NYSDOT HOOCS RFP C030786

Attachment 14

Highway Oversize / Overweight Credentialing System (HOOCS) Overview

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1. Scope

1.1. Purpose of Document

The purpose of the HOOCS Overview document is to provide a conceptual description of the envisioned system and the operational environment in which it is envisioned to be deployed. It is a vehicle for stakeholder discussion and consensus to ensure that the solution is feasible. This document contains the following major sections.

Section 1, Scope – Provides an overview of this document, as well as background information about the project and the project objectives

Section 2, Reference Documents – Identifies supporting documentation useful for understanding the operations of the current system

Section 3, System Overview – Provides a high-level overview of the envisioned system

Section 4, Route Analysis Processing Detail – Provides further detail on the envisioned Route Analysis Processing capability

Section 5, Structural Analysis Processing Detail – Provides further detail on the envisioned Structural Analysis Processing capability

2. References

2.1. Documents

The following documents provide further detail on the current permitting processes:

NYSDOT OS/OW Permits Civil Enforcement Process Manual
NYSDOT Big Truck Manual
NYSDOT Divisible Load Processing Manual
NYSDOT Divisible Load Policy and Procedures Manual

2.2. Websites

The following websites provide further detail on the current permitting processes:

- The NYPermits website provides detailed information on the existing permit processes and procedures. <https://www.dot.ny.gov/nypermits>.
- The One Stop Credentialing and Registration (OSCAR) website provides detailed information on the existing permit processes and procedures. <https://www.oscar.ny.gov/OSCR/OSCRCarrierHome>.
- The GIS layer of restrictions is displayed in the Oversize/Overweight Vehicle Prescreening Tool at <http://www.dot.ny.gov/osowscreen>.
3. System Overview

This section provides a high-level description of what the system and/or users need to do to accomplish business goals. Figure 1 is a context diagram showing the data and users that will interface with HOOCS.

Figure 1, HOOCS Context Diagram
3.1. HOOCS Capabilities

This section provides a high-level functional description of the envisioned HOOCS and identifies the existing systems that HOOCS will replace. For details regarding the current systems and processes, refer to the NYSDOT Permits website at

The existing system utilizes the OSCAR website at https://www.oscar.ny.gov/OSCR/OSCRCarrierHome. OSCAR is a dynamic, multi-agency e-government initiative developed by the Departments of Taxation and Finance, Transportation, and Motor Vehicles; the Division of the State Police; and the New York Thruway Authority, in cooperation with the Federal Motor Carrier Safety Administration and the New York State Motor Truck Association. This website currently supports special hauling permitting. The HOOCS should utilize OSCAR for special hauling and divisible load permitting.
3.1.1. Permitting

The Permitting capability will provide the functionality of the following existing systems:

- Special Hauling Permitting - Over Size/Over Weight Special Hauling permitting program that is used to manage submitted permit applications, track financial data, and provide information regarding the customer and the service company
- OS/OW PST – Over Size/Over Weight Pre-Screening Tool used to identify and verify travel routes and travel restrictions
- DIVLOAD – Divisible Load permitting including management of divisible load tokens, divisible load weight bank, lotteries for available divisible load tokens and Grandfather Rights certificates

The permitting capability enables carriers and permit service companies to prepare and submit an oversize/overweight permit application. It enables the automated review of Special Hauling Permit applications and Divisible Load Permit Applications based on the permit-type business rules. It also enables the approval of permit applications and the issuance of permits, as well as disapproving permit applications.

A high-level overview of the permit application and issuance process is depicted in Figure 2.

![Figure 2, Permitting Process](image_url)

The envisioned flows for processing Special Hauling permit applications and Divisible Load permit applications are depicted in Figure 3 and Figure 4, respectively.
Figure 3, Special Hauling Permit Processing
Figure 4, Divisible Load Permit Processing
3.1.2. **Structural Analysis**

The structural analysis of a permit application is performed to ensure safe passage of the load without any potential damage to any structures it will be crossing. Structural Analysis is envisioned to be performed at two times during the permit process.

During the initial screening of the permit application, structural analysis should be performed as a blanket analysis of all spans. If the Permit Vehicle Load Effect (PVLE) for the blanket analysis is less than 150%, then the permittee should be informed that the permit will receive automatic approval. If the PVLE for the blanket analysis is greater than 150%, then the permittee should be informed that the permit may require manual review approval.

During the post-application analysis of the permit application, structural analysis should be performed for each structure that the oversize/overweight load will be crossing. The structural analysis for each structure is performed by analyzing the load weight, the vehicle configuration, and the structure configuration. Automatic approval of the permit application should be determined based on business rules. For structures that can be automatically approved for the passage of the load, approval will be provided. For all other structures, information on why the auto approval could not occur will be provided to the manual reviewers. The reviewers should be provided with detailed load information, span information, and automatic approval non-approval reasons to enable them to provide manual approval, manual approval with conditions, or dis-approval of the permit application based on business rules.

The NYSDOT Bridge Data Information System (BDIS) will provide information regarding each structure the permit vehicle will be crossing.

The structural analysis capability will replace the functionality of the existing Structures Load and Floor Beam Analysis Tool (BIGTRUK II).

The Structural Analysis Processing section of this document provides further detail on this capability.

3.1.3. **Routing**

The Routing capability will provide vehicle/load based real-time point-to-point routing. This capability will integrate a map-based routing system with a mechanism to identify and restrict route points and/or segments due to clearances, weight, construction, or other restrictive events. Additionally, the routing capability will:

- Build a proposed route based on the user entered start location and destination location
- Provide a list of possible routes based on the size and weight of the load/vehicle
- Provide cost for each route
- Identify any time-based restrictions for each route segment
- Provide the proposed route in both GIS form and turn-by-turn text instructions

Allow the customer to request a specific proposed route

- Provide a list of possible route segments that allow the size and weight of the load/vehicle
- Identify any time restrictions for each route segment
- Provide the proposed route in both GIS form and turn-by-turn text instructions
Allow a text-entered proposed route request capability

Wherever possible, automatically check restrictions and clearances for the proposed route based on the vehicle size, weight, type, and load information

Allow for manual proposed route review

Enable authorized users to override a particular restriction to allow an exception

Provide auto notification (via e-mail) to the customer of updated restrictions on their route when the permit is still valid and a new restriction is identified or imposed

Report on most used routes, average vehicle sizes and weights on a route, etc.

The Routing capability will replace the functionality of the existing OS/OW PST system (Over Size/Over Weight Pre-Screening Tool).

The Pre-Screening Tool (PST) is used during the permit application review and approval process to verify route continuity/destination; travel/bridge restrictions; and bridge information (vertical height clearance, width, load postings). PST is used by internal NYSDOT Central Permits Bureau users. A subset of the tool’s capabilities is used by external users to identify routes of travel and travel restrictions. PST is maintained by the New York State Office for Information Technology Services (ITS).

The Route Analysis Processing section of this document provides further detail on this capability.

3.1.4. Restriction Management

The Restriction Management capability enables the entering and managing of restrictions that impact the routable street network. This includes height restrictions, width restrictions, length restrictions, weight restrictions, and temporal restrictions of a temporary and permanent nature.

NYSDOT currently uses a legacy desktop GIS tool (ArcView 3.3 extension) to locate and describe temporary highway restrictions affecting commercial vehicles due to construction, scheduled maintenance, or other reasons. The GIS layer of restrictions is displayed in the public facing Oversize/Overweight Vehicle Prescreening Tool (https://www.dot.ny.gov/osowscreen). Regional Permit Engineers locate the restriction on the map and enter the allowable vehicle envelope (i.e., maximum vehicle height, width, length, and weight) for each highway restriction.

The Restriction Management capability will replace the functionality currently provided by the OS/OW PST system.

3.1.5. Account Management

The Account Management capability will support managing the carrier account and permit service company account information, including business name, point of contact, addresses, phone numbers, license information, and e-mail addresses. Permit Service Companies, Carriers, and internal NYDOTH users will have the ability to view and update carrier information.

3.1.6. Financial Management

The Financial Management capability will provide permit revenue and fund-tracking support. Payment for permits will be performed by interfacing with other NYS Agencies, including the
Department of Tax and Finance (NYSDTF), for payment processing and, when available, the Statewide Financial System (SFS). The Financial Management capability will enable users to:

- Utilize credit cards or Electronic Funds Transfer to prefund payment accounts to pay for electronic permit transactions
- Pay for one or more permits in one transaction
- Manage payment account and credit card account information
- Support walk-in money order, credit card, or check payments
- Add, maintain, update, and withdraw funds for permits from a user account

The Financial Management capability will provide support for surety bond management including accepting, encumbering, releasing encumbrances, and releasing surety bonds. This capability will provide the functionality of the current existing Surety Bond File system. The Financial Management capability will also support the managing fees and funds, as well as reconciliation of receipts and deposits.

Currently, carriers and permit service companies can use a credit card to prefund a carrier account online through the NYSDTF OSCAR system or through Authorize.Net on the NYSDOT Website. They can also prefund a carrier account through mailing or presenting credit card or check payment to the NYSDOT Counter. Figure 5 is a graphical representation that depicts the current methods of prefunding a carrier account.

![Figure 5, Current Prefunding Flow](image-url)
3.1.7. **Workflow Management**

The Workflow capability supports both automated and non-automated tasks and enables:
- Authorized users to define the business processes to be managed by the workflow system
- Executing the defined processes to get work done
- Ensuring that work can be moved through the defined process
- Triggering automatic notifications
- Monitoring the progress of work
- Creating and maintaining permit workflows to reflect business rules for each permit type

3.1.8. **Business Rules Management**

The Business Rules Management capability enables creating, modifying and deleting business rules relating to business processes. This capability should provide a business rules authoring toolset to design, modify, test, deploy, and execute business rules separate from the application code. It should include a rules repository capable of tracking and reverting to older rule versions and tracking changes to rules based on the system user.

3.1.9. **Documentation Management**

The Documentation Management capability enables carriers and permit service companies to submit supporting documentation with their permit applications, as well as any NOV (Notice of Violation) responses. Users will be able to upload electronic documents to HOOCS as necessary at any point in a permit application workflow and the violation tracking workflow. The system will provide the ability to upload, scan, store, archive, and retrieve documents associated with a carrier and its permit application. A reportable audit trail will exist for each document, including upload, modification, access, and delete dates.

3.1.10. **Reporting**

The Reporting capability enables generating pre-defined reports, ad-hoc queries and reports, and dashboards, as well as correspondence and document generation.

### 3.2. **System Interfaces**

#### 3.2.1. **NYS System Interfaces**

HOOCS will interface with the following other NYS systems:
- **NYSDMV** – will provide valid escort information by means of data files that will be batch loaded into HOOCS on a periodic basis.
- **OSCAR** – provides motor carriers with a single point of contact for application of required operating credentials over the internet. Included in the OSCAR credentialing capability is the ability to apply for oversize overweight permits. OSCAR will provide initial permit application processing and payment processing.
NYCDOT – will allow NYSDOT to transmit oversize overweight special hauling permits that require New York City DOT (NYCDOT) review and will receive the reviewed/approved permits back.

3.2.2. **NYSDOT System Interfaces**

HOOCS will obtain restriction information from the following NYSDOT systems:

- **Bridge Data Information System (BDIS)** - the primary bridge inventory and inspection information for the entire state, regardless of bridge owner. BDIS is the primary data source for bridge load rating, bridge clearance (by lane), lane width, flag status, posting, and R-Posting status.

- **Roadway Information System (RIS)** - the primary road inventory information system. RIS will provide information on the NYSDOT Road ID, Route, Roads, Ramps, Groups of Roads, Roadways, and Overlaps.

- **ArcGIS** – NYSDOT Geographic Information System that will provide geographic maps and imagery.

- **511NY** – New York State's official traffic and travel info source. This system includes a center-to-center messaging component which facilitates the ability to interface with and share data among transportation systems. The NYSDOT 511 system will provide route restriction information for incidents, closures, and special events.

- **NYSDOT Maintenance Asset Management Information System (MAMIS)** - will provide scheduled maintenance route-restriction information.

- **NYSDOT Condition Acquisition and Reporting System (CARS)** - will provide road incident, weather conditions, and traffic situation restriction information.

- **NYSDOT Winter Travel Advisory (WTA)** - will provide weather-related route-restriction information.

HOOCS will provide permit data to:

- **NYSDOT Commercial Vehicle Information Exchange Window (CVIEW)** - will provide external law enforcement users with the capability to validate existing and in-process OS/OW permits.
3.3. System Users

HOOCS will be used directly by internal and external users. External users include Permit Service Companies and Carriers applying for OS/OW permits. Internal users include the below NYSDOT users as follows:

The Central Permits Bureau staff will utilize the HOOCS system to accept, manage, and approve or deny permit applications. The Central Permits Bureau staff will also manage and maintain route restrictions.

The Office of Structures staff will utilize the HOOCS system to perform overload analysis for those permits requiring analysis as determined by the Central Permits Bureau staff.

The Office of Modal Safety and Security staff support the NYS program of commercial vehicle OS/OW enforcement by analyzing potential violations and issuing warnings and/or NOVs as appropriate.

The Division of Legal Affairs (DLA) staff supports the tracking of NOVs issued. Each NOV requires disposition of action and results in multiple follow-up correspondence, tracking of due dates and status, and tracking and linking of scanned documents.

HOOCS will be used indirectly by the below users as follows:

Law Enforcement – will query the HOOCS system to view a specified permit.

DOT Finance – will utilize Financial Reports from HOOCS to perform daily reconciliation of receivables and payments related to OS/OW Permitting

Although users will have secure role-based access to system information, Table 1 provides an overview of the system capabilities by user types.

<table>
<thead>
<tr>
<th>System Capabilities</th>
<th>Carriers/ Permit Service Co</th>
<th>Central Permits Bureau</th>
<th>Office of Structures</th>
<th>Region Staff</th>
<th>Office of Modal Safety &amp; Security</th>
<th>Division of Legal Affairs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Permitting</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Structural Analysis</td>
<td></td>
<td></td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Routing</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Restriction Management</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Account Management</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Financial Management</td>
<td>✓</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Workflow Management</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Business Rules Management</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Documentation Management</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Reporting</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td></td>
<td>✓</td>
</tr>
</tbody>
</table>
Table 2 provides an estimate of the number of HOOCs system users. This estimate is for purposes of providing training and support.

### Table 2, HOOCs System Users

<table>
<thead>
<tr>
<th>Role</th>
<th>Main Office Staff</th>
<th>Region Staff</th>
<th>Service Companies</th>
<th>Carriers</th>
<th>Law Enforcement</th>
<th>Other Agencies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Structures</td>
<td>7</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Permits - Special Hauling</td>
<td>12</td>
<td>0</td>
<td>60 (*2)</td>
<td>500</td>
<td>(*4)</td>
<td>50 (*3)</td>
</tr>
<tr>
<td>Permits - Divisible Load</td>
<td>10</td>
<td>0</td>
<td>20 (*2)</td>
<td>2,000</td>
<td>(*5)</td>
<td>(*6)</td>
</tr>
<tr>
<td>Restriction Management</td>
<td>2</td>
<td>20 (*1)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

* Notes
*1 20 = 2 people *10 regions
*2 This represents the number of companies; each company could have several users.
*3 In the future, there could be NYC, thruway, or bridge authority users.
*4 Currently there is access for many law enforcement agencies, but it is not often, if ever, used; no RFP requirements.
*5 Law enforcement will use the data, but they will be using it through CVIEW and not directly through any future HOOCs system, so there will not be any requirements in the HOOCs RFP other than an integration point.
*6 OSCAR training may be required but will not result in HOOCs RFP requirements.

Reporting will use Performance Dashboards, and no direct training or support should be required.

IT Administration training will need to be provided to a small number of support people in ITS.

Table 3 provides an estimate of the annual HOOCs OS/OW permit volume. The numbers are based on the totals for 2012.

### Table 3, Annual Permit Volumes

<table>
<thead>
<tr>
<th>Permit Type</th>
<th># of applications reviewed</th>
<th>Permits Issued</th>
<th>Certificates Issued</th>
</tr>
</thead>
<tbody>
<tr>
<td>Divisible Load Permit</td>
<td>30,000</td>
<td>28,000+</td>
<td>290,000+</td>
</tr>
<tr>
<td>Special Hauling</td>
<td>109,000+</td>
<td>103,000+</td>
<td>n/a</td>
</tr>
</tbody>
</table>

### 3.4. Assumptions and Constraints

Accurate bridge and restriction data is of paramount importance to the routing and auto-issuance solution’s success.
The Triborough Bridge and Tunnel Authority (TBTA) and the Port Authority of New York and New Jersey (PANYNJ) will continue to permit through the NYCDOT Over-Dimensional Vehicle Permitting (ODVP) system.

Current ITS experienced staff familiar with the OS/OW Permits system will continue to develop the system extensions and/or integrations from the resulting “build here” work.

HOOCS needs to incorporate flexibility to easily adapt to changing laws and regulations.

3.5. Dependencies

Continued support of the OSCAR portal by the Department of Tax and Finance is required.
4. Route Analysis Processing Detail

The route-analysis processing feature will be responsible for performing initial analysis of a route entered by a user. The goal will be to provide the user with a quick indication of whether the selected route is auto-approvable or if a manual review of the route will be required.

The routing component should enable applicants to define the start location, end location, and routing preferences. The system should combine this input with the vehicle and load information in order to analyze it for routing.

Established Route

The route-analysis processing feature will first analyze the carrier-entered start and end locations for an established route.

Established (Preferred) routes would reflect current high use by industry. Past discussions with Permit Service Companies identified approximately 17 through routes within NYS that appear popular with carriers. This function would build on this concept. Industry and current data input could be used to provide an initial identification of these routes.

If an established route will satisfy the desired trip, then the load will be checked for safe passage. The route will also be checked for any temporary restrictions. If the route is still valid, the route should be provided to the carrier for selection.

Recommended Route

When no established route fits the carrier-entered trip start and end locations, the system should provide the carrier with a recommended route. The system should identify the recommended routes by rank. The route that receives the highest ranking should be provided to the carrier for selection. The ranking of possible route(s) should be based on the following:

Route Restrictions (Bridge/Construction/etc.) – If an un-passable restriction is identified on a route, the route analysis should stop. The route analysis could continue analysis at the last acceptable link/leg/intersection of a similar category route.

Highway Category – The highway categories should be selected by the Program staff and should be adjustable over time based on actual use, as well as regional and industry input. Examples include:

1) Interstate
2) Qualifying Highway
3) Four-Lane state route
4) Access Highway
5) Rural state route
6) Urban state route
7) Roundabout
8) Local road
Highway Category Ranking – Program staff would develop a ranking for the Highway categories, which should be adjustable based on regional and industry input.

If a recommended route will satisfy the desired trip, then route should be provided to the carrier for selection.

**User Entered Route**

The following diagram describes the envisioned route-analysis process flow. The table that follows the diagram provides further detail on the elements included in the process flow.
4.1 Route Analysis Processing Business Analysis

Figure 6, Route Analysis Processing
<table>
<thead>
<tr>
<th>BPMN Diagram Element Name</th>
<th>Element Type</th>
<th>Element Description</th>
<th>Role</th>
</tr>
</thead>
<tbody>
<tr>
<td>Received Trip, Route, and Vehicle Info</td>
<td>Start Event</td>
<td>Triggering event for this process</td>
<td>HOOCS System</td>
</tr>
<tr>
<td>Established Route?</td>
<td>Gateway</td>
<td>The system should detect whether an established route exists based on the trip info.</td>
<td>HOOCS System</td>
</tr>
<tr>
<td>Perform Route Check</td>
<td>Task</td>
<td>If an established route exists, the system should check the load to ensure that it fits the envelope of the route and should check for the existence of any restrictions.</td>
<td>HOOCS System</td>
</tr>
<tr>
<td>Restriction Blocking Established Route?</td>
<td>Gateway</td>
<td>If an established route is blocked by any restrictions, the system will not present the established route to the user.</td>
<td>HOOCS System</td>
</tr>
<tr>
<td>Accept Established Route?</td>
<td>Gateway</td>
<td>The user should be presented with a valid established route and be allowed to “Accept the Route” or “Decline the Route.”</td>
<td>User</td>
</tr>
<tr>
<td>Associate Accepted Route with Permit Application</td>
<td>Task</td>
<td>If the user accepts the established route, the system should associate the route with the permit application.</td>
<td>HOOCS System</td>
</tr>
<tr>
<td>Perform Route Ranking</td>
<td>Task</td>
<td>Based on the start location, end location, and vehicle/load information, the system should identify and rank a number of possible routes.</td>
<td>HOOCS System</td>
</tr>
<tr>
<td>Provide Best-Ranked Route</td>
<td>Task</td>
<td>Based on the identified and ranked routes, the system should present the best route to the user.</td>
<td>HOOCS System</td>
</tr>
<tr>
<td>Accept Recommended Route?</td>
<td>Gateway</td>
<td>The user should be presented with a valid recommended route and be allowed to “Accept the Route” or “Decline the Route.”</td>
<td>User</td>
</tr>
<tr>
<td>Associate Recommended Route with Permit Application</td>
<td>Task</td>
<td>If the user accepts the recommended route, the system should associate the route with the permit application.</td>
<td>HOOCS System</td>
</tr>
<tr>
<td>Input Proposed Route</td>
<td>Task</td>
<td>When the user declines the recommended route, the user should be allowed to input a proposed route.</td>
<td>User</td>
</tr>
<tr>
<td>Analyze Proposed Route</td>
<td>Task</td>
<td>Based on the start location, end location, vehicle/load information, and user-entered route, the system should identify whether the user-proposed route is acceptable.</td>
<td>HOOCS System</td>
</tr>
<tr>
<td>Accept Proposed Route?</td>
<td>Gateway</td>
<td>The system should detect whether the user proposed route is acceptable and either “Accept the Route” or “Reject the Route.”</td>
<td>HOOCS System</td>
</tr>
<tr>
<td>Associate Proposed Route with Permit Application</td>
<td>Task</td>
<td>If the system accepts the user-proposed route, the system should associate the route with the permit application.</td>
<td>HOOCS System</td>
</tr>
<tr>
<td>Provide Reasons for Decline</td>
<td>Task</td>
<td>If the system declines the user-proposed route, the system should provide the reasons for declining the user-proposed route to the user.</td>
<td>HOOCS System</td>
</tr>
<tr>
<td>BPMN Diagram Element Name</td>
<td>Element Type</td>
<td>Element Description</td>
<td>Role</td>
</tr>
<tr>
<td>---------------------------</td>
<td>--------------</td>
<td>---------------------</td>
<td>------</td>
</tr>
<tr>
<td>Select Different Route?</td>
<td>Gateway</td>
<td>If the system declines the user-proposed route, the user should be allowed to “Propose a Different Route” or “Request Manual Review” of the route.</td>
<td>User</td>
</tr>
<tr>
<td>Manual Review Selected</td>
<td>End Event</td>
<td>The user requests that their proposed route be manually reviewed.</td>
<td>HOOCS System</td>
</tr>
<tr>
<td>Provide Auto-Approvable Route</td>
<td>End Event</td>
<td>An acceptable route has been identified and is auto-approvable.</td>
<td>HOOCS System</td>
</tr>
</tbody>
</table>

### 4.2. Information Collection

Within the Routing component, the applicant must be provided with the opportunity to input:

- Start location
- End location

### 4.3. Route Ranking Algorithm

The system should combine the initial route information with the vehicle and load information for running through the route-ranking algorithm. As a result of this analysis, a ranked list of routes should be provided to the applicant. Design data such as highway class, lane and shoulder width, and general segment length should exist for supporting the ranking. One would need to see what data exists and extract from the data that will help with the ranking.

The routing algorithm should follow the process described below:

1. Perform Envelope Check – The system should compare the input data with system data, including the following:
   - Bridge Needs Assessment Model (BNAM)
   - Roadway Information System (RIS)
   - Bridge Data Information System (BDIS)
   - Highway Restrictions
     - Temporary
     - Long term

2. Determine Established Route [Preferred] - would reflect current high use by industry. Past discussions with Permit Service Companies identified approximately 17 through routes within NYS that appear popular with carriers. This function would build on this concept. Industry and current data input could be used to provide an initial identification of these routes. Thus, when a carrier selects start and end locations for their trip, and a preferred route exists, the route would be provided to them for selection. It is understood that if any restriction were placed on a preferred route, it would not be provided for...
selection. If the application fits within an Established Route [Preferred] envelop vehicle, the applicant should be allowed to do one of the following:

- Decline: If an established route is not accepted by the applicant, they should be directed to the manual route processing approach and its associated requirements.
  
  i. Applicant will input their proposed route
  
  ii. System will perform a comparison of this route to any restrictions or conditions
  
  iii. If the applicant proposed route does not have any restrictions, then the system can associate the proposed route with the application and proceed to the next step.
  
  iv. Applicant will input appropriate support documentation addressing any restrictions or conditions, such as a route survey and local approvals
  
  v. System will direct the submittal to a permit agent for review and action

- Accept: If an established route is accepted by the applicant, the system should associate the selected route with the application and proceed to the next step. [Still auto-issue eligible]

3) Rank Recommended Routes - If the application does not fit within the Established Route [Preferred] envelop vehicle, the system will calculate a route ranking for route(s) based on a ranking of the following:

- Route Restrictions (bridge/construction, etc.) – If an unacceptable restriction is identified, the routing is stopped and a new one initiated. It could restart at the last acceptable link/leg/intersection of a similar category route.

- Highway Category – Highway categories will be provided by the Roadway Inventory System (RIS), selected by the Program staff, and tweaked over time based on actual use, regional and industry input. Examples are as follows:
  
  i. Interstate
  
  ii. Qualifying Highway
  
  iii. Four-Lane state route
  
  iv. Access Highway
  
  v. Rural state route
  
  vi. Urban state route
  
  vii. Roundabout
  
  viii. Local road

- Highway Category Ranking – Program staff will develop a ranking for the above categories. They would be coordinated with the regions and industry. Once selected, the HOOCS system could populate the ranking database with input from the RIS system matching the categories chosen.
4) If a recommended route can be identified, the applicant will review the recommended route(s) and do one of the following:

- Decline: If not accepted by the applicant, they are directed to the manual processing approach and its associated requirements.
  
i. Input their proposed route.
  
ii. HOOCs will rerun the routing analysis for the selected route for any restrictions or conditions.

iii. Applicant will input appropriate support documentation addressing these restrictions and conditions, such as a route survey, local approvals. [Supplemental Documents Will be Required. Note: a route survey may already have been noted due to vehicle/load height.]

iv. System will direct the submittal to a permit agent for review and action.

- Accept: The system will associate this route to the application and proceed to the next step. [Still auto-issue eligible]

5) Route Rejection – If the application does not fit any system-accepted route [rejected by structures, lane width, restrictions, etc.], the applicant will be informed of the rejection and requested to submit alternate entry and end points or to request manual review. [MANUAL REVIEW REQUIRED]

6) Manual Route - If the carrier does not like the route provided, they can still use the information provided in the routing tool to select an unrestricted route for use.

Once a route has been selected for use with a permit application, it will need to be analyzed by the structural analysis processing.
5. Structural Analysis Processing

5.1. Description
The structural analysis of a permit application is to ensure safe passage of the load without any potential damage to structures it will be crossing. Structural analysis will be performed for each structure the OS/OW load will be crossing and will entail analyzing the load weight, the vehicle configuration, and the structure configuration.

Applicants will provide information on the vehicle (permit vehicle) that will be carrying the load. Permit applicants will provide up to 30 axle loads (29 axle spacings) on the permit application to define the permit vehicle.

The BDIS will provide information regarding each structure the permit vehicle will be crossing. The bridge information will include the number of spans and the span type for each.

For a route where the blanket analysis PVLE is less than 150%, HOOCS should perform the analysis based on typical span lengths (from 20 to 200 feet in 10-foot increments and 220 to 320 feet in 20-foot increments).

The results of the structural analysis will be provided for each structure. For structures that can be automatically approved for the passage of the load, approval will be provided. For all other structures, information on why the auto approval could not occur will be provided to the manual reviewers.

5.2. Structural Analysis Processing Detail
This section provides the formulas and logic utilized to analyze the permit application data.

5.2.1. Multiple Presence Reduction Factor
The Multiple Presence Reduction Factor is calculated based on the permit vehicle width. It is the ratio between the width that an HS20 vehicle is assumed to occupy (8 feet) and the actual width of the permit vehicle:

\[
\text{Multiple Presence Reduction Factor} = \frac{8.0 \text{ feet}}{\text{Actual Vehicle Width in feet}}
\]

with a minimum value of 0.85 and a maximum of 1.0.

For annual and radius permits, the existing BigTruk system uses 1.0 for this value.

For a trip permit, the user can override this computed factor and input another value.

5.2.2. Largest Axle Weight
BigTruk checks the weight of the largest single or grouping of axles (tandem, tridem, and quad) for the permit vehicle.

Single axle - one or two axles whose centers are not more than 46 inches apart
Tandem grouping of axles - two or three consecutive axles where the axle spacing between the center of consecutive axles is not less than 46 inches, and the axle spacing between the center of the outer axles is not more than 96 inches

Tridem grouping of axles - three consecutive axles where the axle spacing between the center of any two consecutive axles is not less than 46 inches or more than 96 inches, and the axle spacing between the center of the outer axles is not more than 142 inches

Quad grouping of axles - four consecutive axles where the axle spacing between the center of any two consecutive axles is not less than 46 inches or more than 96 inches, and the axle spacing between the center of the outer axles is not more than 168 inches

If an annual or radius permit is being checked, and if the largest single axle is greater than 45 kilopounds (kips or 1000 pounds of force), OR if the largest tandem grouping of axles is greater than 69 kips, OR if the largest tridem grouping of axles is greater than 77 kips, then a warning message is output.

If a trip permit is being checked the largest single axle is greater than 56 kips, then a warning message is output.

5.2.3. Vehicle Maximum Moment and Sheer

Vehicle maximum moment and sheer analysis will be performed by analyzing the HS20 truck, H20 truck, and permit vehicle for all of the structure span lengths. For each span length and point to be checked, the maximum moment and shear for each vehicle will be calculated. The ratios will be calculated between the permit vehicle and the HS20 truck and between the permit vehicle and the H20 truck for these moment and shear values.

The permit vehicle is analyzed for each span in increments of 1 foot

The H20 truck is defined as 8 and 32 kip axles at 14-foot spacing

The HS20 truck is defined as 8, 32, and 32 kip axles at 14-foot spacing.

For the H20 truck and the HS20 truck, the uniform load is defined as 0.640 kips/ft., and the concentrated load is 18 kips for moment and 26 kips for shear.

Whichever gives the larger moment and shear, either the truck load or lane load, is used for HS20 and H20.

5.2.4. Length of Span (L)

For continuous analysis, the length of the span under consideration is used as \( L \) for positive moment and for shear, and the average of the two adjacent spans is used as \( L \) for negative moment.

5.2.5. Impact Factor (I)

The impact factor will be calculated using the Standard AASHTO (LFD) formula based on span length:

\[
\text{Impact Factor (I)} = \frac{50}{125 + L}
\]
with a maximum value of 0.3

where:

- \( L = \text{Span Length (in ft.)} \)

### 5.2.6. Overstress Dead Load Consideration

The overstress due to the permit vehicle will be calculated when compared to an H20 or HS20 truck. For simple span moment, BigTruk computes the fraction of the

\[
\text{Overstress} = 0.0022 \times L + 0.34 \text{ for spans 150 feet or less}
\]

\[
\text{Overstress} = 0.0022 \times L + 0.34 + 0.0006 \times (L - 150) \text{ for spans over 150 feet}
\]

where:

- \( L = \text{Span Length (in ft.)} \)

The remaining capacity is assumed to be taken by the design vehicle (H20 or HS20). The percentage overstress is then calculated based on the moment ratio between the permit vehicle and the H20 or HS20 truck.

### 5.2.7. Simple Spans

#### Lane Load Maximum Moment (M)

For lane load, the maximum moment at mid-span will be calculated. The uniform load is placed over the entire span, with the concentrated load placed at the center. The moment can then be calculated as:

\[
\text{Lane Load Maximum Moment (M)} = 0.64 \times \frac{L^2}{8} + 18.0 \times \frac{L}{4}
\]

where:

- \( L = \text{Span Length (in ft.)} \)

For truck loads (permit vehicle and H20 or HS20), the maximum moment occurs at one of the axles.

#### Lane Load Maximum Shear (V)

The maximum shear at end support will be calculated. The uniform load is placed over the entire span, with the concentrated load at the span end. The shear can then be calculated as:

\[
\text{Maximum Shear at End Support (V)} = 0.64 \times \frac{L}{2} + 260
\]

where:

- \( L = \text{Span Length (in ft.)} \)
For truck loads (permit vehicle and H20 or HS20), the maximum shear occurs at the span end.

**Moment at Distance X**

The moment at a distance X due to a point load (P) at a distance A from the left support is:

\[
\text{Moment at Distance (M)} = \frac{P \times (L - A) \times X}{L} \quad \text{if } X \leq A
\]

and

\[
\text{Moment at Distance (M)} = \frac{P \times A \times (L - X)}{L} \quad \text{if } X > A
\]

where:

- \( P \) = Point Load (in lbs or kips?)
- \( L \) = Span Length (in ft.)
- \( A \) = TBD
- \( X \) = Distance from Left Support (in ft?)

**Left Reaction to a Point Load (R1)**

The left reaction due to a point load (P) at a distance X from the left support is:

\[
\text{Left Reaction to a Point Load (R1)} = \frac{P \times (L - X)}{L}
\]

where:

- \( P \) = Point Load (in lbs or kips?)
- \( L \) = Span Length (in ft.)
- \( X \) = Distance from Left Support (in ft?)

**Right Reaction to a Point Load (R2)**

and the right reaction is:

\[
\text{Right Reaction to a Point Load (R2)} = \frac{P \times X}{L}
\]

where:

- \( P \) = Point Load (in lbs or kips?)
- \( L \) = Span Length (in ft.)
- \( X \) = Distance from Right Support (in ft?)
5.2.8. Continuous Spans

BigTruk uses the same span lengths for the continuous analysis as for simple spans - taking into account span ratios of 1-1 for two-span arrangements and 0.75-1.0-0.75 for three-span arrangements.

Predefined influence curve data based on these span ratios is used for the analysis. The same curve is used to calculate the moment or shear at a particular point for all the desired span lengths. This method works since the spans being analyzed are in the same proportion as those which were used to generate the data (and also because a constant moment of inertia is always assumed). Therefore, the influence curve has same basic shape, regardless of span lengths - only the magnitude changes, and only for the moment curve.

Influence Curve Data

The original curve data was generated using STAAD PRO software. In the analysis, a constant moment of inertia was assumed. For two spans, span lengths of 100 feet were used. For three spans, span lengths of 75, 100, and 75 feet were used. A unit load (1.0 kips) was moved across the spans (40th points were used as the increment).

Curve data was created for six points (to check the maximum positive moment, maximum negative moment, and maximum shear for both two- and three-span arrangements). For two spans, points were at 4/10th point of span 1 (positive moment) and at the interior support (negative moment and shear). For three spans, points were at mid-point of span 2 (positive moment) and at the first interior support (negative moment and shear).

All the curve information is stored in a plain text file (INF.TXT). There are 41 data points per span. Two points were needed at each interior location (to handle the case of a sudden jump in shear at the pier). New check points and new span arrangements can be added without changing BigTruk values, only the new curve data needs to be added.

BigTruk calculates moments and shears using the curve data.

Concentrated Load

For a concentrated load, BigTruk determines the value of the curve at the location of load (interpolation is done if needed). The moment or shear can then be calculated:

\[
For \text{ Shear} (V) = P \times y \\
For \text{ Moment} (V) = P \times y \times \Delta^2
\]

where:

- P = Point Load? (in lbs or kips?)
- y = TBD
- \Delta = TBD - Is this the Span Factor?
**Uniform Load**

For a uniform load, BigTruk calculates the area under the curve as:

\[
Area \text{ under the curve } (A) = \sum_{i=1}^{n} \frac{1}{2} \times (y_i + y_{i+1}) \times \frac{L'}{n}
\]

where:

- \( L \) = Span Length (in ft.)
- \( n \) = TBD
- \( y \) = TBD
- \( i \) = TBD

The moment or shear can then be calculated:

\[
Shear (V) = A \times \Delta
\]
\[
Moment (V) = A \times \Delta^2
\]

where:

- \( = TBD \) – Is this the maximum weight?
- \( A \) = Area Under the Curve
- \( \Delta = TBD \) – Is this the Span Factor?

**Span Factor**

The span factor is the ratio of the span length being analyzed \((L)\) to the span length that curve data is based on \((L')\):

\[
Span \ Factor \ (\Delta) = \frac{L}{L'}
\]

where:

- \( L = \) Span Length (in ft.)
- \( L' = \) Span Length that the curve data is based on (in ft.)

**Reverse Pass**

When moving a truck load across the spans, a second pass is performed with the direction reversed.

**5.2.9. Lane Load**

For the lane load, the uniform load is placed on all the spans that will produce the greatest effect. For negative moment and shear, up to two concentrated loads are placed. For positive moment, one concentrated load is placed.
5.3. Results

BigTruk calculates the ratio of moments and shears due to the permit vehicle to those due to H20 and HS20 trucks for each span length (no impact or reduction factor is included yet).

The program currently then creates tables for the following four cases, plus two additional tables, for pure moment and shear values for the HS20 and permit vehicles.

- Case 1 - full speed, no reduction
- Case 2 - full speed, with reduction
- Case 3 - crawl speed, no reduction
- Case 4 - crawl speed, with reduction

For case 1, there is no reduction in the calculated ratio. For case 2, it is reduced by the multiple-presence factor. For case 3, it is reduced by the impact factor. For case 4, it is reduced by the multiple-presence factor and the impact factor.

BigTruk stores the largest calculated ratio (HS20 load effect) in the database for cases 2 and 4, along with length of the span (or spans for continuous) that produced that effect. The equivalent tonnage (effect × 36 ÷ 100) is also calculated and stored.

For annual and radius permits, only the tables for Case 1 and Case 3 are output. Also, a table with overstress percentage values for the H20 truck (full speed, no reduction) is output.

The user can specify whether to view the load effects in the tables as percentages or as an equivalent tonnage.
5.4. Decision Making

HOOCS should determine if it can make a decision regarding permit issuance using the automatic permit approval decision logic specified in this section. The automatic permit approval decision result codes are defined in Table 5. The automatic permit approval decision logic is specified in the following subsections.

<table>
<thead>
<tr>
<th>Result Code</th>
<th>Decision</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Manual Review required</td>
</tr>
<tr>
<td>1</td>
<td>Load allowed to cross R-posted structures. Not to exceed any load-posted structures.</td>
</tr>
<tr>
<td>2</td>
<td>Load not to cross R-posted and/or load-posted structures. Cross all other structures at lawful speed, except as noted below.</td>
</tr>
<tr>
<td>3</td>
<td>Not currently used.</td>
</tr>
<tr>
<td>4</td>
<td>OK for annual crane permit. Not to cross R-posted and/or load-posted structures.</td>
</tr>
<tr>
<td>5</td>
<td>OK for radius/blanket permit. Not to cross R-posted and/or load-posted structures. Incomplete application; please forward information requested in comments.</td>
</tr>
<tr>
<td>6</td>
<td>Disapproved, reason is specified in provided comments.</td>
</tr>
<tr>
<td>7</td>
<td>Other - Example: Vehicle at full speed exceeds the load-carrying capacity of a County Owned Bridge (result would be a #7 if the vehicle at full speed and &lt; 5mph exceeded the load capacity). The note saying “...get permission from County...” used to be put in results for any route with a County bridge even if the bridge had a load rating sufficient for the Vehicle.</td>
</tr>
</tbody>
</table>

If the weight of the largest single, tandem, or tridem grouping exceeds the maximum permissible weight, then no decision is made and Result Code 0 is selected.

If a trip permit is being checked and the full speed load effect (with no reduction) is not more than 100%, then Result Code 1 is selected.

If a trip permit is checked and the full-speed load effect (with no reduction) is between 100% and 150%, then Result Code 2 is selected.

If an annual permit is being checked and the H20 overstress at full speed (with no reduction) is not more than 50%, then Result Code 4 is selected.

If a radius permit or blanket permit is being checked and the full-speed load effect (with no reduction) is not more than 150%, then Result Code 5 is selected.

Otherwise, HOOCS should default to Result Code 0.

The system should provide to the customer the permit review results, including all the comments generated during the review.

5.4.1. PVLE Calculation

The Permit Vehicle Load Effect (PVLE) is the ratio of the load effect (Moment & Shear) of the permit vehicle over the load effect of the HS-20 Design Vehicle, and is calculated using the following formula:
\[ PVLE = \frac{\text{Permit Vehicle (Moment & Shear) load effect}}{\text{HS20 load effect}} \]

### 5.4.2. Automatic Approvals

For the condition where there is no route data, no supplemental data for structures, and no special bridge data (such as load rating), the system should be able to automatically approve the permit application for the following special hauling permit types:

- Five-Mile Radius (No route required)
- Annual Cranes (No route required)
- Trip (Route required when PVLE > 150%)

**Automatic Permit Approval Decision Condition 1:**

Maximum PVLE \(\leq 100\%\) (at full speed, with no reduction)

<table>
<thead>
<tr>
<th>Permit Type</th>
<th>Result Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>5-Mile Radius</td>
<td>1</td>
</tr>
<tr>
<td>Trip</td>
<td>1</td>
</tr>
</tbody>
</table>

**Automatic Permit Approval Decision Condition 2:**

100 % < Max. PVLE \(\leq 150\%\) (at full speed, with no reduction)

<table>
<thead>
<tr>
<th>Permit Type</th>
<th>Result Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>5-Mile Radius</td>
<td>5</td>
</tr>
<tr>
<td>Trip</td>
<td>2</td>
</tr>
</tbody>
</table>

**Automatic Permit Approval Decision Condition 3:**

Maximum PVLE \(\leq 155\%\) (at full speed, with no reduction)

<table>
<thead>
<tr>
<th>Permit Type</th>
<th>Result Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annual Crane</td>
<td>4</td>
</tr>
</tbody>
</table>

### 5.4.3. Automatic Disapprovals

For the following conditions, no route or supplemental data information is required.

**Automatic Permit Approval Decision Condition 4:**

Maximum PVLE > 150% (at full speed, with no reduction)
<table>
<thead>
<tr>
<th>Permit Type</th>
<th>Result Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>5-Mile Radius</td>
<td>7</td>
</tr>
</tbody>
</table>

**Automatic Permit Approval Decision Condition 5:**

Maximum PVLE > 155 % (at full speed, with no reduction)

<table>
<thead>
<tr>
<th>Permit Type</th>
<th>Result Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annual Crane</td>
<td>7</td>
</tr>
</tbody>
</table>

For condition number 5, if the vehicle is in “GRANDFATHERED” status, then the permit can be approved. The permit will need the list of bridges that cannot be crossed.

**5.4.4. Route Span Level Analysis**

Route Span Level Analysis is required when the full speed maximum PVLE without multi-presence (width) reduction exceeds 150%. This analysis requires Route, Supplemental Data, and Bridge-Load Rating Data in order to be performed. For this analysis, every bridge on the route is checked, by comparing the bridge's load rating to the maximum PVLE (at the span lengths of the bridge in question) including the reduction factor. The bridges on the selected route are also checked to see if they are listed in the supplemental data database.

**Automatic Permit Approval Decision Condition 6:**

Full speed with reduction factor & no supplemental data and Primary Member rating >=4 with Level I or Level II Load rating available

- If the Level I Load Rating HSop >= Max. PVLE then it is OK to cross at lawful speed
- If there is no Level I Load rating and the Level II Load Rating HSop >= Max. PVLE, then it is OK to cross the span at lawful speed.

**Automatic Permit Approval Decision Condition 7:**

Full speed with reduction factor & no supplemental data and Primary Member rating >=4; with No Level I or II Load rating

- If the structure year built >= 1956 & design Load HS20; 60 Ton >= Max. PVLE
  - Then the load is OK to cross at lawful speed
- If the Design Load HS25/HL93; 72 Ton >= Max. PVLE
  - Then the load is OK to cross at lawful speed

**Automatic Permit Approval Decision Condition 8:**

Full speed with reduction factor & with supplemental data specified HSop:
− If the bridge supplemental data specifies “No overloads allowed”
  ◦ Then the load is disapproved
− If the structure Supplemental data specified HSop >= Max. PVLE
  ◦ Then the load is OK to cross at lawful speed

**Automatic Permit Approval Decision Condition 9:**

Crawl speed with reduction factor & no supplemental data and Primary Member rating >=4 with Level I or Level II Load rating

− Level I HSop >= Max. PVLE
  ◦ Then the load is OK to cross the specific bridge at < 5 mph
− If there is no structure Level I load rating, and the Level II HSop >= Max. Crawl PVLE
  ◦ Then the load is OK to cross at < 5 mph

For this condition, HOOCS should provide the option for routing failed permit applications for manual review.

**Automatic Permit Approval Decision Condition 10:**

Crawl speed with reduction factor & no supplemental data and Primary Member rating >=4 with No Level I or II Load rating

− If the structure year built >= 1956 & design Load HS20; 60 Ton >= Max. Crawl PVLE
  ◦ Then the load is OK to cross the specific bridge at < 5 mph
− If the Design Load HS25/HL93; 72 Ton >= Max. Crawl PVLE
  ◦ Then the load is OK to cross the specific bridge at < 5 mph

For this condition, HOOCS should provide the option for routing failed permit applications for manual review.

**Automatic Permit Approval Decision Condition 11:**

Crawl speed with reduction factor with supplemental data specified HSop:

− If the structure Supplemental data specifies “No overloads allowed”
  ◦ Then the load is disapproved to cross the specific bridge
− If the structure Supplemental data specifies “do not allow Crawl speed” and disapprove
  ◦ Then the load is disapproved to cross the specific bridge
− If the structure Supplemental data specified HSop > Max. Crawl PVLE
  ◦ Then the load is OK to cross the specific bridge at < 5 mph

For this condition, HOOCS should provide the option for routing failed permit applications for manual review.
**Automatic Permit Approval Decision Condition 12:**

Crawl speed with reduction factor
- When conditions 9 to 11 are not met, then permit is recommended for disapproval.

**5.5. Manual Review**

Manual review will be required when:

- The supplemental data is other than: “HSop = xxx;” “No overloads allowed;” or “Do not allow crawl speed”
- No supplemental data and primary member rating < 4
- No supplemental data, load rating, or year built is prior to 1956

If the system determines that a Manual Review is required by Structures, the system shall send a notification to the appropriate personnel and provide all of the permit information, Structural Analysis result, a list of Bridge Identification Numbers (BINs) in question and all the comments generated by the system.

The system shall enable authorized users to review any permit application where the system could not provide structural analysis approval due to the application not meeting the auto-approval business rules.

The system shall enable authorized users to provide structural analysis approval for permit applications.

The system shall enable authorized users to provide structural analysis dis-approval for permit applications.

**5.6. Floor Beam Analysis**

BigTruk performs an analysis of a typical floor-beam spanning between two main girders. This analysis is included in the output and is not used in any decision making.

The floor beam is assumed to act as a simple span between the main girders. Two cases are looked at: one with constant floor-beam spacing (default 22 feet) and a varying floor beam length (15 to 35 feet), and a second with varying floor-beam spacing (18 to 32 feet) and a constant floor-beam length (default 22 feet). The default constant values can be overridden by the user. BigTruk also examines the situations of one vehicle alone on the bridge and two vehicles placed side by side.

First, the HS20 or permit truck is moved longitudinally along the bridge to determine the maximum reaction over the floor beam. Simple spans are assumed between the floor-beam locations. This reaction is then divided in half to get the wheel load of the truck to be used in the floor-beam analysis.

Second, the truck or trucks are moved transversely across the width of the bridge (at 0.1 foot increments) to determine the maximum moment and shear values for the floor beam. For the HS20 truck, two wheel loads spaced at six feet apart are used. For the two-vehicle case, a distance of four feet is used between the adjacent HS20 trucks. For the permit vehicle, the two wheel loads are placed at distance of six feet. For the two-vehicle
case, the permit vehicle is paired with another HS20 truck spaced at a distance of four feet. (It is assumed that only one overload vehicle will be on the bridge at one time.)

The ratio of the permit vehicle to the HS20 truck for both moment and shear is calculated. This ratio is reported just for the two-vehicle cases. BigTruk outputs the results for permit vehicle moving at both crawl and full speed.

6. Divisible Load Overweight Permit Lottery

The NYS Vehicle and Traffic Law authorizes the Department of Transportation to issue new annual Divisible Load Overweight Permits to a specified number of power units within any 12-month period. The Vehicle and Traffic Law specifies that after 12/31/2008, no more than 25,000 power units shall be issued permits by the Department in any 12-month period.

6.1. Lottery Order of Precedence

The Vehicle & Traffic Law dictates the order of precedence of issuing permits when in this situation.

The first priority is for applications from companies wishing to renew, whose permit has been expired for fewer than four (4) years.

The second priority is for new applications from companies who have one permit but less than three (3), providing that the total of existing and new permits does not exceed three (3).

The last priority (referred to as the true lottery) is given to initial applicants and new applications from companies with more than three permits.

For each prioritized category of permits, applications are placed in line based on the date of receipt of their application. For applications received on the same day, the system should randomly assign the priority.

The Department cannot provide an exact date of when a permit in the lottery will be issued. It depends on the number of permits that are not renewed by current permit holders, which the Department cannot foresee. When the Department reaches the statutory cap of power units permitted, the range of time between when a complete application is received and permit issuance could be as long as six months. Based on the environment the Department experienced when the lottery was last in effect, as well as the number of applications for permits awaiting issuance during that time, it is reasonable to expect a delay of six months should the lottery again be needed.

New York State is one of only a few states that have a Divisible Load type program that is grandfathered under federal law. Current federal law prohibits states from allowing divisible type loads of more than 80,000 pounds to travel on the National Network of highways, except where lower gross weights are dictated by the Federal Bridge Formula.

When checks are received with the application, they are separated immediately. The check amount is recorded in the company's account, and the check is forwarded to the Department's Revenue Unit which then deposits the funds in the State's General Fund.
The permit application is separately reviewed for completeness and for meeting the regulatory requirements for permit issuance. An original issued permit is required to be carried in the vehicle at all times while operating above the legal weights allowed by Sections 385.5 through 385.13 of the NYS Vehicle and Traffic Law. At no time prior to permit issuance may the applicant begin operating the vehicle at the weights applied for. At any time prior to issuance of the permit, an applicant may, in writing, request a refund of the permit fee (minus a $50 processing fee) and a return of the application. Such requests must be made in writing.

Please note that available funds in a company account are not directly tied to specific permit applications.

6.2. Permit Renewals

NYSDOT will provide the carrier with a renewal notice prior to its expiration. The divisible load overweight permit lottery will not apply to companies seeking renewal of a permit that has not yet expired.

The carrier should return the renewal notice approximately two months prior to the expiration date of the permit along with the fee stated on the notice. Carriers have the option of pre-funding their account and completing and submitting a Permit Renewal Confirmation (available on the website) via e-mail so long as there are no changes to the permit aside from a power unit plate change. Any other change to the permit will require the completion and submission of an Application for an Amendment to a Divisible Load Overweight Permit with the appropriate changes indicated.

6.3. Expired Permit (less than 4 years)

The carrier renewing an expired permit should return the renewal notice along with the fee stated on the notice. Carriers have the option of pre-funding their account and completing and submitting a Permit Renewal Confirmation (available on the website) via e-mail so long as there are no changes to the permit aside from a power unit plate change. Any other change to the permit will require the completion and submission of an Application for an Amendment to a Divisible Load Overweight Permit with the appropriate changes indicated.

6.4. New Applications

New permit applications should be received from companies that have up to three existing permits. A fully completed permit application for a Divisible Load Overweight Permit should be submitted. The completed application should be accompanied by information on the current registration for the power unit.

Initial applications and new applications from companies with more than three permits. A fully completed and signed Lottery Application for Divisible Load Overweight Permit (Statewide Permit Types 1, IA, 7, and 9 Only) (Perm 92) should be submitted. The completed application should be accompanied by a copy of the current registration for the power unit.
Note: Rejected applications that are re-submitted will not be returned to their original positions in the pending work. Re-submitted applications will be treated as newly received applications.

7. Routing and Temporary Restriction Data Items

7.1. Road Information

Table 6, Road Restriction Information

<table>
<thead>
<tr>
<th>Data</th>
<th>Data Description</th>
<th>Current Info Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Permit Jurisdiction</td>
<td>Identifies the governmental unit that owns and permits the highway section</td>
<td>RIS</td>
</tr>
<tr>
<td>Road classification</td>
<td>Functional classification for the highway section</td>
<td>Street network</td>
</tr>
<tr>
<td>Travel Lanes Normally Available</td>
<td>The number of lanes normally available for each direction (# of north bound, # of south bound, # of east bound and # of west bound lanes)</td>
<td>RIS</td>
</tr>
<tr>
<td>Lane width</td>
<td>The width of each lane</td>
<td>RIS</td>
</tr>
<tr>
<td>Shoulder width</td>
<td>The width of the right shoulder (in feet) in the direction of travel</td>
<td>RIS</td>
</tr>
<tr>
<td>Shoulder type</td>
<td>A code that characterizes the existing shoulder structure on a section of highway</td>
<td>RIS</td>
</tr>
<tr>
<td>Route #</td>
<td>The route number and type or road name</td>
<td>RIS or street network</td>
</tr>
<tr>
<td>Qualifying Highway or Access Highway designation</td>
<td>Denotes whether tandem trucks can travel the road</td>
<td>RIS or GIS layer</td>
</tr>
<tr>
<td>GIS segment information</td>
<td>Identification of the road segment position, ramp information, etc.</td>
<td>GIS</td>
</tr>
<tr>
<td>Ramp origin (route/road mile point on the road where a ramp begins)</td>
<td>A formatted description of the route/road mile point on the road where a ramp begins (e.g., 2010-Everett Rd Ext. Albany)</td>
<td>GIS</td>
</tr>
</tbody>
</table>
# 7.2. Restriction Information

**Table 7, Restriction Information**

<table>
<thead>
<tr>
<th>Data</th>
<th>Data Description</th>
<th>Purpose (How it will be used)</th>
<th>Current Info Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Restriction type</td>
<td>The requirement will be for user-defined configurable types such as Construction</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Maintenance</td>
<td>Bridge</td>
<td>Road Closure</td>
</tr>
<tr>
<td>Restriction number</td>
<td>A unique ID</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Restriction entered by</td>
<td>User ID or name of the user who entered the restriction</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Restriction start date</td>
<td>Beginning date of the restriction time period</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Restriction entered date</td>
<td>Date the restriction was entered into the system.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Expected end date</td>
<td>Expected end date of the restriction time period (anticipated date to rescind the</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>restriction)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Actual restriction rescinded date</td>
<td>Actual date the restriction is rescinded</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reoccurrence selections</td>
<td>If the restriction is days of week, month, or time sensitive (e.g., Mon-Fri 5AM-9AM).</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Max vehicle weight</td>
<td>Maximum allowed vehicle weight</td>
<td>Used during structural analysis to determine whether permit can be approved</td>
<td></td>
</tr>
<tr>
<td>Max vehicle length</td>
<td>Maximum allowed vehicle length</td>
<td>Used during structural analysis to determine whether permit can be approved</td>
<td></td>
</tr>
<tr>
<td>Max vehicle width</td>
<td>Maximum allowed vehicle width</td>
<td>Used during structural analysis to determine whether permit can be approved</td>
<td></td>
</tr>
<tr>
<td>Max vehicle height</td>
<td>Maximum allowed vehicle height</td>
<td>Used during permit review to determine whether the load can safely pass under any restrictions</td>
<td></td>
</tr>
<tr>
<td>Route</td>
<td>Text version of route (populated by system using starting and ending points (GIS</td>
<td>The data will be used to check selections and possibly for ADA requirements.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>data).</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Restriction contact</td>
<td>Person to be contacted if there is a question</td>
<td></td>
<td></td>
</tr>
<tr>
<td>From (route)</td>
<td>Text version of starting point</td>
<td>Permit application</td>
<td></td>
</tr>
<tr>
<td>Data</td>
<td>Data Description</td>
<td>Purpose (How it will be used)</td>
<td>Current Info Source</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>----------------------------------------------------------------------------------</td>
<td>-------------------------------</td>
<td>---------------------</td>
</tr>
<tr>
<td>To (route)</td>
<td>Text version of ending point</td>
<td></td>
<td>Permit application</td>
</tr>
<tr>
<td>Comments</td>
<td>Additional comments for internal office staff</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Special requirements</td>
<td>Additional information that will be needed on the permit</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Restricted travel direction</td>
<td>(N</td>
<td>S</td>
<td>E</td>
</tr>
<tr>
<td>GIS linear reference location start</td>
<td>A reference point where the restriction begins</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GIS linear reference location end</td>
<td>A reference point where the restriction ends</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GIS information to identify full restriction segment(s)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Additional</td>
<td>Configurable flags for determining when a manual review is required regarding restrictions</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### 7.3. Bridge Restriction Additional Information

#### Table 8, Bridge Restriction Additional Information

<table>
<thead>
<tr>
<th>Data</th>
<th>Data Description</th>
<th>Purpose (How it will be used)</th>
<th>Current Info Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bridge Load Rating</td>
<td>The calculated bridge load rating indicates the carrying load the bridge can safely handle. This will be one of the following: Level I Load Rating – A fully documented PE Certified analysis that is used to determine how much live load the bridge can support. Level II Load Rating – A computer-generated analysis that is used to determine how much live load the bridge can support. Level III Load Rating – A computer-generated indication of how much live load the bridge can support when neither a Level I nor a Level II rating is available.</td>
<td>Bridge Load Rating is used during structural analysis to determine whether permit can be approved.</td>
<td>BDMS/BDIS</td>
</tr>
<tr>
<td>Bridge condition rating</td>
<td>The bridge condition ratings include many structure, span, sub-span, and element condition ratings.</td>
<td>Bridge condition ratings at the structure and span level are used during structural analysis to determine whether permit can be approved.</td>
<td>BDMS/BDIS</td>
</tr>
<tr>
<td>Load posting</td>
<td>Posting load limit where exceeding the posted load limit is allowed if further analysis is performed.</td>
<td>Bridge Load Rating is used during structural analysis to determine whether permit can be approved.</td>
<td>PreScreening Tool/BDIS</td>
</tr>
<tr>
<td>Supplemental (temporary restriction) bridge data</td>
<td>The supplementary bridge data includes revised load rating information as well as free-form text describing restriction information.</td>
<td>Supplemental bridge data is used during structural analysis to determine whether permit can be approved.</td>
<td>Access Database</td>
</tr>
<tr>
<td>Bridge clearance data</td>
<td>The clear distance between the roadway surface and the bridge that crosses over the roadway.</td>
<td>Bridge clearance data is used during permit analysis to determine whether the load will safely pass under the restrictions.</td>
<td>BDIS</td>
</tr>
<tr>
<td>Bridge (asset) ownership</td>
<td>The bridge owner information, including state, local, municipality, or other owner, as well as contact information for the owner.</td>
<td>Bridge owner will be contacted when there are questions about the bridge.</td>
<td>BDIS</td>
</tr>
</tbody>
</table>