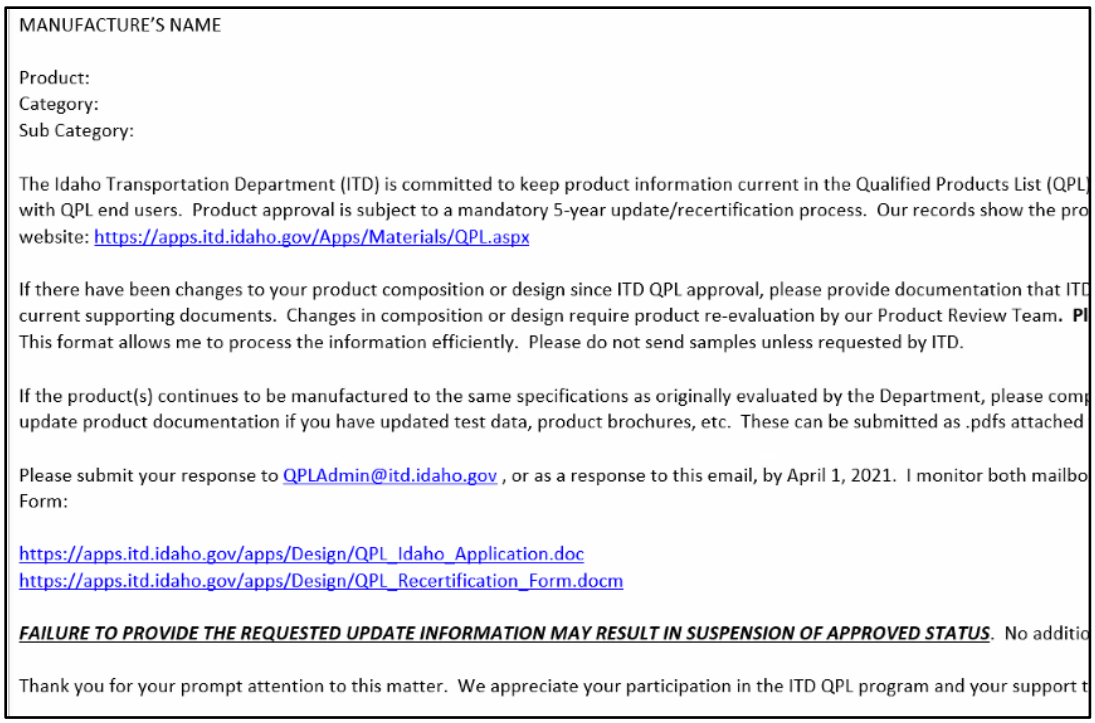
Figure 41 Main public-facing QPL information page and various functionality

1. The Intranet tab displays information available to those within ITD. Those with administrative privileges can access this page by using this tab. Other ITD users access the QPL via the ITD homepage/Technology/Applications Q-Z.

   Those outside ITD access the QPL through the ITD external website/Business/Click for More topics/Qualified Products List.

   a. External website is filtered to prevent sharing of proprietary information
      i. NOTE: disapproved products are **not** shown on the public website.
2. The **Product recertification process** works as follows:
   a. IT will send QPL Manager a list of products in an Excel file
   b. QPL Manager will then check by dates for products that show 5 years or older from the submittal or approval dates.
   c. QPL Manager will generate an email with the manufacturer product's requiring recertification listed, and ask if the product continues to be of the same composition and/or design as originally evaluated (see Figure 42 for the email template that QPL Manager sends). If the product remains the same a form is included to "Certify" the product is the same. If there are product changes the product may be re-evaluated depending on the significance of the change. The manager will note the update (see Figure 16) and copy the form into the product file.

      After adding a note, then QPL Manager updates the "Date Sub." date on the Product application information page to show that the 5 year recertification of that product was completed.



MANUFACTURE'S NAME

Product:
Category:
Sub Category:

The Idaho Transportation Department (ITD) is committed to keep product information current in the Qualified Products List (QPL) with QPL end users. Product approval is subject to a mandatory 5-year update/recertification process. Our records show the pro website: https://apps.itd.idaho.gov/Apps/Materials/QPL.aspx

If there have been changes to your product composition or design since ITD QPL approval, please provide documentation that ITD current supporting documents. Changes in composition or design require product re-evaluation by our Product Review Team. **Pl** This format allows me to process the information efficiently. Please do not send samples unless requested by ITD.

If the product(s) continues to be manufactured to the same specifications as originally evaluated by the Department, please comp update product documentation if you have updated test data, product brochures, etc. These can be submitted as .pdfs attached

Please submit your response to QPLAdmin@itd.idaho.gov , or as a response to this email, by April 1, 2021. I monitor both mailbo Form:

https://apps.itd.idaho.gov/apps/Design/QPL_Idaho_Application.doc
https://apps.itd.idaho.gov/apps/Design/QPL_Recertification_Form.docm

FAILURE TO PROVIDE THE REQUESTED UPDATE INFORMATION MAY RESULT IN SUSPENSION OF APPROVED STATUS. No additio

Thank you for your prompt attention to this matter. We appreciate your participation in the ITD QPL program and your support t

Figure 42 Manufacturer recertification request email template

i. Make sure to include a deadline for when the manufacturer needs to respond. If the manufacturer does not respond to a request for recertification, then the product that will be disapproved.

Appendix 2: Survey of Product Reviewers

This survey will collect feedback from users of ITD's Qualified Products List software user interface. Your candid insights will be useful as the QPL teams seeks to enhance program administration. This survey will take less than two (2) minutes to complete.

Please contact the QPL Manager if you have any questions.

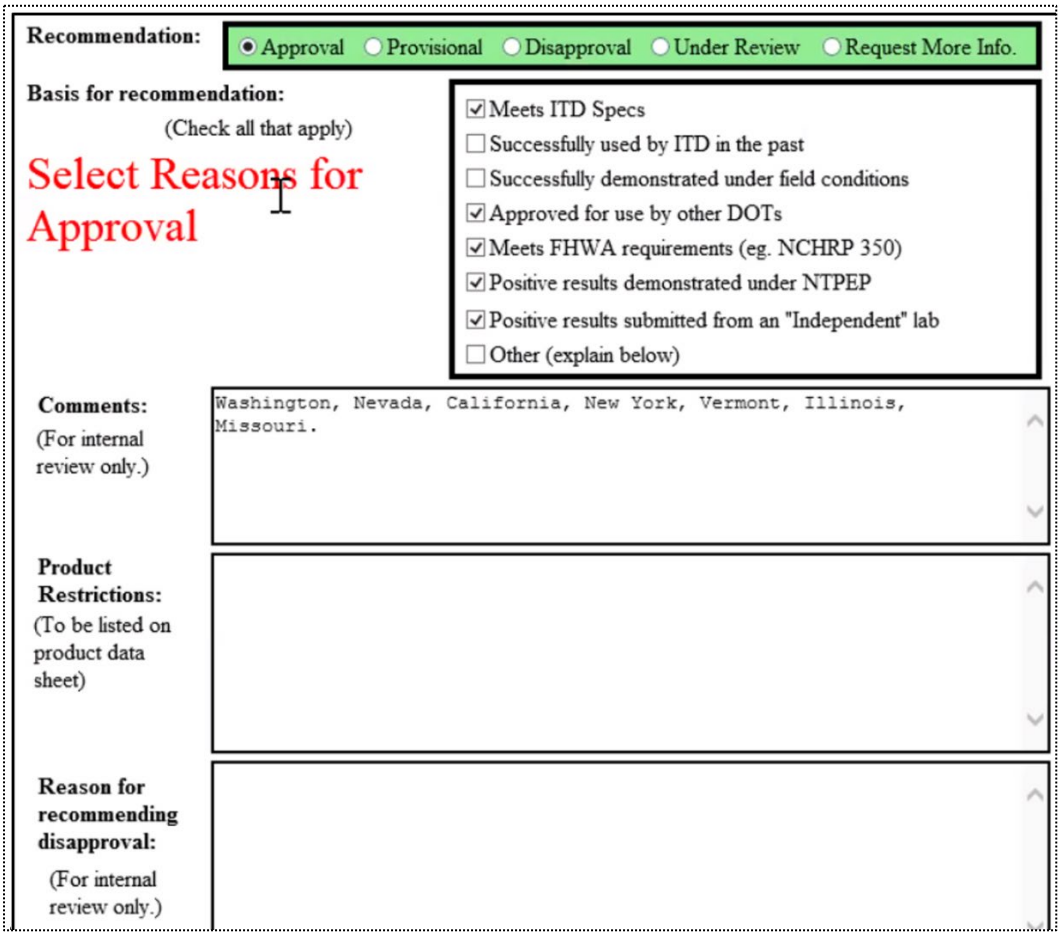


Figure 43 Screenshot of a sample product reviewer feedback screen

As shown in the figure above, Product Reviewers (product evaluators) are requested to provide responses in three areas when conducting an evaluation:

1. Overall Recommendation
2. Basis for Recommendation
3. Comments (internal, any restrictions, and reasons for disapproval)

Overall, how easy does the current interface allow you to provide effective feedback in each area?

	Extremely easy	Somewhat easy	Neither easy nor difficult	Somewhat difficult	Extremely difficult
Overall recommendation (approval, provisional, etc.)	○	○	○	○	○
Basis for recommendation (Meets ITD specs, successfully used, etc.)	○	○	○	○	○
Comments	○	○	○	○	○

Figure 44 Screenshot of survey checkboxes showing five levels of ease for overall recommendation, basis for recommendation, and comments.

Manufacturers include a variety of details in their product applications forms and supplemental information (click here to view the product application form). In general, **does the initial evaluation package include everything you need to conduct an evaluation**?

- ○ Always
- ○ Most of the time
- ○ About half the time
- ○ Sometimes
- ○ Never

Do you have **any suggestions** to make the overall product evaluation process more effective? Any and all ideas are welcome!

_____

Appendix 3: Survey of Product Manufacturers

This survey will collect feedback from product manufacturers who interact with ITD's Qualified Products List software application. Your candid insights will be useful as the QPL team seeks to enhance program administration. This survey will take **less than two (2) minutes to complete**. Please contact the QPL Manager if you have any questions.

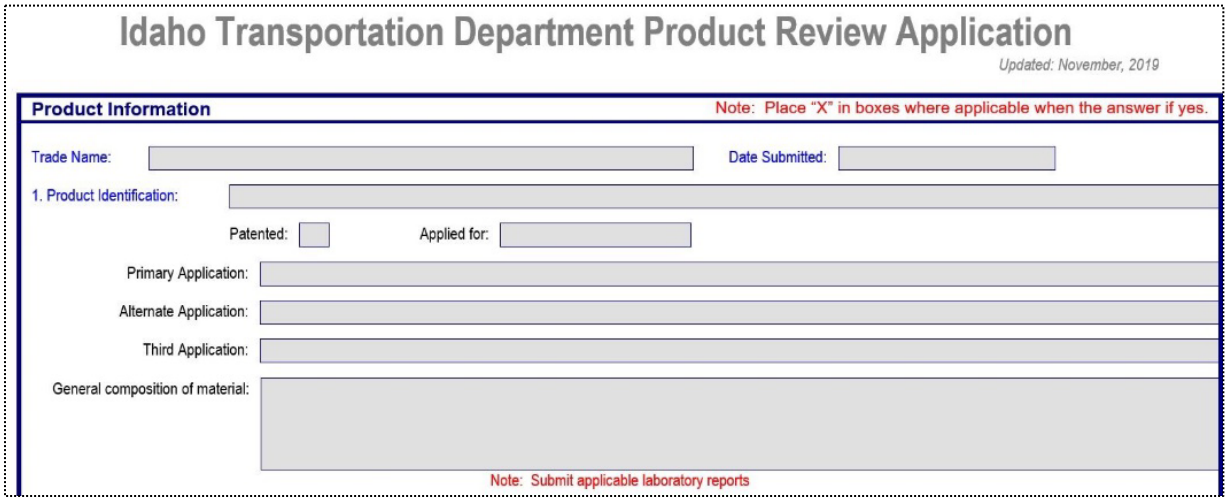


Figure 45 Screenshot of a sample product application page.

As shown in the partial screenshot above, applicants are requested to provide information about products to be evaluated.

Overall, how easy does the current application form allow you to provide sufficient information in each of the areas below?

	Extremely easy	Somewhat easy	Neither easy nor difficult	Somewhat difficult	Extremely difficult
Clearly describing product usage	○	○	○	○	○
Explaining product features or advantages	○	○	○	○	○
Providing technical details (specifications, plans, drawings, etc.)	○	○	○	○	○
Explaining usage at other highway authorities	○	○	○	○	○

Figure 46 Survey checkboxes showing five levels of ease for clearly describing product usage, explaining product features or advantages, providing technical details, and explaining usage at other highway authorities.

ITD intends to develop a web site (instead of the word document) for product application and submission of supplemental documents. **What is your overall reaction of ITD's plan to update the application process to a web-based service?**

- ○ Definitely supportive - I prefer a web-based service
- ○ Somewhat supportive
- ○ Neutral - either way is fine for me
- ○ Somewhat unsupportive
- ○ Definitely unsupportive - I prefer to use a word-document application

Do you have **any suggestions** to make the overall product application process more effective? Any and all ideas are welcome!

_____

Appendix 4: Survey of State Transportation Authorities

The Idaho Transportation Department (ITD) is conducting a national survey to better understand product evaluation practices (including Qualified Product Lists, Approved Product Lists, etc.) across state transportation agencies in the United States. The survey will take approximately 3 minutes to complete.

1. **Which State DOT agency do you represent?**
   Alabama (1) ... Wyoming (51)

2. **Does your agency currently utilize a APL, QPL, etc. to track qualified products/suppliers?**
   Yes (>> Keep going to #3)
   No (>> Go to sub questions below, and end survey)

   - **2b) Can you provide a very brief explanation of why your agency does not use a APL/QPL?**
   -
   - **2c) Does your agency currently have plans to purchase, install, or implement a APL/QPL in the next 18 months?**
     Yes
     No

3. **Identify the best description of your current APL/QPL program:**
   We are using a system/software that has been in place at our agency for 2 years or more. (>> Jump to Part 1)
   We are using a new system/software that has been in place at our agency for less than 2 years. (>> Jump to Part 2)

PART 1 > Old Systems

1. **Approximately how old is your current APL/QPL program:**
   2-5 years old
   5-10 years old
   10+ years old

2. **Describe the primary software that you use to manage your APL/QPL:**
   MS Excel (or a similar spreadsheet software program)
   MS Access (or a similar database software program)
   SiteManager
   AASHTOWare
   eQPL
   SharePoint
   Zengine/Wizehive
   We have a collection of product files and information, but it's not in a database / searchable format
   Other: _____

3. **Was your system developed in-house, or externally (by a supplier/vendor)?**
   In-house
   External

4. **Rate your overall level of satisfaction with your current system:**
   - o Extremely dissatisfied (1) (>> Go to sub questions below)
   - o Moderately dissatisfied (2) (>> Go to sub questions below)
   - o Slightly dissatisfied (3) (>> Go to sub questions below)
   - o Neither satisfied nor dissatisfied (4)
   - o Slightly satisfied (5)
   - o Moderately satisfied (6)
   - o Extremely satisfied (7)

   4b) Can you identify to top 3 reasons why you are dissatisfied with your current system?

5. **How many internal full-time equivalent (FTE) staff manage your APL/QPL program per year?**
   Less than 1 full-time employee dedicated
   1 full-time employee dedicated
   2 full-time employees dedicated
   3 or more full-time employees dedicated

6. **Does your agency have plans to implement a new or updated APL/QPL software in the next 18 months?**
   Yes
   Maybe
   No
   Don't Know

PART 2 > New Systems

1. **Approximately how old is your current APL/QPL program:**
   0 = The new system is not currently up-and-running – we are still implementing it
   Less than 1-year old
   1-2 years old

2. **Describe the primary software that you use to manage your APL/QPL:**
   MS Excel (or a similar spreadsheet software program)
   MS Access (or a similar database software program)
   SiteManager
   AASHTOWare
   eQPL
   SharePoint
   Zengine/Wizehive
   Cherwell Service Management
   We have a collection of product files / information, but it's not in a database / searchable format
   Other: _____

3. **Was your system developed in-house, or externally (by a supplier/vendor)?**
   In-house
   External

   If external

   a. **What was cost to implement the software? An estimate is fine.**
   - **Initial development & installation**: $_____
   - **Annual maintenance costs**: $_____
   - **Other costs**: $_____

4. **Rate your overall level of satisfaction with your current system:**
   - o Extremely dissatisfied (1) (>> Go to sub questions below)
   - o Moderately dissatisfied (2) (>> Go to sub questions below)
   - o Slightly dissatisfied (3) (>> Go to sub questions below)
   - o Neither satisfied nor dissatisfied (4)
   - o Slightly satisfied (5) (>> Go to sub questions below)
   - o Moderately satisfied (6) (>> Go to sub questions below)
   - o Extremely satisfied (7) (>> Go to sub questions below)

   4b) Can you identify to top 3 reasons why you are dissatisfied with your current system?

   4c) Can you identify to top 3 reasons why you are satisfied with your current system?

5. **How would you rate your level of satisfaction with your PREVIOUS (older) APL/QPL program?**
   - o Extremely dissatisfied
   - o Moderately dissatisfied
   - o Slightly dissatisfied (3)
   - o Neither satisfied nor dissatisfied
   - o Slightly satisfied
   - o Moderately satisfied
   - o Extremely satisfied

6. **How many internal full-time equivalent (FTE) staff manage your current APL/QPL program per year?**
   Less than 1 full-time employee dedicated
   1 full-time employee dedicated
   2 full-time employees dedicated
   3 or more full-time employees dedicated

7. **How would you rate the amount of effort required to transition to the new system (from the previous system)?**
   - The transition to the new system required a **significant** amount of internal time & resources
   - The transition to the new system required a **moderate** amount of internal time & resources
   - The transition to the new system **hardly required** any amount of internal time & resources

8. **Were there any unexpected "hiccups" when implementing your new system**
   Yes (>> Go to sub questions below)
   No

   What were the major hiccups that you encountered? (Or, if you would prefer to schedule a phone call, please provide your contact info below and the researchers will schedule a time to chat).

9. **Please provide any additional comments or lessons learned (e.g., if you had to do this all over again, what would you do differently)?**

PART 3 > Demographics for ALL Respondents

How many years of DOT / business / professional experience do you personally have?

- o Less than 5 years
- o 5 – 9 years
- o 10 – 19 years
- o 20 – 29 years
- o 30 – 39 years
- o 40 – 49 years
- o More than 50 years

Please indicate the role that best describes your current job position.

- o Senior Executive (CEO, CFO, COO, CIO, etc.) (1)
- o Vice President or Assistant Vice President (2)
- o Regional Manager / Director / Local Office Supervisor (3)
- o Project Lead / Crew Lead (4)
- o Project Team Member / Crew Member (5)
- o Other: (6)

Would like to receive a summary of the results of this survey?

Yes
No

If yes, please enter the following details and then click the arrow below to continue.

- o First and Last Name (4) _____
- o Job Title (6) _____
- o Email Address (5) _____

Appendix 5: Contact List of State Transportation Authorities

State	First Name	Last Name	Email	Phone
Alaska	Dan	Gettman	daniel.gettman@alaska.gov	907-269-6213
Arizona	Michael	San Angelo	apl@azdot.gov	
Arkansas	Jon	Annable	materials@ardot.gov	505-569-2185
California			new.products@dot.ca.gov	
Colorado	Edward	Trujillo	edward.trujillo@state.co.us	303-398-6566
Connecticut	Leo	Fontaine	Leo.Fontaine@ct.gov	860-594-3180
Delaware	Steven	Sisson	Steven.Sisson@delaware.gov	
Florida	Karen	Byram	karen.byram@dot.state.fl.us	
Hawaii	Casey	Abe	casey.abe@hawaii.gov	
Indiana	Michael	Pelham	mpelham@indot.in.gov	
Iowa	Todd	Hanson	Todd.Hanson@iowadot.us	
Kansas	Susan	Barker	Susan.Barker@ks.gov	785-291-3830
Kentucky	Mark	Higdon	mark.higdon@ky.gov	
Kentucky	Buan	Smith	buan.smith@ky.gov	
Louisiana	Patrick	Icenogle	patrick.icenogle@la.gov	
Louisiana	Amar	Raghavendra	amar.raghavendra@la.gov	
Maine	Dawn	Bickford	Dawn.Bickford@maine.gov	
Maryland	Troy	Davis	TDavis5@mdot.maryland.gov	
Massachusetts	Maria	Batista	Maria.Batista@dot.state.ma.us	
Michigan	Gregg	Brunner	NapierV@Michigan.gov	517-281-3369
Minnesota	Glenn	Engstrom	glenn.engstrom@state.mn.us	

State	First Name	Last Name	Email	Phone
Missouri	Jeffery	Joens	Jeffery.Joens@modot.mo.gov	
Nebraska	Doug	Churchwell	doug.churchwell@nebraska.gov	402-479-4678
Nevada	Sabra	Gilbert-Young	sgilbert-young@dot.nv.gov	
New Hampshire	Joe	Blair	joseph.blair@dot.nh.gov	603-271-1545
New Mexico	Monica	Maes	nmdotapl@state.nm.us	505-819-8513
New York	Russell	Thielke	Russell.Thielke@dot.ny.gov	
North Carolina	Dan	Snoke	djsnoke@ncdot.gov	919-329-4004
North Dakota	Matt	Linneman	mlinneman@nd.gov	
Ohio	Daniel	Miller	Daniel.Miller@dot.ohio.gov	614-275-1325
Oregon	Dean	Chess	Dean.M.CHESS@odot.state.or.us	
Rhode Island	Michael	Sock	michael.sock@dot.ri.gov	
South Carolina	Caleb	Gunter	guntercb@scdot.org	803-737-6694
Tennessee	Danny	Lane	danny.lane@tn.gov	
Texas	Joe	Adams	rtimain@txdot.gov	
Utah	Tim	Wozab	udotapl@utah.gov	
Vermont	Philip	Peloquin	phil.peloquin@vermont.gov	
Virginia	Robert	Crandol	Robert.Crandol@VDOT.Virginia.gov	804-328-3173
Washington	Tony	Briscoe	BriscoT@wsdot.wa.gov	
West Virginia	Dan	Brayack	Daniel.A.Brayack@wv.gov	304-414-6610
Wisconsin	John	Rublein	john.rublein@dot.wi.gov	