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NATIONAL COOPERATIVE FREIGHT RESEARCH PROGRAM

NCFRP REPORT 25

Freight Data
Sharing Guidebook

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2013
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NATIONAL COOPERATIVE FREIGHT RESEARCH PROGRAM

America's freight transportation system makes critical contributions to the nation's economy, security, and quality of life. The freight transportation system in the United States is a complex, decentralized, and dynamic network of private and public entities, involving all modes of transportation—trucking, rail, waterways, air, and pipelines. In recent years, the demand for freight transportation service has been increasing fueled by growth in international trade; however, bottlenecks or congestion points in the system are exposing the inadequacies of current infrastructure and operations to meet the growing demand for freight. Strategic operational and investment decisions by governments at all levels will be necessary to maintain freight system performance, and will in turn require sound technical guidance based on research.

The National Cooperative Freight Research Program (NCFRP) is a cooperative research program sponsored by the Research and Innovative Technology Administration (RITA) under Grant No. DTOS59-06-G-00039 and administered by the Transportation Research Board (TRB). The program was authorized in 2005 with the passage of the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU). On September 6, 2006, a contract to begin work was executed between RITA and The National Academies. The NCFRP will carry out applied research on problems facing the freight industry that are not being adequately addressed by existing research programs.

Program guidance is provided by an Oversight Committee comprised of a representative cross section of freight stakeholders appointed by the National Research Council of The National Academies. The NCFRP Oversight Committee meets annually to formulate the research program by identifying the highest priority projects and defining funding levels and expected products. Research problem statements recommending research needs for consideration by the Oversight Committee are solicited annually, but may be submitted to TRB at any time. Each selected project is assigned to a panel, appointed by TRB, which provides technical guidance and counsel throughout the life of the project. Heavy emphasis is placed on including members representing the intended users of the research products.

The NCFRP will produce a series of research reports and other products such as guidebooks for practitioners. Primary emphasis will be placed on disseminating NCFRP results to the intended end-users of the research: freight shippers and carriers, service providers, suppliers, and public officials.

NOTICE

The project that is the subject of this report was a part of the National Cooperative Freight Research Program, conducted by the Transportation Research Board with the approval of the Governing Board of the National Research Council.

The members of the technical panel selected to monitor this project and to review this report were chosen for their special competencies and with regard for appropriate balance. The report was reviewed by the technical panel and accepted for publication according to procedures established and overseen by the Transportation Research Board and approved by the Governing Board of the National Research Council.

The opinions and conclusions expressed or implied in this report are those of the researchers who performed the research and are not necessarily those of the Transportation Research Board, the National Research Council, or the program sponsors.

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FOREWORD

By Joseph D. Navarrete
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NCFRP Report 25: Freight Data Sharing Guidebook provides a series of guidelines for sharing freight data, primarily between public and private freight stakeholders. The guidebook identifies barriers and motivators to successful data sharing, offers guidelines for freight data sharing, and provides two successful case study examples. The guidebook also provides example data sharing agreements.

Public sector freight planners depend on freight data to help identify freight transportation planning needs. Traditionally, their efforts relied on limited data sources such as vehicle counts, in/out gate information from ports, and weigh-in-motion data. The 21st Century brought a significant increase in the amount of freight data produced through the introduction of new logistics technologies and sensors and from the increased integration of supply chains. This robust data would significantly improve freight transportation planning efforts, but because of private sector proprietary concerns, much of this detailed freight data has not been made available to the public sector.

This research, led by Cambridge Systematics under NCFRP Project 31, began with a review of past and current practice relative to data sharing, including a detailed examination of selected data sharing efforts both inside and outside the United States. The research process also included a workshop that brought together private industry, the public sector, and academic researchers to review and confirm barriers and motivators and identify best practices to overcome these barriers. Based upon this research, the team developed the guidebook.

The guidebook is organized into four chapters, with the first chapter providing an introduction and overview. Chapter 2 describes the legal, resource, competition, institutional, and coordination barriers that discourage data sharing and presents motivators for overcoming these barriers. Chapter 3 provides guidelines for sharing freight data and addresses nonrestricted data, privacy concerns, data scrubbing, restricting access, facilitating stakeholder engagement, communicating the benefits of data sharing, and funding data sharing. Chapter 4 provides two case study examples where the guidelines were successfully applied. The guidebook also features helpful appendices that include sample nondisclosure agreements.

C O N T E N T S

Note: Many of the photographs, figures, and tables in this report have been converted from color to grayscale for printing. The electronic version of the report (posted on the Web at www.trb.org) retains the color versions.

S U M M A R Y

Freight Data Sharing Guidebook

Timely, comprehensive, and high-quality data on freight shipments, flows, and services can improve decision making of public infrastructure operators and planners as well as private sector carriers and shippers. The private sector is the primary producer of freight data and the public sector is the key consumer. Sharing of freight data between the private and public sectors has not occurred to the extent that practitioners had hoped. Reasons for this largely center on private sector proprietary concerns with sharing their data, as well as with the public sector's nescience to fully appreciate and adjust their data goals and needs to these concerns. The transportation community and TRB in particular have been working to improve freight data availability to users. As an outgrowth of various TRB and FHWA workshops and research studies, TRB initiated NCFRP 31, a project that involved the development and refinement of guidelines for data sharing.

The NCFRP 31 project reviewed past and current efforts in freight transportation to share data and looked in detail at selected data sharing projects. This project covered freight data sharing activities in North America, as well as outside the United States and Canada, and involved land as well as waterways projects. The project included a workshop with private and public sector participants to help refine a series of barriers to data sharing and motivators and best practices that have been used to overcome such barriers.

NCFRP Report 25 prepared in this project is designed for use by data sharing partners both as a reference manual for setting up, operating, and enhancing freight data partnerships and also as a procedural manual to aid in developing, negotiating, and formalizing data sharing agreements. The principal audience is potential public sector practitioners (and their consultants and advisors). The guidebook defines 28 guidelines based on identified barriers to effective freight data sharing and measures that have been taken to overcome the barriers. The guidelines deal with freight data from private sources, usually individual trucking companies, railroads, barge lines or private terminal operators. The guidelines should help this public sector audience establish new data sharing projects with the private sector and avoid the pitfalls that past projects have experienced.

The guidelines in this guidebook include examples of how data has been successfully shared and protected. In Chapter 2, barriers and motivators to successful data sharing are described, with the inclusion of examples from the research. Chapter 3 describes the 28 guidelines in more detail with tables to assist the reader. Most guidelines have one or two examples included of projects that successfully did what the guideline describes. After the guideline section, Chapter 4 describes two more detailed project examples that show how a number of the guidelines are applied. Appendix A contains a table that lists the 32 projects studied in the research. Appendices B and C include sample nondisclosure agreements.

1

CHAPTER 1

Introduction
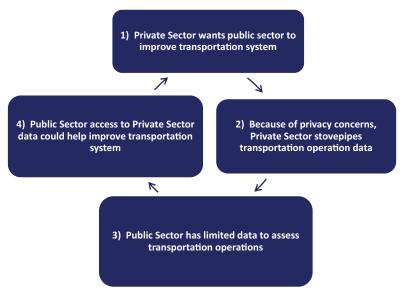
1.1 Research Need

At the turn of the 21st century, many practitioners believed that because of the Internet, new logistics technologies and sensors, and the increasing integration of supply chains, a revolution in freight data would occur that would provide substantial new datasets and tools to public sector freight planners. With some limited exceptions, this revolution has yet to occur. Reasons for this largely center on private sector proprietary concerns with sharing their data, as well as the public sector's nescience to fully appreciate and adjust their data goals and needs to these concerns. Figure 1.1 provides an overview of the functional roles and perspectives of both the public and private sectors concerning freight data sharing—a key concept here is that if both sectors could be brought together in a constructive way that addressed private sector concerns, then both sectors could potentially benefit from an improved freight transportation system.

More specifically, the functional roles and perspectives noted in the four boxes in Figure 1.1 are:

1. The freight private sector desires an improved freight transportation system (e.g., improved intermodal connectors, reduced congestion near freight facilities, and dedicated truck lanes), and expects the public sector to bear the responsibility for providing and improving this system.
2. The operations of the freight industry generate significant amounts of status, movement, supply chain, and other information which it consumes, and which typically each company or supply chain partner "stovepipes" due to competitive concerns, privacy concerns, and/or technical complexities.
3. Public sector freight planners are tasked with trying to assess freight transportation system needs and issues, but are hamstrung with limited data (e.g., surface road vehicle counts, in/out gate information from ports, weigh-in-motion data, etc.) that does not provide much information beyond gross truck movement information. This has led to an over-reliance on modeling (i.e., using simulation tools and methodologies for estimating truck movements, intermodal movements, and commodity flows).
4. If the public sector could gain access to major private sector freight datasets, then through the assessment of "complete picture" data (e.g., the integration of freight tracking, supply chain visibility, cargo manifests, mode handoffs, etc.), better decisions could be made in regards to where to make transportation funding investments. This could lead to an improved freight transportation system.

Because of the limited availability of private sector data, public sector freight planners and decision makers have traditionally relied on publicly available data (such as the DOT/ FHWA's Freight Analysis Framework (FAF) version 3) or purchased data sets (such as IHS Global Insight's proprietary commodity flow database TRANSEARCH) for analysis and decision support. There

Figure 1.1.   Freight data sharing – private and public sector roles and perspectives.

also is industry-specific data available, usually without cost, from the trade associations that represent the transportation modes such as the Association of American Railroads data on various aspects dealing with rail freight, the Intermodal Association of North America (IANA) data on intermodal freight, and the Port Import Export Reporting Service (PIERS) and American Association of Port Authorities (AAPA) for waterway and port data. However, all of these sources are subject to various issues related to geographic scope, industry coverage, commodity detail, and overall data compatibility which can conspire to limit their usefulness to freight planning practitioners.

1.2 Research Objectives

Since the mid-2000s, freight practitioners and their private sector partners at TRB have discussed sharing of freight data, and have explored the use of public-private partnerships to improve data sharing. The private sector is the primary producer of freight data and the public sector is the key consumer, but typically private companies are less interested in public sector data than the public sector is in private data.

The transportation community, in general and TRB in particular, has been working to improve freight data availability to users. TRB sponsored research and workshops in recent years to address issues involving freight data. Some of the key efforts that helped establish the groundwork for the current research are:

Meeting Freight Data Challenges (July 2007) TRB workshop with a draft report—Included several discussions of public-private partnerships needed for improved data sharing. Recommended additional public-private and public-public partnerships to promote collection and sharing of freight data.

North American Freight Transportation Data Workshop (2007) TRB workshop E-Circular 119—Provided an overview of the progress and problems associated with obtaining freight data with particular emphasis on border crossings. Noted that simply sharing practices is likely to bring value, and eventually, best practices.

NCHRP Report 594: Guidebook for Integrating Freight into Transportation Planning and Project Selection Processes, Transportation Research Board of the National Academies, Washington, DC, 2007—Provided guidelines for how freight projects could be implemented more easily. Contains a series of case studies that describe how state and local governments have carried out freight improvements.

Path to Better Information on Freight Transportation Unpublished Draft TRB Research Circular documenting a May 19-20, 2010 Workshop, August 2010—Primary purpose was to develop a roadmap for freight data. Included presentations on freight data sharing and the problems with sharing private sector data.

NCFRP Report 2: Institutional Arrangements for Freight Transportation Systems, Transportation Research Board of the National Academies, Washington, DC, 2009—Included descriptions of many local and regional projects with public and private sector stakeholders organized to help a project succeed.

Freight Data Sharing Compendium: Final Report FHWA, 2011—Identification and analysis of a series of freight data sharing projects. Contains an extensive bibliography related to freight data sharing.

NCFRP Report 10: Performance Measures for Freight Transportation, Transportation Research Board of the National Academies, Washington, DC, 2011—Included development of freight performance measures by all modes and identification of the sources of data that could be used for continued measurement.

As part of NCFRP, TRB initiated a study, NCFRP Project 31, to develop a guidebook for the sharing of freight data, particularly between the public sector and private transportation firms that generate or control the freight data. The contractor team that undertook NCFRP Project 31 identified 32 freight data sharing projects that served as case studies to specify both good and bad examples of what worked and didn't work in facilitating the sharing of data. From its literature search and analysis, the team defined a series of barriers to data sharing and a series of motivators or best practices that helped overcome the barriers. Later in the project, the team conducted a workshop with a select group of private and public sector participants to review the barriers and motivators and suggest additional examples of freight data sharing. The results of the workshop helped the team create 28 guidelines that are included in this guidebook.

1.3 The Data Sharing Guidebook

This guidebook is designed for use by data sharing partners, both as a reference manual for setting up, operating, and enhancing freight data partnerships, and also as a procedural manual to aid in developing, negotiating, and formalizing data sharing agreements. There are two primary audiences for the guidebook:

- The principal audience is potential public sector practitioners (and their consultants and advisors). The guidebook defines 28 guidelines based on identified barriers to effective freight data sharing and measures that have been taken to overcome the barriers. The guidelines should help this public sector audience establish new data sharing projects and avoid the pitfalls that past projects have experienced.
- A second audience is the private sector generators of data who are primarily concerned with protecting data from their competitors or from inappropriate use in the regulatory environment. The guidelines provide positive examples of how private data has been protected in past projects. This should make it easier for private parties to share data when they can see protections that have been used by others.

The objective of this guidebook is to provide a series of guidelines for sharing freight data, primarily between public and private freight stakeholders. The guidelines are designed in a format that can be used as both a reference manual and a set of procedures for negotiating and formalizing data sharing agreements. The objective is to provide a tool that can meet the needs of a wide variety of users.

The focus of this guidebook is therefore freight data from private sources, usually individual trucking companies, railroads, barge lines or private terminal operators. Experience has shown that most private sector holders of freight data have yet to be convinced of the value of sharing it with the public sector. Public sector users of freight data must be able to demonstrate the value of data sharing to businesses that hold the data – i.e., how it will impact their bottom line. Understanding how different groups within the transportation community will use the information is key.

The guidelines in this guidebook include examples of how data has been successfully shared and protected. In Chapter 2, barriers and motivators to successful data sharing are described, with the inclusion of examples from the research. Chapter 3 describes the 28 guidelines in more detail with tables to assist the reader. Most guidelines have one or two examples included of projects that successfully did what the guideline describes. After the guideline section, Chapter 4 describes two more detailed project examples that show how a number of the guidelines are applied. Appendix A contains a table that lists the 32 projects included in the research. Appendices B and C include sample nondisclosure agreements.

CHAPTER 2

Barriers and Motivators for Freight Data Sharing

2.1 Barriers and Challenges to Freight Data Sharing

The following categories of barriers to freight data sharing—and to success in obtaining project approval or required funding in other public-private partnerships—were identified in the research and are shown in Table 2.1.

1. **Legal Barriers.** In some cases, there are laws that interfere with the ability to share data or complete a project. Legal barriers might include contract law or might be national privacy laws that restrict what information can be requested. Legal barriers are difficult to overcome because they require a contractual or legal remedy.
2. **Resource Barriers.** The lack of resources is a common barrier. This might involve lack of personnel resources, particularly at small private firms, to actually collect, sanitize, compile, or share data. Lack of funding also is a significant barrier in accomplishing data sharing, processing the data, and in keeping a project going smoothly.
3. **Competition Barriers.** Private firms are concerned that data about their operations might be used by their competitors to gain business advantage. While firms know they need to comply with regulatory requirements involving data, the companies are reticent to share data without protection of the details of their business and customers.
4. **Institutional Barriers.** The more parties there are in a project, the more difficult it is to work through all of the coordination issues. This is particularly true of projects that involve international borders with multiple federal, state/provincial, and local governments as well as private firms in the respective countries. There also are institutional barriers between private sector firms and public agencies. While usually easier to overcome than legal barriers, institutional barriers take a great deal of time and use scarce resources.
5. **Coordination Barriers.** Somewhat related to institutional barriers, significant coordination is needed to achieve data sharing and to accomplish large public-private projects. Failure to coordinate with all stakeholders and failure to articulate why a project is being conducted and how it will benefit the various stakeholder groups can lead to failure of a project or a much longer and more expensive project or data sharing approval process.

Table 2.1 lists the freight data sharing barriers, with generalized examples of projects that encountered these problems. Detailed information about these projects may be found in Appendix A.

2.2 Motivators for Freight Data Sharing

The research also identified a set of motivators that can help to overcome barriers to data sharing. The categories of motivators that promote or facilitate freight data sharing—and help projects gain approval or required funding in other public-private partnerships—are defined here.

Table 2.1. Freight data sharing barriers.

Barriers	Examples
Legal	
Lack of formal contract	Programs utilizing truck GPS data at the national and state levels to support freight planning activities required a process to develop nondisclosure agreements and other protections of private data. This process, which required the use of attorneys, can be time consuming and costly.
Lack of legal basis for public-private partnerships	Public funds needed to complete infrastructure improvements are sometimes not available. However, public-private partnerships that can fund such improvements are not legally allowed in some states or political jurisdictions.
Control of data by technology contractor	If the contractor controlling the data is unwilling to release the data, freight tracking data cannot be shared with funding organizations, complicating their ability to effectively evaluate a project.
National security sensitivities	Due to security restrictions, customs agencies may not participate or provide data to international freight improvement or border crossing projects.
Data sharing with foreign countries	Some international projects have legal limitations on what data could be shared with agencies in other countries.
Resource	
Small companies find it harder to provide freight data	In some state level truck GPS projects, smaller firms did not have the resources to share their truck GPS data and the data was only acquired from larger GPS vendors. Smaller firms have also had limitations in their ability to participate in various U.S. Homeland Security freight data initiatives for import and export cargo.
Funding uncertainties make it difficult to keep all partners interested in and committed to participation	In general, having a good relationship with partners makes them more willing to expend additional effort and resources to participate in projects. Public-private partnerships in some regional areas found this to be the case.
Limitations in data analysis that can be done with aggregated data	In order to protect privacy, projects often release summary results based on aggregate data.
Data source diversity, and in some cases the large amounts of data, required costly processing	Many existing freight data sources need to be collated, compiled, and analyzed before they are useful. This particularly is the case for larger regional and national data sharing efforts and those that use technology data. Examples include studies based on truck GPS data and both domestic and U.S.-Canada corridor projects.
Competition	
Sensitivity about sharing information which could be used by competitors	This is a common concern for many projects where public agencies use private sector business data. This can impede a private company's willingness to participate in projects. A regional public-private partnership rail infrastructure project in Chicago had to address such concerns when they collected information from competing railroads.
Disclosure of individual shipment or company data viewed as proprietary or business-sensitive	Once public agencies have collected private sector data, they need to have a mechanism in place to protect the data. This is a common barrier found in many freight data sharing projects.
Increased security data requirements may delay cargo	Customs organizations have found that processes to collect data by scanning containers overseas is difficult to implement in part because it affects the efficiency of freight flows.
Third-party data supplier's validation and cleaning process not known	Projects which collect freight data that has been provided by a third party can be a challenge to process and to understand. Some past freight analysis projects used GPS data that is prepackaged by vendors. The use of the data required additional validation before it could be used to support policy decisions.

Table 2.1.   (Continued).

Barriers	Examples
Institutional	
Lengthy negotiation process to obtain approval for data sharing; extra time needs to be planned	In addition to addressing data privacy concerns, the negotiation process can be needed to determine prices and set up funding arrangements. There are many examples of freight and border crossing analysis projects in North America that required a negotiation process.
Private sector interests sometimes interfere with the public good	Public-private partnerships are often needed for infrastructure projects. There have been projects in some states or regions in which conflicts between public and private sector interests have delayed the projects.
Different facilities, such as border crossings, operate differently so may have different requirements	A common freight data sharing issue. Freight data collected by one organization may not address the need of another organization. For example, Customs and Border Protection collects truck data at border crossings but this information is not in a format that is always usable by the freight community.
Compatibility issues between national freight data sets	For example, different commodity codes used in different national data sets can require additional processing in order to be compared. Some state and regional projects that involve freight forecasting must perform additional analysis to overcome differences among national data sets.
Coordination	
Not articulating uses of data to private data providers	Experience from several GPS-based performance measures projects at the national and state level shows that private sector organizations sharing freight data want to understand how their data will be used. There is a particular need to demonstrate that the data will not be used by government for regulatory enforcement.
Lack of coordination with stakeholders	Acquiring freight data requires working with the stakeholder community. Several border crossing facility improvement projects and some state or regional parking information system efforts would have been more successful with additional stakeholder outreach.
Sharing across international boundaries is more difficult as is coordination with multiple international agencies	This barrier is common with any project with freight data sharing across international boundaries. There are several examples in border crossing projects in the United States with both Canada and Mexico.

1. **Nondisclosure Agreements.** An important way to protect data and to assure that those with the data are willing to provide it is to execute non-disclosure or privacy agreements. These may be part of legal contracts or separately negotiated documents.
2. **Stakeholder Engagement.** It is incumbent upon project leaders, particularly public sector participants who desire data from other entities, to coordinate with everyone involved in a project. Coordination committees and numerous stakeholder meetings are important to the ultimate success of a project.
3. **Funding for Data Sharing and Projects.** An important motivator to project participation and to sharing of data is funding. The most successful projects are those where participants are reimbursed for their costs and efforts and where public and private money are brought to bear in accomplishing results.
4. **Technology Innovation.** Sometimes implementation of a particular technology makes it easier to share data and helps a project to succeed. An automated technology which could accomplish the identification of a transportation vehicle without requiring the divulging of certain data about that vehicle could be a motivator.
5. **Scrubbing or Restricting Data.** While often done as part of project coordination, the willingness of all parties to remove sensitive information from data to be exchanged or to restrict the uses that can be made of data can be important in gaining acceptance of data sharing.
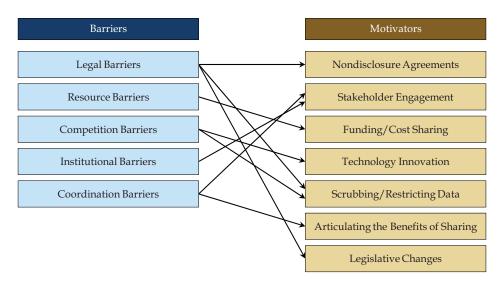
Figure 2.1.   Relationships between barriers and motivators.

6. **Articulating Benefits of Sharing.** It is important for project proponents to be able to explain to the public, to private sector participants, and to other stakeholders how they will benefit from the conduct of a project. Articulating benefits is an important part of coordination of a project. Sometimes publishing analyses of the expected costs and benefits of a project helps to assure its success.

7. **Legislative Changes.** Sometimes the introduction of legislation can overcome barriers and introduce protections of data that can then motivate firms and entities to participate in a project and to share appropriate data. Canada, for example, has a well-known national privacy protection law that restricts the way data can be used. This protection is helpful in gaining participation from firms in projects.

The relationship between barriers to data sharing and motivators that help projects succeed is shown in Figure 2.1. Table 2.2 lists motivators in more detail. Again, detailed project descriptions are available in Appendix A. These motivators became the basis for definitions of guidelines that constitute the bulk of the information in this guidebook.

Table 2.2.   Freight data sharing motivators.

Motivators	Examples
Nondisclosure Agreements	
Data agreements to allow multiple uses which ultimately lowers cost	Freight travel measurements collected at some regional and border projects were usable by multiple stakeholders.
Explicit inclusion of data sharing in formal contracts	Contracts can be written which contain nondisclosure agreements and other protections of private data. These were used within most national and state truck GPS data projects.
Standard nondisclosure agreements and memoranda of agreement	The GPS truck data efforts developed nondisclosure agreements that could be reused to expand the data collection process.
Stable contracting relationship with data provider	The national and state GPS truck data at some border crossing had longer-term contractual arrangements that supported data sharing.

(continued on next page)

Table 2.2.   (Continued).

Motivators	Examples
Agreement to maintain confidentiality of private sector data	Such agreements are a common tool when freight survey data is collected using interviews. There are numerous examples of such agreements in state or regional freight studies. Federal agencies who work with the private sector make efforts to protect company-specific data and agree not to divulge cargo contents data.
Third-party data is usually in cleaned format and simpler to acquire than directly collected data	Using third-party data was found to be a resource-effective approach to gathering freight data for several corridor and border crossing projects, so long as the data supplier's validation and cleaning process is understood.
Stakeholder Engagement	
Extensive coordination with public and private stakeholders and gradual implementation of data acquisition is helpful. Coordinating meetings and committees is useful	Stakeholder engagement was an important element in a number of successful freight data sharing efforts, including several border crossing travel time studies and regional public-private partnership infrastructure projects.
Clear identification of purposes of data sharing. Understanding public uses may help providers share data	Key national and state GPS truck studies clearly stated that the data collected would support freight system improvements.
Trusted third parties (consultants or academics) as well as personal relationships with data providers; involvement of trade associations	Including performing contractors who were trusted by public and private sector partners proved to be a benefit for freight performance measures projects at the national and state level and with freight innovation projects sponsored by the Federal Highway Administration.
Funding for Data Sharing and Projects	
Joint public-private funding of projects	Rail projects usually involved both public and private funding. This motivated both the public agencies at the state and regional level and the private railroad companies to participate.
Funding to cover costs of data sharing and for infrastructure partnerships	Some Federal and state agencies which sponsored freight analysis projects provided stipends to trucking companies to help with their costs of providing data.
Government contracts (with funding) help, particularly long-term contracts	The government funding of border crossing projects and some freight efficiency improvement projects helped offset costs and encouraged participation if there were fewer identifiable private-sector benefits.
Funding to cover costs of data sharing	If it costs data providers to share data and they do not otherwise perceive benefits, reimbursement sometimes helps. Government agencies sometimes reimbursed trucking companies in truck GPS projects.
Using open source data or gathering data from volunteer stakeholder groups or round tables	Such data lowers cost and reduces the need to set up data sharing agreements. Typically state and regional studies include the use of open sources or stakeholder groups as a first choice of data sources.
Technology Innovation	
Some technologies do not require sharing agreements and are not intrusive on data providers	No data sharing agreement was needed for RFID transponder use for the projects where RFID tags were already in use for toll collection. However, trucking partners needed to be involved in coordination. Manual surveys for truck counts do not require sharing agreements, nor do Bluetooth readers. Various Corps of Engineers and other government system programs and activities such as the Institute for Water Research provide data that is useful to the private sector.

Table 2.2.   (Continued).

Motivators	Examples
Usefulness of technology for other functions	Some border crossing travel improvement projects used existing technology (RFID transponders and GPS) to develop border metrics for trucks. Some waterways and other transportation network projects used standard telecommunications technologies to provide transportation carriers with network status information.
Private sector GPS data will become more available as more fleets have the technology and as GPS data read rates increase	The conduct of national and state GPS truck projects helped increase the number of trucks with devices. These projects, and their successors, are likely to have access to better quantity GPS data in the future.
Harmonize the freight data	This already occurs with GPS data due to standards which facilitate data sharing. Several TRB research studies and DOT initiatives support freight data standards.
Scrubbing or Restricting Data	
Scrubbing of individual shipment or company data from data to be shared; restricting data release to limited locations or in an aggregated format	This occurred in most national and state vehicle tracking projects. These efforts needed to remove identifying information before data was provided to public agencies.
Standardized interfaces or using same data collection technique as at other locations	Some government systems have standard interfaces and facilitate private sector access to government data. Several national level freight analyses in Canada and Europe used common data and work at standardizing the sharing of freight technology data.
Adding value to data and making it available to all stakeholders	Several U.S. border crossing projects both with Canada and Mexico provided crossing time information that was of interest to a number of groups.
Sufficiently protected data can lead to new markets for data providers	The success of some GPS projects resulted in the purchase of data as part of similar studies in different regions. This, in turn, made the GPS vendor more willing share data with other agencies.
System capability of restricting access to a company's data is an alternative to scrubbing data	Truck IDs were scrambled by the vendor in several GPS truck studies. Federal data projects typically do not release specific vehicle or vessel identification information but generalize the location information.
Articulating Benefits of Sharing	
Defining and articulating benefits and goals to stakeholders helps with data sharing and support of technology improvements	This is common in many efforts where public sector agencies acquire freight data from private sector organizations. Often it is important to indicate the data will not be used for regulatory enforcement. Some waterways efforts share data for waterways operations rather than regulatory purposes.
A stipulation that data is one-time use that can't be used for any other purposes such as regulation	Used when obtaining private sector truck data for national and state GPS truck projects.

Table 2.2.   (Continued).

Motivators	Examples
Favorable publicity for private companies and public visibility of accomplishments of a project. Peer pressure can also play a role	Some Federal, state, and local freight improvement projects provided positive publicity that is valued by the participants.
Indicating that sharing private data will support improved freight infrastructure decisions	This approach works with agencies that have infrastructure responsibilities. There are numerous examples in the research by all the modes of transportation.
Legislative Changes	
Laws on nondisclosure of data	A Canadian law about protection of data made it easier for providers to share data in various projects without worry of disclosure issues.

Freight Data Sharing Guidelines

Twenty-eight guidelines were developed based on identified barriers to effective freight data sharing and measures that have been taken to overcome the barriers. Table 3.1 shows the 28 guidelines organized into six categories. In the following pages, the guidelines are defined under their corresponding categories in more detail and, most importantly, illustrated with one or two examples from the various case studies that the research team analyzed. It is hoped that these examples, which constitute best practices, will be useful to public-sector freight planners, private-sector freight data providers, public and private freight partnership leaders, and freight data practitioners.

The guidelines start at the initiation of a public sector project. Most public sector analyses of the transportation system, whether at the local or metropolitan area or at the national level including crossing international borders, involve the analysis of transportation data. The question for public sector analysts and their consultants is where to get the freight data they believe they need to support their studies. The guidelines include many examples of projects that had a need for freight data and found ways to overcome barriers to getting the data.

Guideline 1 – Identify Sources of Freight Data via Literature Search and Review of Past Research

Note that the first guideline is considered to be a cross-cutting one that applies to all freight data sharing projects.

Fortunately, there is a large body of research that has been conducted and published that identifies freight data sources, particularly those that are publicly available and either have no cost or restrictions or are available for purchase. This first guideline contains a list of commonly used and publicly available data sources. The key to this guideline is to do a literature search and take full advantage of past research. Not reinventing the wheel can save both time and money. Some of the past research studies are enumerated here and others are included in the references section of the contractor's final report, which is available on the TRB website (www.TRB.org, search for *NCFRP Report 25*). Examples included with the guidelines include projects that built on the foundation of publicly available data and explain how they supplemented those data sources in conducting their projects. For example, *NCFRP Report 10: Performance Measures for Freight Transportation* (2011) notes many sources of freight data. The list of public and commercial data sources shown in Table 3.2 is based on a list from *NCHRP Synthesis 410: Freight Transportation Surveys* (2011) (Table 19, page 32).

3.1 Guidelines Related to Nonrestricted Data

Two guidelines were identified that apply to the use of some of the public data sources listed or other data that might not require restriction. Table 3.3 shows those guidelines and examples that exhibited those guidelines. Leaders of example projects talked about difficulties in obtaining

Table 3.1.   Summary of guidelines for freight data sharing.

1	Identify sources of freight data via literature search and review of past research.
Guidelines Related to Nonrestricted Data	
2	Use nonrestricted or open source data if available.
3	Utilize nonintrusive technologies for data collection that do not require sharing agreements.
Guidelines to Address Privacy Concerns	
4	If unrestricted data is not enough, be aware that privacy concerns must be addressed.
5	A nondisclosure agreement can be a good tool to support a data sharing arrangement.
6	A stable contracting relationship with data providers can be very helpful in successful data sharing.
7	A less formal agreement to maintain confidentiality of private sector data may be sufficient.
8	Begin negotiations of disclosure and use restrictions on freight data as early in the process as possible.
9	Public agencies desiring to obtain data from private companies may need to research Freedom of Information Act (FOIA) laws.
10	Consider seeking enabling legislation and public agency policy approaches to support data sharing and protect the data.
Guidelines for Scrubbing or Restricting Access to Freight Data	
11	Consider the use of software and database tools to protect and access freight data by removing private or competitive information.
12	Build access restrictions into the data set as an alternative to scrubbing.
Guidelines for Stakeholder Engagement	
13	Place a high priority on coordination and devote the needed resources to extensive coordination with public and private stakeholders.
14	Consider the use of trusted third parties (associations, consultants, or academics) as intermediaries or data analysts.
15	Investigate possible partnerships with trade associations to facilitate data sharing.
16	Coordinate with local or regional agencies that may have closer relationships with data providers.
17	Consider gradual implementation of data acquisition coupled with coordination about successes.
Guidelines for Articulating Benefits of Sharing	
18	Define and articulate the benefits, goals, and purpose of data sharing to stakeholders.
19	Include a stipulation that data is for limited or for one-time use and cannot be used for any other purposes such as regulation.
20	Publicize the cooperation amongst project partners and seek to give the project visibility to stakeholders and the public.
21	Explain clearly to stakeholders that sharing of data will support improved freight infrastructure decisions that will benefit those stakeholders.
22	Add value to the data and make it available to all stakeholders.
23	Use technologies that are useful for other purposes.
24	Explore new market opportunities with potential data providers.
Guidelines for Funding for Data Sharing and Projects	
25	Attempt to include funding for research and data collection in public sector contracts.
26	Be sure to include funding to cover costs of data sharing and needed agreements to protect data.
27	Where appropriate, try to obtain joint public-private funding for projects.
28	Consider gathering data from volunteer stakeholder groups or roundtables.

Table 3.2. Public and commercial data sources.

Database	Source and URL
Airline Traffic, Airfare, and Airline On-time Data	U.S. DOT Bureau of Transportation Statistics – BTS Publicly available at www.bts.gov
Border Crossing Data	U.S. DOT Bureau of Transportation Statistics – BTS Publicly available at www.bts.gov
Commodity Flow Survey (CFS)	U.S. DOT Bureau of Transportation Statistics – BTS Publicly available at www.bts.gov
Freight Analysis Framework (FAF-3)	U.S. DOT Federal Highway Administration Publicly available at www.ops.fhwa.dot.gov/freight/freight_analysis/faf/faf3/netwkdbflow
Industry Trade Data and Analysis	U.S. Department of Commerce International Trade Administration publicly available at www.trade.gov/data.asp
Intermodal Data and Statistics	Intermodal Association of North America (IANA) - Multiple report and products – some for a fee. See www.intermodal.org/statistics_files/index.shtml
Maritime Statistics Reports and Survey Series and Fleet Statistics	U.S. DOT Maritime Administration.. publicly available at www.marad.dot.gov/library_landing_page/data_and_statistics/Data_and_Statistics.htm
National Roadside Survey Commercial Vehicles Surveys	U.S. DOT/Federal Motor Carrier Safety Administration publicly available at www.fmcsa.dot.gov/documents/facts-research/CMV-Facts.pdf
Port/Import/Export Reporting Service (PIERS)	available for a fee from Journal of Commerce at http://www.piers.com/
Rail Waybill Sample	Surface Transportation Board publicly available at www.stb.gov/stb/industry/econ_waybill.html
Rail Industry Operating Statistics	Association of American Railroads www.aar.org/StatisticsAndPublications.aspx - Multiple products – some publicly available and some only available to members
Rail Industry Reference Files	RAILINC Corporation multiple products, some publicly available and some available to subscribers only at www.railinc.com/ References and Files tab
State of the Trucking Industry	American Trucking Associations - Only available to the subscribers. See www.trucking.org/StateIndustry/Pages/default.aspx
Ton Miles of Truck Shipments by State	U.S. DOT Federal Highway Administration Publicly available at www.ops.fhwa.dot.gov/freight/freight_analysis/nat_freight_stats/docs/09factsfigures/
Transborder Surface Freight Data	U.S. DOT Bureau of Transportation Statistics – BTS Publicly available at www.bts.gov
TRANSEARCH	IHS Global Insight - Available for a fee at http://www.ihs.com/products/global-insight/industry-analysis/commerce-transport/database.aspx
TranStats – The Intermodal Transportation Database	U.S. DOT Bureau of Transportation Statistics – BTS Publicly available at www.transtats.bts.gov
Waterborne Commerce of the U.S.	U.S. Army Corps of Engineers - publicly available at www.ndc.iwr.usace.army.mil/wcsc/wcsc.htm

Sources: *NCHRP Synthesis 410: Freight Transportation Surveys*, Transportation Research Board of the National Academies, Washington, D.C., 2011.

Table 3.3.   Summary of guidelines for nonrestricted data.

	Guideline	Project Examples
2	Use nonrestricted or open source data if available	• Minnesota Freight Performance Measures Project • Snake River Lock Outage Study
3	Utilize nonintrusive technologies for data collection that do not require sharing agreements	• Southern Border Wait Time Project • Border Crossing Information System

permission to use some datasets and the ease with which other data, without restrictions, could be used.

Guideline 2 – Use Nonrestricted or Open Source Data if Available

Most of the freight data collected by government agencies or trade and industry associations can be accessed without restrictions. For example, U.S. DOT Bureau of Transportation Statistics (BTS), as noted in Table 3.2, provides access to a wide range of aggregated freight data for different modes. In a similar manner, the European Commission's statistical office (Eurostat) collects country-level transportation data that includes freight data. Other sources of freight data address more narrowly defined areas. The Washington State University (WSU) lock outage study used the data from the U.S. Army Corps of Engineers' Waterborne Commerce Statistics Center. Some modes (e.g., railroads, trucking) and many industrial trade associations (e.g., wheat, soybeans) have web sites and reports with readily available freight data. Practitioners should look first at these studies and the sources they used. Lessons learned by others can make it easier to get the most from existing data.

NCFRP Project 03, published as *NCFRP Report 10: Freight Performance Measures for Freight Transportation (*http://www.trb.org/Main/Blurbs/165398.aspx), discusses the need to develop national freight measures to gauge the performance of the freight system. The final report recommends approaches, including a national freight report card. For the report card, the report suggests drawing on multiple unrestricted data sources, mostly from government agencies but also from the private sector or trade associations. The report has an illustrative list of data sources. Many of the sources listed in Guideline 1 above were identified in *NCFRP Report 10.* The Minnesota Department of Transportation sponsored a project called "Measurement Sources for Freight Performance Measures and Indicators" that identified many data sources including open source data as described under Example 2-1. Example 2-2 includes the use of open sources in the Columbia River Lock Outage study.

Guideline 3 – Utilize Nonintrusive Technologies for Data Collection That do not Require Sharing Agreements

If a freight project covers a metropolitan or regional area, it is likely that the data sources in Guidelines 1 and 2 will need to be supplemented by current, locally collected data. This guideline addresses data that can be collected easily and without the need for complicated agreements. Certain freight data collection technologies are nonintrusive by nature and do not require formal agreements. Radio frequency identification (RFID) tags, for instance, can be used to measure border crossing and wait times at international land ports of entry. The tags are already ubiquitous on trucks enrolled in the Free and Secure Trade (FAST) program, used for weigh-in-motion systems (e.g., PrePASS), and trucks equipped with toll transponders (e.g., EZ-Pass in a number

Example 2-1.   Minnesota Freight Performance Measures Project

To support Minnesota's Freight Plan, the Minnesota DOT conducted a project that identified and recommended the best sources of information available for state level freight performance measures (FPM) and indicators. A significant aspect of the project is that it compiled, analyzed, and classified information sources for all modes. The recommended data was from a wide range of sources and most of these were open source and unrestricted. Sources identified included:

- **Federal Data Sources.** CFS, Waybill, Waterway data from Army Corps, and Economic and Industry Surveys by Census. BTS and FHWA data (particularly FAF data).
- **State Sources.** Past freight-related studies and statewide and district plans. Economic, demographic, establishment, export and import, and other information available from economic development departments and other Minnesota agencies. Data from commercial vendors. Some data from technology devices such as roadway loops.
- **Private Sources.** IHS Global Insight's TRANSEARCH for national and regional flows. Association of American Railroads data on various aspects dealing with rail freight. The IANA data on intermodal freight. PIERS and AAPA for waterway and port data. Annual logistics survey sponsored by the Council of Supply Chain Management Professionals provides good insight into the factors that are affecting performance of freight industry.

The intent was to use the data sources to develop freight performance measures and indicators to evaluate the performance of Minnesota's freight transportation system. The project was completed in July 2008. Details about this project can be found at: http://www.lrrb.org//200812.pdf.

Example 2-2.   Impacts of Columbia-Snake River Extended Lock Outage

The WSU's Freight Policy Transportation Institute completed a study that assessed the transportation and environmental impacts of extended lock outages on the Columbia-Snake River System. Information collected for this effort includes the volume and variety of commodities shipped up and down river. One important open source of data was the Lock Performance Monitoring System (LPMS) maintained by the U.S. Army Corps of Engineers. As each barge passes through each lock, the content of the barge is reported to the lock operator for LPMS coding. The content of each barge is recorded in the North American Industry Classification System (NAICS). This unrestricted information is available through a central database: http://www.ndc.iwr.usace.army.mil//.htm. Another unrestricted data source used for this project was information from trade associations. One example of an association that provided information is U.S. Wheat Associates, which provides trade information (http://www.uswheat.org/.nsf/OpenPage). More details about the lock outage analysis project can be found at: http://www.fpti.wsu.edu/.htm.

Example 3-1.   Southern Border Wait Time Measurement Projects

FHWA sponsored a study of the use of RFID from existing passive tags to capture crossing and wait times of U.S. bound commercial vehicles on the U.S.-Mexican border. Readers were installed at key spots on both sides of the border. FAST tags and others used for tolls in the area were read, so no additional tagging was needed. The RFID system captures the tag ID and timestamp, but not the truck's ID. This assures anonymity and protects individual companies. No agreement with trucking companies was needed because the tags were already installed for other purposes. Permission to locate RFID readers was obtained through stakeholder meetings with U.S. Customs and Border Protection and the General Services Administration.

   Subsequent to the implementations in El Paso, similar measurement systems using RFID technology were implemented at other border crossings in Texas including Pharr-Reynosa International Bridge, World Trade Bridge, and Camino Colombia Bridge. A similar system is being implemented at the Veteran's Memorial Bridge in Brownsville, Texas, and Mariposa Port of Entry in Arizona. More information about this project can be found at the Texas Transportation Institute web site: http://tti.tamu.edu/projects/project_details.htm?id=2497 and the FHWA publications web site: http:ops.fhwa.dot.gov/publications.

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of eastern states). Detection systems can be designed in such a way as to read the RFID chip's ID number and a timestamp, but not record the specific truck/company moving the freight. Bluetooth readers detecting enabled cell phones or other mobile devices also have been used in this way.

Although these arrangements do not require a data sharing agreement, it is important to coordinate with stakeholders including trucking companies to keep them informed about what is going on. If readers need to be installed on government property (such as a border crossing facility), appropriate permission is required to locate and connect the equipment. However, this can often be done informally through stakeholder meetings and interagency coordination. Extra time should be planned to allow for coordination with all of the agencies involved, particularly in a border environment where customs/security, facilities management, law enforcement, and transportation agencies (often from two countries) will be at the table.

Example 3-1 describes a project in which RFID chips and toll tags were utilized to compute border crossing and wait times at U.S.-Mexico border crossings in Texas. Example 3-2 shows how Bluetooth technology has been used in a similar manner along the southern border (although the Bluetooth readers were detecting cars, the same method has been tested for trucks).

3.2 Guidelines to Address Privacy Concerns

To really understand the movement of freight through a metropolitan area, freight analysts need detailed freight data from transportation companies and shippers. These private firms are concerned that data about their operations might be used by their competitors to gain business advantage. While firms know they need to comply with regulatory requirements involving data, they are sometimes reticent to share data with public agencies without protection of the details of their business and customers. Analysts and practitioners who want private data must take positive steps to address these concerns. The willingness of all

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Example 3-2.   Border Crossing Information System Project

The purpose of this project was to develop a prototype of a centralized repository of border crossing-related data and provide traveler information to the public to aid in their decisions about the time of day to make a border crossing, as well as provide performance-related data to stakeholder agencies. The prototype was developed by using the Paso Del Norte Regional Mobility Information System (PDN-RMIS) in El Paso as the platform. Border crossing-related archived data and pre-trip traveler information were integrated with the PDN-RMIS database and the pre-trip traveler information was added to the existing PDN-RMIS web site.

   Both Bluetooth and RFID data from readers installed near the border were used to compute travel times. In the prototype, data were extracted from Customs and other agency web sites. Since the data are public, there was no access agreement necessary. It was noted, however, that changes in agency web sites could not be accommodated without database management efforts within the Border Crossing Information System. In a fully operational system a formal data sharing agreement between agencies would be beneficial in terms of minimizing these data management requirements. Additional information is available at the TTI web site: http://tti.tamu.edu.

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parties to remove sensitive information from data to be exchanged or to restrict the uses that can be made of data can be important in gaining acceptance of data sharing. Table 3.4 below shows seven guidelines and some case study project examples that exhibited those guidelines.

   The following guidelines address privacy concerns in more detail. The critical nature of protecting privacy of data cannot be overemphasized. There are many examples of dealing with privacy

Table 3.4.   Summary of guidelines for privacy concerns.

	Guideline	Project Examples
4	If unrestricted data is not enough, be aware that privacy concerns must be addressed.	• Cross Town Improvement Project (C-TIP) • Wireless Waterways Project
5	A nondisclosure agreement can be a good tool to support a data sharing arrangement.	• Truck Data from GPS Vendors • Electronic Freight Management – Kansas City
6	A stable contracting relationship with data providers can be very helpful in successful data sharing.	• Canadian GPS Projects
7	A less formal agreement to maintain confidentiality of private sector data may be sufficient.	• Mississippi Study of Intermodal Technologies
8	Begin negotiations of disclosure and use restrictions on freight data as early in the process as possible.	• Otay Mesa Border Delay Project • International Trade Data System
9	Public agencies desiring to obtain data from private companies may need to research Freedom of Information Act (FOIA) laws.	• The FHWA and ATRI's Freight Performance Measures initiative
10	Consider seeking enabling legislation and public agency policy approaches to support data sharing and protect the data.	• Canada Freight Gateways and Corridors Project

concerns including long term stable contracting relationships and also standard nondisclosure agreements or NDAs.

Guideline 4 – If Unrestricted Data is not Enough, be Aware that Privacy Concerns Must be Addressed

Since freight is usually carried by the private sector, public sector program use of private freight data depends, to some degree, on the public sector's ability to collect private sector data. This is often a challenge since the private sector is reluctant to release data for a range of reasons including business and privacy concerns, lack of resources to make the data available, fear of government regulation, and a sense that there is little value to giving the public sector their data. Most likely, if freight data is not publicly available from one of the numerous data sources listed in Guideline 1, it will be from private sector sources and its use and access may be restricted. This critical need to protect and restrict the use of freight data is often due to privacy concerns: freight data can be business sensitive, proprietary, or reveal personal information.

A July 2007 TRB workshop on freight data noted the following:

> Anecdotal evidence shows that the basis for industry's reluctance to share this data derives primarily from, in order of importance: fears of civil litigation; competitive access; and regulatory impacts. With satisfactory resolution of these concerns, industry would be much more likely to participate in data-sharing partnerships with government and academia.
>
> The public sector must also demonstrate how the data can be collected and maintained in such a way that the private sector has a reasonable level of confidence that the confidentiality of their data is protected. (Pages 41-42, "Meeting Freight Data Challenges Workshop," July 2007.)

Feedback received at the March 1, 2012 Freight Data Sharing workshop, as well as the research conducted on this project, has confirmed that there are downsides to data sharing for private companies. Similar to the noted challenges, the workshop identified privacy, resources, fear of regulation, or competitive concerns. It is therefore incumbent on public agencies requesting data to recognize these drawbacks and mitigate them where possible.

The public sector can reduce these privacy concerns by aggregating any data output to obscure individual company's information, signing legal documents such as nondisclosure agreements, promising not to use the data for regulatory actions, providing resources to help private companies prepare appropriate outputs of their data, and demonstrating how each company's input will result in positive changes.

There are many examples of projects that needed to address privacy concerns. These included the FHWA Performance Measures Project performed by the American Transportation Research Institute (ATRI), the Washington State and Southern California GPS projects, and the port analysis projects at the Ports of Los Angeles and Long Beach. Typically these privacy concerns were expressed by private sector partners who were asked to provide their freight data to the public sector. Addressing these concerns often resulted in the use of neutral or trusted third parties, development of legal agreements, or other mechanisms to protect privacy. The Cross-town Improvement Project in Kansas City described in Example 4-1 only made progress after the data from the private sector terminals was protected. Example 4-2 describes the Wireless Waterway project on the Ohio River.

Guideline 5 – A Nondisclosure Agreement Can be a Good Tool to Support a Data Sharing Arrangement

In the United States, a common tool to support data sharing is a nondisclosure agreement (NDA). An NDA is a legal contract or document between two or more parties that restricts any unauthorized disclosure of confidential data and can require reasonable measures to

Example 4-1.   Cross-Town Improvement Project (C-TIP)

This project was a technology application designed to improve the efficiency of cross-town truck movements in Kansas City that connected railroad yards. The project attempted to maximize productive moves and minimize unproductive ones. It consisted of several components including real-time traffic monitoring/dynamic route guidance for draymen; an open architecture exchange of load data and availability information between railroads, terminal operators, and trucking companies; and wireless information exchange for truckers regarding trip assignments, traffic congestion, trip status, and location. This required the collection of supply chain event data and tracking of truck movements between rail terminals. Some partners were reluctant to share proprietary data such as commodity or financial information but were willing to sharing data such as origin and destination of the container to coordinate the moves between terminals. Some private sector partners, particularly the railroads, were willing to participate only after their freight data was protected by using a trusted third-party integration contractor. In a few cases, the data sharing was not possible or was limited because privacy concerns could not be adequately addressed. More information on this project can be found here: http://www.ctip-us.com.

Example 4-2.   Wireless Waterways Project

The Port of Pittsburgh Commission (PPC) sponsored a series of interrelated studies by Carnegie-Mellon University that culminated in the design of a network to allow key stakeholders (barge operators, the Corps of Engineers, and the U.S. Coast Guard, and other waterway interests) to replace outdated workflow processes such as faxes and phone calls with more efficient digital communication technologies. The Corps developed a series of digital communications-compatible tools to collect data from the barge operators. The Corps found that much of the data it wanted was already being collected by industry. The voyage, commodity, and vessel data submitted by industry is to be protected from disclosure that would reveal individual company operations. The system as envisioned would allow data owners (e.g., the barge lines) to decide what data becomes public and what is proprietary. It has become clear over the years that there are certain data that would be of interest to the public sector and which the barge industry is willing to share, but no one has ever asked them for it. The Wireless Waterways system would speed up the gathering of information now done manually, but it would allow for the gathering of so much more data that is not currently even collected. It is anticipated that there would remain an owner of the data, protected by firewalls. The PPC is providing the seed money for funding for the initial test bed and demonstration network on the Ohio River. The concept was completed in 2006 and funding is needed to implement the results of the test bed. More information about this project can be found at http://www.port.pittsburgh.pa.us/home/index.asp?page=175.

prevent any such disclosure. The NDA may require that the organizations receiving the data limit access of the data only to employees having a need to know in connection with the data. NDAs also may require the agency originally owning the data to identify what information needs to be considered confidential and to clearly define what constitutes authorized usage.

Specific elements that can be included in the NDA to protect freight data include:

- Information about the parties involved;
- A concise definition as to what data needs to be protected;
- Any up-front data cleansing requirements by the suppliers;
- Any fees related to the data sharing;
- When the contracts and agreements should be updated;
- Language about how long the non-disclosure agreement should last; and
- Legal information about resolving disputes and terminating the relationship.

NDAs are considered legal documents and it may be wise to have an attorney review the document. This will increase the time and resources required. Often these NDA arrangements can use a fairly standardized format and many larger institutions have NDAs in preset formats. Appendix B contains a sample NDA from a university transportation research group and Appendix C is a consulting firm NDA. A search on the internet will find a number of additional sample NDA agreements. Each project is different and may require a unique NDA; however these two appendices are examples of data sharing NDAs that have been used successfully in the past. Project examples that involved NDAs include the FHWA/ATRI and Washington State performance measures projects (described in Example 5-1), the Southern California Truck data analysis project, the Electronic Freight Management case study in Kansas City (Example 5-2), the port trucking movement study at Los Angeles/Long Beach, and the International Trade Data System in the Federal government.

Example 5-1.　Truck Data from GPS Vendors

Both the ATRI FPMs project for FHWA and Washington state truck GPS case studies use data obtained from private sector GPS fleet management vendors. The use of vendors circumvented direct concerns about the individual company's business sensitive information, but the vendor still required privacy protection in the form of nondisclosure agreements. The data feeds between the vendors and ATRI and Washington State were set up only after NDAs were developed to help protect the data. The NDAs stipulated or involved both legal punitive actions as well as technical approaches such as suppression of individual trucker's names and allowing only the release of aggregate data. ATRI has data sharing agreements with recipients of their services, but the core agreements between ATRI and its data providers are considered confidential. ATRI executes nondisclosure agreements and contracts with each provider of data as well as with each recipient of the GPS data. The contracts and agreements are updated annually and as projects and uses are defined. These relationships have evolved over time based on trust and sensitivity of use of data. Information on the ATRI effort can be found here: http://www.atri-online.org. Detail on the Washington State GPS project can be found here: http://www.wsdot.wa.gov/freight/.

Example 5-2.   Electronic Freight Management – Kansas City

The purpose of the Electronic Freight Management (EFM) project is to conduct case studies to document the benefits of companies using Web services and electronic data exchange technologies in different supply chain scenarios. The goal is to improve supply chain efficiency and reduce supply chain costs for shippers and carriers through a series of case study tests. In Kansas City, the project involved a distributor receiving ocean containers by rail. Supply chain event data (rail departure, in transit, arrival, customs clearance, delivery) was captured and shared. Partners who participated in EFM were concerned with protection of their existing information systems from unauthorized access. This was mitigated through data security layers and digital certificates for transactions between authorized partners. Confidentiality concerns related to partner data were mitigated by memoranda of understanding (MOUs) to protect from outside access. In Kansas City, there was a single multi-party nondisclosure agreement for the 2–3 month deployment test. Tests were conducted to assure accuracy of automated data acquisition and to analyze the benefits of automation. Researchers found that each partner's needs and view of proprietary data were different. This required considerable coordination and effort by the study contractor. There are two web sites that provide additional information about EFM case studies: http://www.efm. us.com and http://www/efm-saic.com.

Guideline 6 – A Stable Contracting Relationship with Data Providers Can be Very Helpful in Successful Data Sharing

The FPMs GPS truck data project and the Canada Borders project both had longer term contractual arrangements that supported data sharing. See Example 6-1. The ATRI, the not-for-profit research arm of the American Trucking Associations, has a long-term

Example 6-1.   Canadian GPS Projects

Both Transport Canada and the Ontario Ministry of Transport (MOT) have developed long-term contracts with one of the major GPS providers, Turnpike Global Technologies, Inc (TGT) for equipping trucks, collecting data, scrubbing it of IDs, and then sharing the data with the appropriate government agencies. Two projects included in the research involved TGT data, the Canadian Gateways and Borders project and the Canada Border Wait Time project. These projects included acquiring existing GPS data that TGT has collected from its extensive network of existing transportation industry clients. From the public agency perspective, the contractual relationship with TGT shifts the primary burden of working out multiple data protection agreements to TGT. The stable contractual relationship with a data provider is important in obtaining freight movement data. The Transport Canada web site has more information about this project at http://www.tc.gc.ca/eng/policy/acg-acgc-menu_gateways-1961.htm.

contract with U.S. DOT/FHWA. ATRI then contracts with several GPS providers, collects data, scrubs it, and then uses it to support U.S. DOT objectives. Through its long-term contract with U.S. DOT, ATRI acts as an intermediary and combines together GPS data from multiple GPS vendors in building its GPS database. Since the trucking industry is usually not in the data sharing business, and as a research organization supported by the trucking industry, ATRI views itself as a trusted third party with trucking industry relationships that help to acquire data. ATRI executes a nondisclosure agreement and contract with each provider of data. The contracts and agreements are updated annually and as projects and uses are defined. The University of Washington and WSU as well as other academics such as the Texas Transportation Institute at Texas A&M have successful long-term contracts as well.

Guideline 7 – A Less Formal Agreement to Maintain Confidentiality of Private Sector Data may be Sufficient

Where privacy is less of a concern, formal contracts or NDA's may not be needed. For projects where freight survey data is collected using interviews, a data sharing agreement was often as simple as a statement that the responses and data would be held confidential. An example of such agreements is a mail-out survey as part of the Mississippi ports technology study (see Example 7-1).

Guideline 8 – Begin Negotiations of Disclosure and Use Restrictions on Freight Data as Early in the Process as Possible

Negotiating nondisclosure agreements or restrictions in the use of data is very time consuming, so those negotiations should begin as soon as possible. In addition to addressing data privacy concerns, the negotiation process can be needed to determine prices and set up funding arrangements. Acquiring data for the Otay Mesa border crossing study (see Example 8-1 below), the Southern border Wait Time, and Washington State GPS truck data project all required a negotiation process. Example 8-2 describes a data sharing project within the federal government that required detailed approvals and restrictions between users and the controlling agency, in this case Customs and Border Protection. It should be noted that such negotiations also consume corporate legal resources.

Example 7-1.   Mississippi Study of Intermodal Technologies

The purpose of this 2001 project was to assess the use, adoption, benefits, and impacts of intermodal information technologies on intermodal ports and terminals serving agribusiness firms in Mississippi. Surveys were developed and sent to port and terminal operators in the state. Survey participants were asked to share data both to help understand port industry in Mississippi and to help them better understand their use of technology in context of the global economy. As public agencies also interested in public relations, port officials and terminal operators were willing to share information. The survey participants were told their replies would be held in strict confidence. The survey cover letter told participants that the study promised to hold the data confidential and that it would not be possible to extract individual business information. See the following web site for more information: http://ncit.msstate.edu/PDF/mso2B0.pdf.

Example 8-1.   Otay Mesa Border Delay Project

The project began in October 2007 to assess GPS and license plate recognition technology for the measurement of travel times for trucks through the Otay Mesa international border crossing from Mexico into the United States. The project collected GPS truck movement data across the border from January 2009 to March 2010 for participating trucks crossing the border and allowed analysis of border crossing times and delays against standards. Prior to the data collection, the data provider participated in a lengthy negotiating process before the carriers finally agreed to grant access to their data. Before collection, stakeholder sessions with transportation industry interests, border agencies, local planning agencies, and the public offered insights into the challenges faced by users and administrators at the border. These sessions allowed for a comprehensive understanding of the conditions as they existed at the border and what might be done to improve them. This process showed project participants that care is needed in defining specifically what data is to be collected. They also found that more specificity of data needs to be provided in a contract, including spelling out in more detail the data processing involved. The conclusion was that the level of time and effort necessary to execute agreements with the carriers indicates that this should be factored in whenever GPS fleet data is sought. More details are included in the final report at http://ops.fhwa.dot.gov/publications/fhwahop10051/fhwahop10051.pdf.

Example 8-2.   International Trade Data System

ITDS is a U.S. Customs and Border Protection (CBP) system for sharing trade data with other government agencies. The purpose of the project is to develop a single window for import processing for federal government agencies that regulate the import or safety of goods. The single window helps avoid proliferation of parallel import reporting systems. ITDS provides controlled access to Automated Customs Environment (ACE) data. ITDS provides an interface and appropriate data sharing agreements for other government agencies to access ACE data from CBP. CBP negotiates MOUs with other government agencies to obtain ACE customs data and in some cases to acquire additional information on import shipments. The MOU covers how each subordinate agency within the particular government agency will access data. Individual users are required to complete nondisclosure agreements. The agreements and the interface in ITDS control access to the industry-sensitive data and provide a single data gathering process with industry. Negotiating concepts of operations, memoranda of understanding, and nondisclosure agreements with all of the 47 various agencies is a challenge. Standardization of data elements and operating procedures for other agencies to use ACE take considerable coordination and time to complete. See http://www.itds.gov for more information.

> **Example 9-1.   The FHWA/ATRI Freight Performance Measures Initiative**
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> The purpose of this FHWA-funded project is to develop and test a national system for monitoring freight performance on the nation's highways (http://www.atri-online.org). The program is led by ATRI who collects GPS truck position records data and scrubs them to remove individual companies' identities. The actual data is obtained from a variety of sources including fleets, GPS vendors, and tele-communications companies. Users of the data obtain a license from ATRI for data products and services. The actual data is owned by the providers, who govern whether and how it can be shared. This approach means that FOIA and state sunshine laws can't be used to access the raw data. ATRI acquires raw data, then licenses out rights to use it on a royalty-free basis. They can stipulate that it is a one-time use that can't be used for any other purposes. These requirements help to ensure continued participation of carriers. More information is available at http://www.atri-online.org.

Guideline 9 – Public Agencies Desiring to Obtain Data from Private Companies May Need to Research FOIA Laws

For governmental agencies, privacy protection may be complicated by open information laws that allow individuals to request information from governmental agencies. For example, the 1966 FOIA is a federal law that gives individuals access to any U.S. government agency records unless the release fits within nine exemptions (or release is prohibited by law). The exemptions include confidential business data and personal privacy that can support freight data sharing. In spite of these exemptions, individuals in the private sector can have the perception that public agencies are unable to protect data due to FOIA.

Most states also have their own version of freedom of information laws that are known as open government, open meeting, or sunshine laws. A number of national organizations catalog and provide information about each state's laws. One such source is http://nfoic.org/state-freedom-information-laws. As with the federal laws, state laws typically have some exemptions related to protecting privacy that may allow freight data sharing. As Example 9-1 shows, innovative approaches may be needed to exercise these exemptions and protect privacy concerns and meet the intent of FOIA without divulging private data.

Guideline 10 – Consider Seeking Enabling Legislation and Public Agency Policy Approaches to Support Data Sharing and Protect the Data

There are a number of legal and policy protection approaches that can address these privacy concerns. At the highest level it can involve national laws that facilitate and protect data sharing. The Canadian Transportation Gateways and Corridors Project (Example 10-1) benefited from a national nondisclosure law, known as the Access to Information Act, that standardizes the protection of data. This act provides access to data held by federal agencies, but also explicitly guarantees the protection of commercially sensitive information.

The freight data provided to the Eurostat is based on legislative mandates that are required as part of being a European Union member as well as based on voluntary agreements.

> **Example 10-1.   Canada Freight Gateways and Corridors Project**
>
> Canada's Strategic Gateways and Trade Corridors program was developed to advance the multimodal integration of that country's major transportation systems. An important part of the program is the development of a range of national gateway performance measures. Developing measures for each geographic area has involved the collection of multimodal freight data from the private sector freight carriers. One reason this effort could collect private freight data was a national nondisclosure agreement supported by a Canadian law, the Access to Information Act, and a strong Transport Canada policy of data protection (supported by a visible history of protecting data). Like the American Freedom of Information laws, the Access to Information Act provides the public access to data from federal institutions. However, this act also legally protects commercially sensitive data collected by public agencies such as found in the situation for the Gateways and Corridors project. Canadian Federal agencies are restricted from releasing any statistics that relate to any identifiable business without the previous consent of that business. Private sector freight organizations can be referred to this act and this increases their willingness to share freight data with the Canadian governmental agencies. More information on the act is at: http://laws-lois.justice.gc.ca/eng/acts/A-1/index.html. More information on the gateway and corridor project is found here: http://www.tc.gc.ca/eng/policy/acg-acgc-menu_gateways-1961.htm.

3.3 Guidelines for Scrubbing or Restricting Access to Freight Data

In a 2009-10 FHWA project entitled Freight Data Sharing Compendium, the primary barrier to freight data sharing identified was the possible disclosure of individual shipment or company data. The primary mitigation for this disclosure problem is aggregating or scrubbing data to remove individuality. While there are certainly nondisclosure and other agreements that govern data sharing, the Compendium project found that aggregating data was the practice that most protected data and yet allowed important research to go on. Table 3.5 shows two guidelines and the case study projects that exhibited those guidelines.

Data users (agencies) can help mitigate these concerns by engaging in best practices, such as scrubbing sensitive data, signing nondisclosure agreements, providing funds to cover the costs of supplying the data, and involving a trusted third party to act as a data repository.

Table 3.5.   Summary of guidelines for scrubbing data.

	Guideline	Project Examples
11	Consider the use of software and database tools to protect and access freight data by removing private or competitive information.	• Modeling Freight in Alabama • Southern California Association of Governments Heavy Duty Truck Model
12	Build access restrictions into the data set as an alternative to scrubbing.	• Lock Operations Management Application (LOMA)

Guideline 11 – Consider the Use of Software and Database Tools to Protect and Access Freight Data by Removing Private or Competitive Information

A common approach to overcoming data privacy concerns is to scrub the data of all company, shipment, and/or operator or driver information prior to delivering it to a public agency. This has been the approach for several truck GPS tracking projects including the ATRI and Washington State performance measures projects, the Southern California Truck modeling project, and the Canada Gateways project. GPS data can be automatically cleansed of specific company or vehicle identifying information while still retaining truck position records and timestamp information which is valuable for freight planning. Often, it is easier to do this through a third party data provider, such as a firm that provides GPS devices and tracking services to logistics companies on a contract basis. Assuming the data owner is willing to release the information, this relieves them of having to devote resources to scrubbing it beforehand. Normally, negotiations about data release occur between the data owner (e.g., a logistics firm) and its GPS services provider. After securing permission to release the data, the provider will scrub it according to the stipulations set forth in its contract with the owner and release it to the public agency. As mentioned earlier, ATRI performs a scrubbing role with GPS data that is subsequently used in several projects including the FPMs project for FHWA, the Southern California Association of Governments project (see Example 11-1), and the Minnesota DOT Performance Measures study.

A variety of database and software tools can be used to facilitate the data scrubbing and protection. The simplest approach may be just to strip a database of selected columns or variables with identifiers. Alternatively, data hashing algorithms allow for specific information (such as company ID) to be transposed (hashed) into a new code. The new code remains within the data-

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Example 11-1.   Southern California Association of Governments Heavy Duty Truck Model

In its Comprehensive Regional Goods Movement Plan and Implementation Strategy, the Southern California Association of Governments (SCAG) used GPS data from existing commercial GPS truck tracking/operations vendors during the period from October 2009 to July 2010 to support the development of a heavy duty truck model. Historical GPS data from fleets already deployed in the six-county SCAG region were purchased from three established GPS vendors to support the data collection effort. Trip data that has been stripped of company ID is made available to SCAG. The GPS data collection vendors were concerned with the risk of the data being used to specifically identify one of their customers (e.g., a specific trucking fleet); this concern was mitigated through sanitizing the data before it was provided to the public sector. Because the data obtained from the vendors was found to be inadequate, SCAG's contractor purchased a license for GPS truck movement data products and services from ATRI. This data was already scrubbed, and after processing, was used to update the SCAG model. The difficulty associated with recruiting fleets for the GPS data collection effort may show that it is more viable to purchase data from secondary sources as opposed to recruiting fleets to participate in data collection. The reluctance of fleet managers to participate mainly revolved around the economic climate, privacy concerns, or a general distrust of government. Additional information can be found at: http://www.scag.ca.gov/goodsmove/.

> **Example 11-2.   Modeling Freight in Alabama**
>
> The University of Alabama in Huntsville obtained and analyzed readily available federal data such as from the U.S. DOT's Freight Analysis Framework, and used surveys to collect local shipping data. A methodology and database were developed to combine these two levels of freight data for use in forecasting freight demand arising from the household sector. This combined information was used to analyze the local area through trips and to develop a freight O/D matrix for modeling freight flows in Alabama. This ability to combine aggregated freight data with specifically collected local data allowed the City of Mobile MPO to produce an intelligent estimate of freight movement and helped to validate transportation models. See the following web site for more information: http://ntl.bts.gov/lib/32000/32100/32101/Forecasting_final_demand__pass_through_freight_Final_09_14_0.pdf.

set and is internally consistent to allow for functions such as geographic tracking but reduces the ability to identify specific businesses. This approach was used by the vendors that supplied GPS data to the Washington State Freight Performance Measures project. Another more complicated technical approach is to data mask using statistical disclosure limitation tools such as used for U.S. Census data and other Federal agencies (http://www.fcsm.gov/working-papers/totalreport.pdf). Since much freight data is geographical, it also is possible to use GIS tools to filter data to just specific network segments, zones or jurisdictions relevant to a project. For example Inrix, a private sector company that sells truck performance data derived from GPS devices, provides roadway segment-level travel information. The use of segment-level information removes any individual truck data and any origin and destination-based travel patterns. Finally, database software can be set so users can only view and output aggregated data.

Software and database approaches can be used to extract useful information from freight data that is aggregated or protected. The Alabama freight modeling study (see Example 11-2) developed a framework and database to combine aggregate regional Federal data with project-collected local data to develop usable local freight flow information that was input into freight models.

Guideline 12 – Build Access Restrictions into the Data Set as an Alternative to Scrubbing

Data scrubbing can be a labor intensive process that can add significant cost to a freight data collection effort. One way to mitigate this issue is to build suitable access restrictions into the freight data as part of the sharing arrangement. It is possible to develop automated processes which aggregate freight data to a level sufficient to protect privacy but still useful for planning efforts. Similarly, company or shipment-identifying information can be hashed or scrambled prior to delivery to a government agency (this is the approach used in the Washington State GPS project discussed in Example 5-1). Indeed the sheer size of such databases will oftentimes require automated data processing protocols. Database software also can be set up to allow different types of access to freight data based on different users' authorization levels.

Example 12-1 shows how carrier identifiers were deliberately left out of the Lock Operations Management Application (LOMA), a system developed by the Army Corps of Engineers

> **Example 12-1. LOMA**
>
> The purpose of LOMA is to provide the inland waterway navigation community (including lock operators, barge lines, government agencies, and the navigation industry) with improved situational awareness through the collection, integration, and dissemination of existing data streams as well as new ones. Overall the effort seeks to automate much of the manual data collection which is currently required by lock operators. The system leverages existing Automatic Identification System (AIS) equipment required by the Coast Guard on certain commercial vessels. This provides an opportunity to employ the technology for the broader use and exchange of important navigation data.
>
>   In this initial deployment, only vessel location and speed data, plus weather information gathered from public sources, is available. Vessel identification information was deliberately left out of the initial phase due to privacy concerns, however future phases may include this and other data points such as commodities carried/weight if confidentiality issues can be adequately addressed. Additional data elements such as lock gate settings and delay times, navigation advisories, tracks taken, and river stages and hazards (e.g., debris) are planned as the system is refined in the future.
>
>   The Corps of Engineers is working with government and industry partners to address privacy and use concerns to enable further expansion of LOMA. The Federal Initiative for Navigation Data Enhancement (FINDE) is an intra-governmental effort to harmonize navigation data collection and sharing. Under FINDE, the Federal-Industry Logistics Standardization (FILS) effort works with industry to agree on common data reporting standards and formats. These have proven to be good forums for addressing these types of issues. Articles that describe LOMA in more detail can be found at the Corps of Engineers web site: http://chl.erdc.usace.army.mil/.

and its partners to collect and disseminate pertinent inland waterway operational data to lock operators and barge captains. Additional data streams may become available in future iterations of the system, but the initial deployment is already providing information valuable to lock operators.

When developing an information reporting/dissemination system involving many public and private actors, it can help to have an institutional arrangement in place to help deal with the confidentiality issues that are likely to crop up. The LOMA project is leveraging other federal initiatives aimed at harmonizing data collection and reporting efforts across agencies.

3.4 Guidelines for Stakeholder Engagement

It is incumbent upon project leaders, particularly public sector participants who desire data from other entities, to coordinate with everyone involved in a project. Coordination committees and numerous stakeholder meetings are important to the ultimate success of a project. Coordination is needed to achieve data sharing and to accomplish large public-private projects. Failure to coordinate with all stakeholders can lead to failure of a project or a much longer and more expensive project or data sharing approval process. Five coordination guidelines are shown in Table 3.6 along with examples for each.

Table 3.6.   Summary of guidelines for stakeholder engagement.

	Guideline	Project Examples
13	Place a high priority on coordination and devote the needed resources to extensive coordination with public and private stakeholders.	• Electronic Freight Management Data Exchange
14	Consider the use of trusted third parties (consultants or academics) as intermediaries or data analysts.	• ATRI Freight Performance Measures Project
15	Investigate possible partnerships with trade associations to facilitate data sharing.	• Performance Measures for Freight Transportation
16	Coordinate with local or regional agencies that may have closer relationships with data providers.	• Washington E-Seal Border Crossing Project
17	Consider gradual implementation of data acquisition coupled with coordination about successes.	• Importer Security Filing (10+2) Project

Guideline 13 – Place a High Priority on Coordination and Devote the Needed Resources to Extensive Coordination with Public and Private Stakeholders

The more parties there are in a project, the more difficult it is to work through all of the coordination issues. This is particularly true of projects that involve international borders with multiple federal, state/provincial, and local governments as well as private firms in both

Example 13-1.   Electronic Freight Management Supply Chain Data Exchange

The goal of FHWA's Electronic Freight Management program was to improve supply chain efficiency and reduce supply chain costs for shippers and carriers. The Kansas City EFM deployment test applied Web and Internet-based data exchange technologies to a wholesale supplier that used data and reports about supply chain movements to better manage its operation. Supply chain partners included shippers and consignees (the principal supply chain owner); transportation providers including third party logistics providers, rail carriers, and local trucking companies; and a customs broker. An integration contractor implemented the technology and conducted the test for FHWA. This partnership model was used in a previous Columbus test and with several subsequent supply chain case studies, but the partners were different for each case study. Determining what data each partner would provide and how it processed and transmitted the data required significant coordination amongst FHWA, the study contractor, the supply chain owner, and the various partners. Kansas City SmartPort, a not-for-profit corporation that facilitates transportation in the Kansas City area, was a participant in the promotion of the project and assisted in coordination. Confidentiality of partner data was mitigated by MOUs to protect data from unauthorized outside access. Each partner's needs and view of proprietary data were different. This required considerable coordination and effort by the study contractor. Reports of results from additional case studies are or will be available as they are completed through FHWA and its case study contractors. Identification and calculation of benefits were useful parts of the reports that were shared and coordinated with partners. There are two web sites that provide additional information about EFM case studies: http://www.efm.us.com and http://www/efm-saic.com.

countries. Thus, stakeholder coordination was an important element in a number of successful freight data sharing efforts including several border crossing travel time studies and the CREATE rail improvement public-private partnership in Chicago. For the border crossing projects, coordination was more complicated because of the various government organizations at the borders (two border enforcement agencies, two sets of facilities managers, two state/provinces, at least two local governments, two federal governments). Projects around terminals that included terminal operators, shippers, and the carriers that served them involved coordination with diverse public and private interests. The FHWA-sponsored EFM supply chain improvement projects were good examples of such coordination (Example 13-1). Some projects had success with formal public-private coordinating committees and meetings with stakeholders. Another aspect of freight data sharing that appeared in several studies was that local or personal contacts, as well as personal appearances by project leaders at freight stakeholder meetings, enhanced survey and interview response rates.

Guideline 14 – Consider the Use of Trusted Third Parties (Consultants or Academics) as Intermediaries or Data Analysts

Experience with several projects has shown that personal relationships and trust between the public agency desiring the data and the private firms providing the data are important. Specifically, some projects involved performing contractors who were trusted by both public and private sector partners. Examples include ATRI and its relationship with the trucking industry (see Example 14-1), several university-led projects including the Washington State GPS Performance Measures Program, Alabama freight study, and Texas border crossing projects, and the Cross-Town Improvement Project, where the integration contractor was well known to the railroads involved and had railroad experience.

Guideline 15 – Investigate Possible Partnerships with Trade Associations to Facilitate Data Sharing

Trade associations can help foster relationships as well as facilitate data sharing. As advocacy groups, trade associations typically understand how infrastructure policy decisions impact their industry and can therefore see the potential value in sharing data. They are also likely to

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Example 14-1.   ATRI Freight Performance Measures Project

As previously discussed, the ATRI conducted this project for DOT/FHWA and developed and tested a national system for monitoring freight performance on the nation's highways (http://www.atri-online.org). As the research arm of the American Trucking Associations, ATRI was considered a trusted third party for near real time data collection. ATRI has a data sharing agreement with recipients of the services, but the core agreements between ATRI and its data providers are considered confidential. The trucking industry is usually not in the data sharing business, but program participants believe that it is important to have a trusted third party in this arrangement since the data owners need to be sure the information won't be used in ways that could harm them. ATRI has a multi-year government contract with FHWA because the trucking industry has indicated the results are useful and of value. ATRI's relationship with the trucking industry allowed data to be collected and cleansed. Oftentimes, once participants know who ATRI is, they are willing to help.

Example 15-1.   Performance Measures for Freight Transportation

NCFRP Project 03, which culminated in *NCFRP Report 10,* developed a comprehensive set of performance measures for the nation's freight transportation system. Measures are presented as a Freight System Report Card, which has three levels of increasingly detailed information to serve the needs of a wide variety of stakeholders. The Report Card includes 29 performance measures in six categories, and reflects different levels of geographic detail from the local to the global perspective. The proposed freight report card would draw on multiple data sources, mostly from government agencies but also from the private sector or trade associations. See the following for more information: http://apps.trb.org/cmsfeed/ TRBNetProjectDisplay.asp?ProjectID=1575.

provide access to appropriate owners of freight data. For example, in the Minnesota Performance Measures study, the researchers obtained data dealing with rail freight from the Association of American Railroads, data on intermodal freight from the IANA, and waterway and port data on intermodal freight from both the PIERS and AAPA. Example 15-1 describes some of the data sharing involved in freight performance measures. In the study of the Snake River Lock Outage, a Technical Advisory Committee (TAC) included staff from the American Trucking Associations, and the Association of American Railroads. A lesson learned from that project was that dealing with trade associations can be more useful than dealing with individual businesses. Similarly, the Goods Movement Roundtable in the MetroLinx study in Greater Toronto and Hamilton included private sector industry associations as members.

Guideline 16 – Coordinate with Local or Regional Agencies that May Have Closer Relationships with Data Providers

Metropolitan Planning Organizations (MPOs) or other local/regional agencies can sometimes collect data more easily than higher level agencies. These agencies may have a specific, focused working relationship with data providers. Example 16-1 involved collecting border data

Example 16-1.   Washington E-Seal Border Crossing Project

The project involved tracking of containers with electronic seals moving both north and south between Seattle and Vancouver, British Columbia. Pilot tests involved in-bond containers sealed in the Puget Sound Ports and read at the U.S.-Canadian border. The objective was to enhance security and reduce transit time at the border crossing. The funding for this project was from the U.S. Department of Transportation, Washington State Department of Transportation, U.S. Department of Homeland Security, the State of Washington, Whatcom Council of Governments (the local MPO) and their IMTC. The IMTC organization was helpful in dealing with stakeholders and had data sharing agreements and relationships from previous tests. Researchers in the project found that data sharing depends on personal relationships, especially with the enforcement agencies and that it is easier to maintain trust at the local level. Additional information can be found at: http://www.wcog.org/imtc.

> **Example 17-1. Importer Security Filing (10+2) Project**
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> The purpose of the Importer Security Filing (ISF), commonly known as the 10+2 Project, is to obtain import container manifest information prior to vessel departure from a foreign port and require automated submittal of that information to CBP prior to departure of the vessel from the foreign port. After the introduction of ISF in early 2009, CBP had a period of gradual enforcement and extensive public relations and coordination with importers and carriers. CBP stated at the time that they really wanted the data and not penalties, and that they did not want to disrupt the flow of legitimate cargo into the United States. CBP performed extensive outreach and phased in the enforcement of the requirements to ease the ability of importers to comply. The preparation, involvement of the trade, and the gradual enforcement were important in gaining compliance and acceptance of the program by all parties involved. The CBP web site has additional information: http://cbp.gov/xp/cgov/trade/cargo_security/carriers/security_filing/.

for the electronic seals project from the Whatcom Council of Governments' (a Washington State MPO) through their International Mobility and Trade Committee (IMTC) rather than CBP. That MPO had a long term and strong relationship with border enforcement agencies operating in their jurisdiction. This provided access to data that was not readily available to other public agencies.

Guideline 17 – Consider Gradual Implementation of Data Acquisition Coupled with Coordination About Successes

Sometimes starting small is helpful, particularly if it is coupled with continuing coordination and feedback with data providers and, as appropriate, the public. Not every project lends itself to an evolutionary approach, but there are good examples of projects that succeeded because they incrementally expanded the scope after early phases. A good example is the ATRI performance measures project which started as an analysis of five corridors, with data collection from companies specifically related to operations on those highway corridors. Subsequently, the relationships, data agreements, documentation of results, and overall coordination allowed ATRI to expand the scope of its data collection to become nationwide and involve trucks operating across the border with Canada. In the 10+2 project, CBP stretched out the implementation period so that the coordination with shippers and carriers could be completed and so that individual companies would have the time to comply with the data submission requirements (see Example 17-1). In both projects, these confidence-building measures allowed involved parties to become comfortable with the data sharing before making big commitments.

3.5 Guidelines for Articulating Benefits of Sharing

It is important for project proponents to be able to explain to the public, private sector participants, and other stakeholders how they will benefit from the conduct of a project. Articulating benefits is an important part of coordination of a project. This is needed at the beginning when the participants are seeking approval of a project and very often needed throughout the conduct of a project. Sometimes publishing analyses of the expected costs and benefits of a

Table 3.7.   Summary of guidelines for articulating benefits.

	Guideline	Project Examples
18	Define and articulate the benefits, goals, and purpose of data sharing to stakeholders.	• C-TIP Project • 10+2 Project
19	Include a stipulation that data is for one-time use and cannot be used for any other purposes such as regulation.	• Washington State FPM
20	Publicize the cooperation amongst project partners and seek to give the project visibility to stakeholders and the public.	• EPA SmartWay • Freight for a Day Study
21	Explain clearly to stakeholders that sharing of data will support improved freight infrastructure decisions that will benefit those stakeholders.	• Detroit Windsor Bridge • Double-stack Clearance Improvement Project
22	Add value to the data and make it available to all stakeholders.	• Washington E-Seal Border Crossing Project • Border Crossing Information System Project
23	Use technologies that are useful for other purposes.	• Otay Mesa-Tijuana Border Travel Time Measurement Project
24	Explore new market opportunities with potential data providers.	• Washington State and Southern California GPS Projects

project helps to assure its success. There are seven guidelines that deal with benefits of sharing, shown in Table 3.7, along with examples from case studies.

The case studies and the workshop conducted under this project both identified the importance of articulating benefits.

Guideline 18 – Define and Articulate the Benefits, Goals, and Purpose of Data Sharing to Stakeholders

Almost all successful projects include analysis at the beginning to carefully publicize potential benefits of a project. Particularly in data sharing, it is crucial that project proponents articulate benefits to private sector participants who might not otherwise be willing to share data. Often it is important to stipulate that the data will not be used for regulatory enforcement. The key in this area is communications with project participants and with the public. Example 18-1 describes efforts in the Cross-Town Improvement Project (C-TIP) in Kansas City. Example 18-2 explains a slightly different situation at the Department of Homeland Security where, for matters of national security, they want to require transportation companies and shippers to submit data; the DHS effort to articulate its goals is described. The coordination and outreach by customs agencies helped in getting the import community ready to submit the data. Coordination among public and private partners and with foreign ports and multiple countries is challenging but crucial to successful improvements such as the Secure Freight Initiative (SFI) foreign port scanning project.

Guideline 19 – Include a Stipulation that Data is for One Time Use and Cannot be Used for Any Other Purposes Such as Regulation

Private sector data providers were more likely to share their data if they could be assured that there are limitations on the way data is used. Most importantly, private sector firms were

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Example 18-1.   C-TIP

The C-TIP Intermodal Transfer Project is a technology application, supported by U.S. DOT/FHWA, designed to improve the efficiency of cross-town dray movements between railroads by maximizing productive moves and minimizing unproductive ones (e.g., bobtails). For the railroads involved, the C-TIP contractor found that as long as they could show the benefits, the railroads would usually agree to participate. The primary selling point from the railroads' perspective was saving money on cross-town drayage rates through a more rational system of coordinating and dispatching moves. The railroads did recognize that the main immediate benefit would accrue to the dray companies, but that this could translate into lower rates for the railroads over the longer term. As long as participation did not cost the railroads too much, and would result in reasonable benefits to the Kansas City region, they were usually willing to share. Railroads wanted to be good corporate citizens. More information on this project can be found here: http://www. ctip-us.com.

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concerned about additional uses by the government beyond the purpose of the project at question. In particular, they were quite concerned about using data against them, for example, in the regulatory process. Therefore, it is important for the public agencies to put in writing the intended use of the data and an agreement that data will not be used for other purposes. The example below describes techniques that were used when obtaining private sector truck data for the Washington State FPM project (Example 19-1).

Example 18-2.   Importer Security Filing (ISF) (10+2) Project

The purpose of the 10+2 Project is to obtain import container manifest information prior to vessel departure from a foreign port and require automated submittal of that information to CBP prior to departure of the vessel from the foreign port. The 10 importer data elements and two ocean carrier data files allow CBP to identify potentially high-risk cargo through the identification of actual cargo movements and, at the same time, expedite the processing of lawful international trade by identifying low-risk shipments early in the supply chain. As noted earlier, CBP conducted extensive public relations and coordination with importers and carriers. Extensive publicity and coordination occurred to determine the impacts on importers and to facilitate the ISF data being provided to CBP correctly and in a timely way. Detailed data requirements were issued to avoid confusion and make it easier for importers to provide the required data. The ISF program helps CBP meet the congressional requirement to provide advanced data to U.S. ports and reduce the risk of terrorism via import ocean container. The coordination and outreach by CBP helped in getting the import community ready to submit the data. 10+2 provides ocean carriers greater confidence in the security of the shipment they are transporting, and increases the likelihood of an uninterrupted and secure flow of commerce. The CBP web site has additional information: http://cbp. gov/xp/cgov/trade/cargo_security/carriers/security_filing/.

Example 19-1. Washington State FPMs

The state-funded Washington State GPS FPMs Project used data from commercial GPS devices in trucks to develop a statewide freight performance measure program. The project involves ongoing GPS-based probe truck movement data collected for the Puget Sound area since 2008 and for all of Washington State since 2010. The GPS data are used to support a statewide freight performance measure program that includes locating and quantifying truck roadway bottlenecks. There is a monthly fee for the acquisition of the GPS data from the GPS vendors. Concern by individual companies of release of their data was mitigated by aggregating data and removing individual company ID. In addition, the public agencies assured the GPS vendors that the data would not be used for regulatory purposes and that the agencies would safeguard the data while making effective and positive use of the data. More information can be found at the University of Washington's transportation research web site: http://www.depts.washington.edu/trac.

Guideline 20 – Publicize the Cooperation Among Project Partners and Seek to Give the Project Visibility to Stakeholders and the Public

Most freight data projects involve significant publicity of the goals, objectives, and benefits of the project in general and of the particular data sharing. It takes considerable time and effort to perform the coordination and articulate the benefits. If providers understand what public uses of data are planned, it may help with sharing of data. This was true in several state studies including the WSU lock outage study, the Minnesota DOT and Alabama Freight Study. In some cases, participants benefitted from favorable publicity of being involved in a project. This even included peer pressure as playing a role in convincing other similar partners to participate in a project. The EPA SmartWay partnership is discussed in Example 20-1 to show how visibility of a project and participation benefits individual companies in the program. Example 20-2 describes the Freight for a Day study in Philadelphia that gave companies an opportunity to show off their freight efficiencies. In addition, the CREATE partnership in Chicago was among the projects that provided positive publicity that is valued by the participants. The FPMs projects for FHWA and the State of Washington clearly stated that the data collected would support freight system improvements.

Guideline 21 – Explain Clearly to Stakeholders that Sharing of Data Will Support Improved Freight Infrastructure Decisions that Will Benefit Those Stakeholders

There are numerous projects in which this approach works with agencies that have infrastructure responsibilities. These projects included the Washington State Freight Performance Measures project (for roadway improvement projects), the Mississippi Study of Intermodal Information Technologies (terminals and intermodal technology investments), the CREATE rail infrastructure improvement program in Chicago, and the Metrolinx Greater Toronto and Hamilton Area Urban Freight Study (road and rail infrastructure). Example 21-1 describes an international bridge crossing project in Detroit that has involved articulation of benefits of the project. Example 21-2 is the Double-stack Clearance rail improvement in Philadelphia.

Example 20-1. EPA SmartWay

The U.S. Environmental Protection Agency's (EPA) SmartWay partnership program began in the early 2000s to encourage and recognize energy conservation in freight transportation. The primary focus is on transportation companies, particularly trucking companies, railroads, and those companies that handle intermodal freight which voluntarily agree to implement energy improvements. EPA encourages companies to use the SmartWay logo and the companies' participation in the partnership in advertising to let suppliers, customers, and the public know about benefits accruing from the energy improvements. Freight data is not shared in the project, but companies enter into partnership with EPA to voluntarily reduce energy consumption and emissions. Participating companies benefit from the positive publicity and use of the SmartWay logo in advertising. Data about partners and the energy conservation efforts they have undertaken are shared with EPA and often publicized. Companies apply to become partners in SmartWay and download a model which is used to document emissions reductions. Firms enjoy cost savings, public/peer recognition, and environmental achievement benefits. EPA commits to promote company participation in the program by posting partner names on the SmartWay web site and in related materials. As the program expanded, partners already enrolled publicized their participation through trade conferences, meetings with other companies in the industry, and marketing/promotional materials. This increased awareness of the program within the industry; as more and more firms became familiar with SmartWay, more started to sign up. The program continues and plans to expand to other areas of freight transportation including short sea shipping. More information can be found at the SmartWay web site: http://www.epa.gov/smartwaylogistics/index.htm.

Example 20-2. Freight for a Day Study

As part of its regional planning responsibilities, the Delaware Valley Regional Planning Commission (DVRPC) promotes freight transportation efficiency improvements and economic development throughout the region. The Freight for a Day study was to be a freight scan for all modes operating within the two-state region around Philadelphia and was intended to provide a picture of the extent of freight operations and of the economic impact that freight transportation has on the region. The study involved one day of data collection (September 20, 2006) from numerous public and private partners with accompanying field visits to ports and terminals in the Philadelphia area to observe freight movements into and out of Delaware Valley freight facilities. The results of all of the data collection and observation were pulled together in a document that provided a scan of freight activity at various points within the study region. There were no formal agreements for the data that was collected. Through the personal contact by DVRPC, the goals and objectives of the study and the data desired from each party were communicated. Since the study was intended to publicize the role of freight in the region through one time data collection, there were no issues of sharing use of the data. Field visits were useful as reminders to participants and as opportunities for participants to show off their operations. The report "Freight for a Day, September 20, 2006 An Elementary Guide to Understanding Cargo Shipments in the Delaware Valley," can be found at the DVRPC web site http://www.dvrpc.org.

Example 21-1.   Detroit Windsor Bridge

The Detroit-Windsor New International Trade Crossing, formerly known as the Detroit River International Crossing (DRIC) Project, began in 2000 as a partnership among U.S. DOT/FHWA, Transport Canada, the Michigan Department of Transportation, and the Ontario Ministry of Transport. The primary purpose of the proposed new international bridge crossing is to improve transportation in the Detroit-Windsor corridor and to reduce the projected economic impact of increasing freight delays at the border. The new crossing has significant economic effects in both Michigan and surrounding states and in Ontario. The top auto makers, many other businesses, the Ohio legislature, and most area Chambers of Commerce support the new bridge project. There have been useful and well-publicized studies of the economic impacts of the international crossings on the respective economies of Michigan and Ontario. The intent of the four public agency partners noted above is to award a contract for the new bridge as a public-private partnership in which the contractor finances and builds the publicly owned bridge and receives toll revenue to cover the cost of the financing. During 2012, an interlocal agreement was signed between the state of Michigan and the province of Ontario. A Michigan ballot initiative that would have essentially delayed or stopped the new bridge was defeated in November 2012. Political arguments and potential lawsuits continue. So while the project is an interesting example of public-private efforts to build infrastructure, it also shows that having well-executed economic analyses to justify infrastructure projects is important, but not sufficient. The politics surrounding the alternatives for the new crossing have been difficult to date and continue to threaten the future completion of the project. There are numerous news articles about the bridge proposal and its history. These include http://www.freep.com which published a special bridge issue in April 2011, detfreepressbridgeissue.pdf and a pro-bridge web site, http://www.buildthebridgenow.com.

Example 21-2.   Double-Stack Clearance Improvement Project

The Double-Stack Clearance Improvement Project, which began in 2009, is a public-private partnership for CSX rail physical plant improvements needed to allow double-stack container cars to safely pass through existing rail lines in Philadelphia. The effort involves the CSX railroad, the state of Pennsylvania, the city of Philadelphia, and other proponents in the Philadelphia area and will be completed in 2013. The improvements, two thirds funded by public agencies, involve reconstruction of tracks and/or bridges at 16 crossings in the Philadelphia area. The improvement avoids circuitous routing of 37 miles and cuts transit time by 5 hours. The reason for the cooperative working relationship is that the state of Pennsylvania and businesses that operate there are likely to benefit from double-stack improvement, since the more efficient container operations result in fewer trucks on area roads and bridges. The DVRPC has helped local officials plan and advocate for improvements and has periodically published information about the project to keep the public informed. See the DVRPC web site for more information: http://www.dvrpc.org.

Guideline 22 – Add Value to the Data and Make it Available to All Stakeholders

If partners see value in the data products offered by agencies and are offered access to the information resources that their data helps to generate, they may be more willing to provide data. This is especially true for public-public data sharing, i.e., the sharing of information between government entities. Although formal agreements are not always needed for this sort of sharing since the data is already in the public realm, agencies would have to devote staff time to providing and maintaining data feeds to other agencies for the purpose of assessing transportation system performance. Some public data contains private industry data that is considered confidential, so sharing and confidentiality agreements are necessary sometimes. The commitment to provide data to another agency is more likely to be forthcoming if the receiving agency adds value to the data and makes it available in a useful format for the providing agency. Example 22-1 discusses public sharing of container tracking data at borders. Example 22-2 describes a system for consolidating and publishing public border crossing and traffic information on a web site for public users.

Guideline 23 – Use Technologies that are Useful for Other Purposes

It is important that participating companies perceive a benefit for themselves in sharing data. Technologies such as GPS devices are useful for public agency measurement of transportation system performance, but can also provide useful data for the company itself. Negotiations to secure this type of data will normally be more involved since the data is proprietary and could divulge sensitive business information. Agencies should carefully define the data that they need, and how it will be processed, to reassure private firms that their data will be protected. Information sharing agreements need to consider alternative uses of the data to ensure that the maximum value can be obtained. Although data obtained from a limited set of probe vehicles will prove useful for measuring freight performance, significant penetration of the chosen technology in the region of interest would be required to develop truly representative results.

Example 23-1 details a project where the FHWA purchased GPS data from a third party vendor with carrier consent to analyze border travel times at the Otay Mesa-Tijuana port of entry.

Example 22-1.   Washington E-Seal Border Crossing Project

This project involved the tracking of containers with electronic seals on shipments moving north and south between Seattle and Vancouver, BC. Pilot tests involved in-bond containers sealed in the Puget Sound Ports and read at the border. The objective was to enhance security and reduce transit time at the border crossing by pre-clearing trucks prior to their arrival at the border. E-seal data was combined with truck transponder data from other pilot tests to improve border crossing efficiency and enhance operations along the I-5 Corridor. Carriers and other supply chain partners who process shipments across the border provided shipping documents and supply chain event data. Information provided included intermodal movement data for containers moving by truck either through the corridor or to and from regional ports.

Since, in many cases, the benefits of data sharing were made obvious, the project partners were supportive. The project was security-oriented but this also resulted in a process that appealed to the private sector partners. The border wait time metrics generated by the project were made available to participants. Additional information can be found at: http://www.wcog.org/imtc.

Example 22-2.   Border Crossing Information System Project

The purpose of the Border Crossing Information System (BCIS) project was to develop a prototype of a centralized repository of border crossing-related data and provide traveler information to the public to aid in their decisions about the time of day to make a border crossing, as well as provide performance-related data to stakeholder agencies.

   BCIS consolidates existing data from multiple public sources and presents it on a web site accessible by the public. Data are grabbed from other systems and stored in a relational database for display on web-based maps. The data are used for public advisories/information about border crossings, delays, and special circumstances at borders. Since the data is public, no access agreement was necessary.

   Prior to the development of the BCIS, there was no system to extract data from existing systems to present archived border data to users of a public web site for travelers and users of the border crossing. Rather, each agency's data was used only by that agency. It was found that adding value to data provided by stakeholder agencies, especially public agencies, is the best approach a border crossing information system can use to guarantee continuous support from the agencies. Additional information is available at the TTI web site: http://tti.tamu.edu

Example 23-1.   Otay Mesa-Tijuana Border Travel Time Measurement Project

The purpose of this project was to assess the effectiveness of a technology for automated capture of travel time for vehicles crossing the border by collecting and analyzing one year's worth of travel time data. GPS data from a third party provider was selected for a one year test to record travel times through the border zone at Otay Mesa, California. GPS was chosen in part because it is a reliable, proven technology that is trusted by users. GPS data from two participating carriers was used to measure transit time across the U.S.-Mexico border and analyze differences between FAST and normal lane crossings.

   Although the negotiations to obtain the GPS data were lengthy, ultimately the carriers became more receptive as they recognized that the devices are useful for other functions as well. GPS and related fleet management applications can be useful for asset tracking and other functions such as fuel consumption monitoring and fleet maintenance. GPS data recorded in the project could be used not only for travel time calculation, but also for the identification of origins and destinations and route selection. By working directly with carriers while agreeing to protect sensitive information from distribution, the data provider was able to structure its data agreements to allow for the re-use of information for multiple purposes without incurring additional cost. More details are included in the final report at: http://ops.fhwa.dot.gov/publications/fhwahop10051/fhwahop10051.pdf.

Guideline 24 – Explore New Market Opportunities with Potential Data Providers

Historically, agencies have had to make do with inadequate public data or engage in expensive data collection efforts to accomplish freight planning goals, even though it is widely known that superior data exists but is controlled by private firms. In some cases, however, third party data providers may find that there is an untapped market for anonymous freight movement data that public sector agencies can use for transportation planning and modeling purposes. GPS data in particular is being used in this way to help agencies better understand truck movements and bottlenecks in their regions. Although the same privacy and use concerns discussed in other guidelines must also be addressed for GPS data, once this has been done it can lead to an ongoing data relationship with participating fleets and vendors. Example 24-1 discusses two similar GPS projects, both of which successfully used purchased GPS data for freight performance measurement/modeling.

The cost of purchasing freight data, especially on an ongoing basis, is frequently a concern for planning agencies. This is particularly true in smaller regions which may not have the same resources as larger ones. This is one reason why such projects have heretofore been limited to one-time efforts or expensive projects in larger regions. However, in the case of GPS, it should be noted that increasing read rates on GPS devices, combined with growing fleet penetration, will likely lead to reduced costs and better quality data in the future.

Example 24-1.   Washington State and Southern California GPS Projects

This example involves two similar projects since the first one in some ways led to the second. In 2008, Washington State began using data from commercial GPS devices in trucks to develop a freight performance measurement program. The effort was funded by the State Legislature and the University of Washington, with additional sponsorship from the Washington Trucking Associations and the Washington State DOT. Data collection was coordinated by researchers at the University of Washington. Having attempted unsuccessfully to recruit multiple truck fleets to provide data, the researchers turned to a commercial GPS vendor. After lengthy negotiations with the vendor, researchers gained access to aggregated/anonymous truck movement information. They used the data to map truck bottlenecks and construction impacts on truck movements in the Puget Sound region. Once the carrier privacy concerns were addressed, the GPS vendor realized that this could be a new revenue source for the firm. See http://www.depts.washington.edu/trac for more information.

In 2009 and 2010, a similar truck data collection effort was undertaken on behalf of the SCAG for the purpose of updating their heavy duty truck model. The decision to use this approach was based in part on the successful experience in Washington State, and indeed one of the same GPS vendors was used for the Southern California effort. SCAG purchased truck GPS positional records from three different vendors, each representing different sectors of the regional truck fleet. This work provided a far richer data set at lower cost than could be obtained through traditional trip diary approaches. Moreover, the project further raised the profile of the public sector market with GPS vendors, who now recognize public agencies as potential new clients for their data. Additional information can be found at: http://www.scag.ca.gov/goodsmove/.

3.6 Guidelines for Funding for Data Sharing and Projects

Most freight data projects originate because of a public and sometimes public-private interest in furthering a transportation objective. Federal, state, or regional/local planning or transportation agencies conduct projects that look at the performance of the transportation system, address the impacts of congestion, and analyze the costs and benefits of proposed infrastructure improvements. Such projects may be conducted by in-house transportation staff at the various agencies, but more often the projects are carried by contractors working for the agencies. Thus, an important, if not essential, aspect of projects involving freight data is funding to conduct the research and to facilitate sharing of data. Four guidelines related to funding are shown in Table 3.8 with examples for each.

Making sure that the data sharing efforts are adequately funded is important. The most successful projects are those where participants are reimbursed for their costs and efforts and where public and private money are brought to bear in accomplishing results. The following four guidelines are provided to improve the effectiveness of funds and are especially relevant as funding becomes tighter.

Guideline 25 – Attempt to Include Funding for Research and Data Collection in Public Sector Contracts

An important part of public infrastructure programs is adequate planning at the beginning of the project. Several of the border crossing projects both on the U.S.-Canadian border and the U.S.-Mexican border were funded to improve traffic flow and reduce delays at the border. Electronic Freight Management was a series of research projects sponsored by U.S.DOT to demonstrate improvements in automation of supply chain data. There have been numerous projects involving the capture, aggregation, and analysis of GPS data and most were federal or state initiatives. All of these public contracts involve stakeholder groups in the local areas and require adequate resources in the contract to coordinate with the various stakeholders and put in place agreements that help assure participation. Government funding from the contracts helps offset costs and encouraged participation in the projects. Public sector projects should include funds to support the private sector activities involved with participation as well as data collection. This helps assure success of the project. Example 25-1 discusses the FHWA GPS project, Freight Performance Measures, which featured a long-term contracting partnership between FHWA and the non-profit trucking industry research firm ATRI.

Table 3.8.   Summary of guidelines for funding data sharing.

	Guidelines	Project Examples
25	Attempt to include funding for research and data collection in public sector contracts.	• FHWA-ATRI Freight Performance Measures Project • Border Crossing Wait Time Projects
26	Be sure to include funding to cover costs of data sharing and needed agreements to protect data.	• Canadian Gateways • The CREATE Program
27	Where appropriate, try to obtain joint public-private funding for projects.	• Double-stack Clearance Improvement Project • Truck Turn Time Study
28	Consider gathering data from volunteer stakeholder groups or roundtables.	• Minnesota FPM • GHTA Urban Freight Study

Example 25-1.   Freight Performance Measures

The long term FHWA contract with American Transportation Research Institute (ATRI), the not-for-profit research arm of the American Trucking Associations, to obtain GPS data and analyze freight movements has been discussed in earlier examples. ATRI executes an annually updated nondisclosure agreement and contract with each provider of data and has expanded the number of participants in both the U.S. and Canada. ATRI's contract with the data providers and software that it uses to scrub the data and remove individual trucking company identification data have been important in getting the various parties to provide the desired data. The truck travel time data collected by ATRI is being used to calibrate network assignment models and to understand activity by time of day. A freight performance measurement web site looks at average truck operating speeds on various U.S. highway networks. The multi-year contract with FHWA is viewed by both ATRI and FHWA as a partnership that has been crucial to obtaining the data and developing freight performance measures. More information is available at http://www.atri-online.org.

Example 25-2 explains in more detail some of the contracts involved with several of the border crossing projects.

Guideline 26 – Be Sure to Include Funding to Cover Costs of Data Sharing and Needed Agreements to Protect Data

If it costs data providers to share data and they do not otherwise perceive benefits, reimbursement sometimes helps. Thus, when defining a contract, be sure to include funding related to data acquisition and sharing. As shown in Example 26-1, the Canadian Gateway project provided a

Example 25-2.   Border Crossing Wait Time Projects

The U.S.DOT FHWA and Transport Canada jointly sponsored a wait time technology evaluation in July 2010 at Peace Bridge in Buffalo and Pacific Highway in Blaine, WA. The evaluation involved vehicle identification technologies such as RFID, Bluetooth, License Plate Recognition, and the measurement or calculation of accurate border wait times. Separately, there have been pilot projects at El Paso, TX (RFID), and Otay Mesa CA (GPS), funded by the U.S. DOT/FHWA government contracts. Additional information about border crossings can be found at the FHWA web site http://www.ops.fhwa.dot.gov.

Transport Canada sponsored the Canada Border Wait Time project and signed a MOU with several provinces to set up an Ontario-Quebec Continental Gateway and Trade Corridor. The project involves a GPS-based border travel (transit) time system. After a successful proof of concept, Transport Canada awarded a contract to a third party GPS provider. More information can be found at: http://ebtc.info/2009_presentations/11_tardif_transit_times.pdf.

These projects were successful because they provided public contract funds to project participants to pay for their efforts in participating.

Example 26-1.   Canadian Gateways

Transport Canada is the sponsor of the project to develop indicators measuring the reliability or fluidity of multimodal freight movements in Canada and across the U.S. border. Data is collected from private partners who are transportation providers, primarily trucking companies, but also from railroads when rail shipments are involved. Transport Canada has letter agreements with carriers to provide automated data from their systems. In addition, Transport Canada has a long-term contract with the GPS data provider. Transport Canada was also willing to assist financially any of the participating companies if they had to make minor adjustments in their information systems in order to provide the data. In addition they assured the companies that there would be no ongoing, recurring cost. http://www.tc.gc.ca/eng/policy/acg-acgc-menu_gateways-1961.htm.

stipend to trucking companies to help with their costs of providing data. Example 26-2 below discusses the CREATE program in Chicago that used TIGER funds to support data sharing, coordination, and infrastructure improvements.

Guideline 27 – Where Appropriate, Try to Obtain Joint Public-Private Funding for Projects

Particularly where the public benefits from the work, rail improvement projects often involve both public and private funding. This motivates both the public agencies and the private companies to participate. Although it was not a data sharing project, the Double-Stack Clearance Improvement Project, described in Example 27-1, was successful because of the involvement and funding from both a state DOT and a railroad. The railroads also contribute substantial funding to the CREATE program in Chicago.

Example 26-2.   The CREATE Program

The Chicago Region Environmental and Transportation Efficiency (CREATE) Program is a partnership to improve rail transport efficiency and reduce traffic congestion in the Chicago area via infrastructure and operational projects. The partnership includes local and state DOTs, the regional commuter rail system (Metra), Amtrak, six Class I railroads, and two switching railroads. CREATE receives U.S. DOT funding, state and local DOT funding, and significant funding from the freight railroads. There was extensive coordination with citizen groups to help mitigate problems. The various public agencies involved included the state of Illinois and local community governments including Chicago, who were involved because of the potential public benefits of rail improvements. Private businesses including shippers and railroad companies were also in the partnership. A key advantage of the partnership was in obtaining funds including earmarked federal funds as well as state, local, and private funds for the rail improvements. For more detail, see the Case Studies Appendix C *of NCFRP Report 2: Institutional Arrangements for Freight Transportation Systems* (June 2009), pages C-33 through C-46.

Example 27-1. Double-Stack Clearance Improvement Project

The Double-Stack Clearance Improvement Project, which began in 2009, is a public-private partnership for CSX rail physical plant improvements needed to allow double-stack container cars to safely pass through existing rail lines in Philadelphia. The effort involves the CSX railroad, the state of Pennsylvania, the city of Philadelphia, and other proponents in the Philadelphia area. The improvements involve reconstruction of tracks and/or bridges at 16 crossings in the Philadelphia area. The improvement avoids circuitous routing of 37 miles and cuts transit time by 5 hours. The reason for the cooperative working relationship is that the state of Pennsylvania and businesses that operate there are likely to benefit from double-stack improvement, since the more efficient container operations result in fewer trucks on area roads and bridges. Funding has been provided by CSX Railroad (about one-third), PennDOT, federal earmark funding, and FHWA improvement funds. The public-private partnership that provided public funding for the double-stack rail improvement has been crucial to the success of the project, which will be completed in 2013. See the DVRPC web site for more information: http://www.dvrpc.org.

The Turn Time Study at the Port of Long Beach, described in Example 27-2, was funded by several different private groups and the port operators; it used data collection equipment and data collected in an earlier project that received federal funding.

Projects to improve air quality in Southern California almost always include co-funding by private sector partners and/or other government agencies. These can be in the form of monetary or in-kind contributions.

Example 27-2. Truck Turn Time Study

The purpose of the turn time study, performed in 2010-11, was to analyze truck movements at the ports of Los Angeles and Long Beach to quantify the length and impact of trucking delays in picking up and delivering containers to the port. The project used GPS data from 250 dray trucks at the ports already equipped with GPS and capturing the data in the METRIS system as part of an earlier 2006-08 study funded by U.S.DOT. A Truck Turn Time Stakeholders Group was formed and oversaw the project. It consisted of port operators and truckers and was key to keeping parties talking with each other. A consulting firm analyzed the data and made recommendations to the stakeholder group. Private organizations including Ability Tri-Modal Transportation Service Inc, Port of Long Beach, Port of Los Angeles, and PierPass, Inc, all contributed funding for the turn time study to pay for the consultant's analysis and report. The analysis of 6 months of data from October 2010 to March 2011 showed where bottlenecks occurred and measured time that trucks waited in queues and time picking up and delivering containers in the ports. The analysis was documented in an April 2011 report by Digital Geographic Research Corporation for PierPass, Inc. and Ability/Tri-Modal Transportation Service. Efforts by stakeholders to implement the recommendations of the analyses continue. A METRIS web site has more information: www.metris.us.

Example 28-1.   Minnesota FPM

The Minnesota DOT study of freight performance measures involved data on all transportation modes. The project's Technical Advisory Panel included members from both public and private transportation organizations. Operational data such as travel time data, loop detector data, and classification data were identified as good open source data, but it was found that these sources have not been tapped fully. The project was completed in July 2008 and showed that public-private approaches in gathering data, especially travel time along corridors, is a productive way to obtain data. The study also showed that such partnerships between public and private agencies and among different public agencies at different levels are critical in developing understanding of freight data as freight flow is not confined to one jurisdiction. See http://www.lrrb.org/PDF/200812.pdf for more information.

Guideline 28 – Consider Gathering Data from Volunteer Stakeholder Groups or Roundtables

In addition to open source data usually available without cost, some projects obtain data through the network of stakeholder groups involved in the projects. Such data lowers cost and reduces the need to set up data sharing agreements. The Minnesota DOT, described earlier for its contribution to identifying publicly available data sources, included locally gathered data involving project stakeholders as described in Example 28-1. Another example of the use of such data is the Greater Toronto-Hamilton Area Urban Freight Study, described in Example 28-2.

Example 28-2.   GTHA Urban Freight Study

The Metrolinx Greater Toronto and Hamilton Area (GTHA) Ontario Urban Freight Study, undertaken between December 2009 and January 2011, identified challenges to strengthening urban freight in the region and summarized action to boost freight capacity and freight efficiency. A key aspect of the project was the involvement of stakeholders. Two stakeholder groups contributed. One was a Goods Movement Roundtable that included private sector industries and carriers, their associations, and marine port and airport authorities. The other was a Technical Working Group that included representatives of local and regional governments within the GTHA, as well as the provincial and federal governments, two Class I railroads, and two local universities. The project gathered information for the air, marine, rail, and highway modes, primarily publicly available data or information voluntarily presented by stakeholders. The freight data was collected in a series of meetings, workshops, and one-to-one interviews, including environmental scan information from stakeholders about freight conditions and issues. The project studied the current activities in urban freight and the conditions under which freight moves through the "last mile" portions of the journey. The summarized results were included in an overview report and a technical report, GTHA Urban Freight Study, FINAL DRAFT, Toronto, Ontario, February 2011 http://www.metrolinx.com/en/regionalplanning/goodsmovement/GTHA_UFS_Final_DRAFT.pdf.

CHAPTER 4

Application of the Freight Data Sharing Guidelines

To illustrate how the freight data sharing guidelines have been applied successfully, the following examples are descriptions of two of the key case study projects reviewed in this research. The bold text shows which guideline was used. The first example used 13 of the guidelines and the second used 12.

4.1 Washington State Freight Performance Measure Project

Guideline 4 – If unrestricted data is not enough, be aware that privacy concerns must be addressed.

Guideline 21 – Explain clearly to stakeholders that sharing of data will support improved freight infrastructure decisions that will benefit those stakeholders.

Guideline 18 – Define and articulate the benefits, goals and purpose of data sharing to stakeholders.

Guideline 19 – Include a stipulation that data is a one-time use and cannot be used for any other purposes such as regulation.

The Washington State GPS Freight Performance Measures (FPM) project used data from commercial fleet management GPS devices in trucks to develop a statewide freight performance measure program. The project involves ongoing GPS-based probe truck movement data collected for the Puget Sound area since 2008 and for all of Washington State since 2010. The GPS data is used by the Washington State Department of Transportation (WSDOT) to support an ongoing statewide FPM program that locates and quantifies roadway bottlenecks for trucks and provides guidance to the WSDOT capital program office as they make roadway infrastructure investment decisions. Ultimately these roadway investments improve freight mobility and this is why the private sector supports this program.

The FPM project illustrates a number of different approaches to supporting freight data sharing. The original effort was funded to acquire truck data to quantify truck performance. The project team originally **attempted to find readily available truck unrestricted data** (Guideline 4) (such as from roadside counters and surveys) but it became apparent early in the effort that data from the private sector trucking industry was the only detailed truck travel information that was available and, if this data was to be used, **privacy protection for this data** would be a critical element of the project.

The project eventually approached a number of private commercial fleet management GPS vendors about the use of data from their systems for this program. The vendors, who were initially reluctant to share their clients' data with the public sector, **agreed to discuss data sharing after the state trucking associations stated that the data would support improved freight infrastructure decisions and demonstrated their support for the program** (Guideline 21) and **WSDOT indicated the project's result could help to focus resources on improved infrastructure for freight mobility** (Guideline 18). In addition, the DOT assured the GPS vendors that the GPS data **would be used just for the freight performance measurement and would not be used for any regulatory or enforcement purposes** (Guideline 19).

The use of GPS vendors circumvented direct concerns about an individual company's business sensitive information, but **the vendors still required privacy protection in the form of a NDA** (Guideline 5). GPS data feeds between the vendors and Washington State were set up only after NDAs were developed to help protect the data. The NDAs stipulated or involved both legal punitive actions as well as technical approaches such as suppression of individual truckers' names and allowing only the release of aggregate data. **The NDA process, because it involved review and negotiations by attorneys and some contract modification, was time consuming and delayed the project for more than six months** (Guideline 8).

The NDA agreements determined that the raw GPS would go to the **University of Washington who has a tradition of protecting sensitive data. The University was considered a trusted third party** (Guideline 14) that would only pass aggregated analyzed data to the WSDOT and other project partners.

The NDA and the resulting data sharing process were only possible after a number of technical and software approaches were agreed on to protect the identities of individual trucking companies. **The vendor used software to ensure the individual IDs of the trucking companies were scrambled (hashed)** and **the NDA specified access restrictions in that aggregated database information** (Guideline 11) could be released and accessible to the public and to other agencies. Ultimately the GPS data will be placed in an Internet-based data sharing and visualization package that allows manipulation and analysis of the data but this dataset **also only allows access to aggregated data and any raw data will be not be accessible** (Guideline 12).

Another important motivator for data sharing was simply that the **vendors were paid for the GPS data feeds which covered their cost of data sharing** (Guideline 26). The resulting **contractual relationship that was negotiated** facilitated data sharing set up and supported a **stable longer-term data sharing relationship.** The multi-year funding was made available through the Washington State legislature and the WSDOT **and has supported an ongoing effort via contracts with the GPS vendors** (Guideline 25). This contract framed the data sharing arrangement as a business relationship and helped support the GPS vendors who needed to make an internal business case that the **data sharing arrangement with the public sector was a new market and revenue stream** (Guideline 24). The FPM project team was fortunate in that, early in the process, they **developed a solid relationship with individuals in GPS companies** (Guideline 6) that were interested in new business development. This greatly facilitated the project's progress.

4.2 Cross-Town Improvement Project (C-TIP)

C-TIP is a technology application designed to improve the efficiency of cross-town dray trucking movements between railroads by maximizing productive moves and minimizing unproductive ones (e.g., bobtails). The several phase development and deployment test began in Kansas City in 2007 after several years of planning and coordinating with the various partners. A C-TIP Concept of Operations (ConOps) was published in March 2007 and updated in July 2009. C-TIP consists of several components, including real-time traffic monitoring/dynamic route guidance for draymen; an open architecture exchange of load data and availability information among railroads, terminal operators, and trucking companies; and wireless information exchange for truckers regarding trip assignments, traffic congestion, trip status, and location. The C-TIP deployment test applied Web Services technologies and other management techniques

Guideline 5 – A non-disclosure agreement can be a good tool to support a data sharing arrangement.

Guideline 8 – Begin negotiations of disclosure and use restrictions on freight data as early in the process as possible.

Guideline 14 – Consider the use of trusted third parties (consultants or academics) as intermediaries or data analysts.

Guideline 11 – Consider the use of software and database tools to protect and access freight data by removing private or competitive information.

Guideline 12 – Build access restrictions into the data set as an alternative to scrubbing.

Guideline 26 – Be sure to include funding to cover costs of data sharing and needed agreements to protect data.

Guideline 25 – Attempt to negotiate and award public sector contracts with funding for research and data collection.

Guideline 24 – Explore new market opportunities with potential data providers.

Guideline 6 – A stable contracting relationship with data provider can be very helpful in successful data sharing.

to truck moves between rail companies' terminals in Kansas City in order to reduce interchange delays, reduce the number of truck trips, and improve fleet management and terminal operations, for example, by reducing bobtail or empty chassis movements. The stated public objective was to **reduce congestion and improve air quality by reducing or optimizing truck movements** (Guideline 22).

Portions of the C-TIP project were completed during 2011, and were documented in a report by an independent evaluation contractor under a separate federal government contract from that of the developer/integration contractor. **DOT/FHWA provided overall project funding and acted as facilitator** (Guideline 25) for contractors to develop the C-TIP ConOps, Business Case, and software applications and to deploy and evaluate the pilot. The integration contractor and the separate evaluation contractor used contract funding for system development and testing. (See U.S.DOT report *Cross-town Improvement Project Evaluation, Final Report, February 17, 2012.)* Private company partners didn't receive funds for their work on the project; they just provided the data as part of normal business operations. **State DOTs in Missouri** (Guideline 13) **and Kansas were public stakeholders and provided some funding. The MPO for the Kansas City area participated** (Guideline 16). Kansas City SmartPort, a not-for-profit corporation that facilitates transportation in the Kansas City area, was a participant in the promotion of the project.

Open source software components for data exchange and route optimization were tested in the project and are available to apply in other inland or ocean ports. Another component tested in Kansas City focused specifically on Kansas City dray carriers. This component was tested by one local drayage carrier and involved use of a commercial software package by the carrier. The system helps locate the driver who is closest to a particular move and who is bobtailing, enabling the trucking company to assign the load or empty to that driver and thus eliminate a bobtail. Previously this effort was entirely manual, with dispatchers attempting to locate drivers through manual methods, often resulting in unnecessary empty moves.

C-TIP supply chain partners included several rail carriers (UP, BNSF, and NS), and several local trucking companies (Mid Cities, Greer, IXT, Comtrak, and Lake Country) (Guideline 21)**. A local traffic data collection and dissemination group, Kansas City Scout, provided traffic flow data on the highways in the Kansas City area** (Guideline 16). (However, Missouri DOT turned off their data feed during the pilot test, which necessitated a traffic data purchase from a private local supplier of data.) Project participants had a desire to capture dray truck movement and rail inbound data from carriers to better schedule truck movements and reduce trucking congestion and delay. The test data was gathered and analyzed as part of a several-month deployment test. The results and lessons learned in Kansas City have been made available to two more recent federally sponsored initiatives: a drayage optimization software development and pilot in Memphis, and the Freight Advanced Transportation Information System (FRATIS) project being tested in three different applications in Los Angeles, Dallas, and South Florida.

Getting the railroads to share their information did present a challenge in some cases. **One railroad required a NDA** (Guideline 5), which took three months to complete; but another didn't require anything before providing data. It largely depended on who the contractor talked to. Railroads have always been strict about handing out data, especially to third parties. **Any time a third party was involved, a letter of authorization was required** (Guideline 7), even for data coming from the same railroad. As a former railroad industry employee, **the integration contractor is trusted by participants and already understood how the railroads operated, which helps assure success of data sharing agreements**

(Guideline 14). Key project staff used to work for the railroads, which meant they already knew who to talk to in order to get the data they needed. They also knew the right questions to ask. Data were obtained through asking the railroads repeatedly, since coordination with dray truckers is typically not a front-burner issue for them. Repeated contact proved to be the only way to gain cooperation.

Railroad reluctance to share information was the main challenge, in the sense that C-TIP was not regarded as a priority for the railroads. So even if there was a potential benefit for railroads, it proved hard to obtain their cooperation. **There were discussions with each railroad regarding the format of data** (Guideline 12); these had to be negotiated with each railroad individually. For the railroads, **the contractor found that as long as they could show the benefits, the railroads would usually agree to participate** (Guideline 18). The primary selling point from the railroads' perspective would be saving money on cross-town drayage rates through a more rational system of coordinating and dispatching moves. The railroads did recognize that the main immediate benefit would accrue to the dray companies, but that this could translate into lower rates for the railroads over the longer term. As long as participation did not cost the railroads too much, and would **result in reasonable benefits to the Kansas City region, they were usually willing to share. Railroads wanted to be good corporate citizens** (Guideline 20).

Kansas City was chosen for C-TIP because the overall size of the terminal area in terms of volume, number of carriers, etc., was considered manageable. However, the testing found that there is not enough cross-town freight volume unless the railroads completely change their operations. There was no continued use of the test suites in Kansas City following the test, but as noted above, Memphis and FRATIS prototypes are building on the test results in Kansas City. The C-TIP design and lessons learned in Kansas City should make these new projects easier to undertake and succeed.

Guideline 14 – Consider the use of trusted third parties (consultants or academics) as intermediaries or data analysts.

Guideline 12 – Build access restrictions into the data set as an alternative to scrubbing.

Guideline 18 – Define and articulate the benefits, goals, and purpose of data sharing to stakeholders.

Guideline 20 – Publicize the cooperation amongst project partners and seek to give the project visibility to stakeholders and the public.

NCFRP 31 Freight Data Sharing Projects

The projects listed were analyzed in the research. A project participant or point of contact for each project was interviewed for most projects. The projects are described in more detail in Appendix B of the Final Report.

Project Name

1. Canada Freight Gateways and Corridors
2. Freight Performance Measures Project
3. NCFRP Project 03, Performance Measures for Freight Transportation
4. Metrolinx Greater Toronto and Hamilton Area Urban Freight Study
5. Using Aggregated Federal Data and Local Shipping Data to Model Freight in Alabama
6. Mississippi Study of Intermodal Information Technologies
7. Minnesota Freight Performance Measures
8. Impacts of Columbia-Snake River Extended Lock Outage
9. Washington State GPS Freight Performance Measures Project
10. Comprehensive Regional Goods Movement Plan and Implementation Strategy: Southern California Association of Governments (SCAG) Truck GPS Data Collection Plan
11. SMARTFREIGHT in Europe
12. Southern Border Wait Time Delay
13. Canada Border Transit Time Data
14. Washington State Electronic-Seal Border Crossing Project
15. Otay Mesa-Mexico border delay data
16. Border Crossing Information System
17. Electronic Freight Management Supply Chain Case Studies
18. Cross-Town Improvement Project Intermodal Transfer
19. Trade Data Exchange
20. National Consortium for Remote Sensing in Transportation at the ports of San Pedro Bay
21. Truck Turn Time Study at Los Angeles/Long Beach using METRIS data
22. Wireless Waterways Project including River-Net Info. System
23. Lock Operations Management Application

Project Name
24. Importer Security Filing (10+2) Project
25. International Trade Data System (ITDS)
26. Environmental Protection Agency SmartWay Partnership
27. Clean Trucks Programs at the Ports of Los Angeles/Long Beach and New York/New Jersey
28. South Coast Air Quality Management District freight air quality initiatives
29. Secure Freight Initiative (SFI)
30. Chicago Region Environmental and Transportation Efficiency (CREATE) Program Improvements
31. Detroit-Windsor New International Trade Crossing
32. Double-Stack Clearance Project

A P P E N D I X   B

Mutual Nondisclosure Agreement

_____

This Mutual Nondisclosure Agreement ("Agreement") is entered into as of [_____ __, ____,] **-OR-** [the date of the last signature below] ("Effective Date") between *your agency,* located in *city, state,* and _____, a [for-profit/ nonprofit corporation organized under the laws of the State of _____] **-OR-** [a governmental agency of/in the State of _____] having [its principal place of business] **-OR-** [a place of business] located in [city, state] ("Company").

Recitals

WHEREAS, the parties desire to share certain Confidential Information as defined below relating to _____, a field of common interest, for the purpose of _____ ("Authorized Use"); and

WHEREAS, the Confidential Information is [describe with a reasonable degree of specificity the nature and form of the Confidential Information]; and

WHEREAS, the disclosure of Confidential Information will be carried out under the direction and supervision of _____, *(position title)* and _____, a [_____] in the Company's _____ Division ("Company Representative"); and

WHEREAS, *your agency* and Company also [optional relevant recitals].

NOW, THEREFORE, in consideration of the foregoing and the mutual agreements contained herein, *your agency* and Company hereby agree as follows:

1. <u>Definitions.</u> For purposes of this Agreement, the following definitions apply: "Confidential Information" means nonpublic information in written, graphic, electronic, oral or other tangible form, including without limitation data, algorithms, formulae, techniques, improvements, technical drawings, computer software and materials, owned or controlled by a party to this Agreement. "Disclosing Party" means a party disclosing and "Receiving Party" means a party receiving Confidential Information under this Agreement.

2. <u>Nondisclosure and Nonuse of Confidential Information.</u> The Receiving Party, on behalf of itself, its affiliates, employees, and agents, agrees not to make, either directly or indirectly, any unauthorized disclosure of Confidential Information or make any use other than an Authorized Use of the Confidential Information, and to take reasonable measures to prevent any unauthorized disclosure or use of Confidential Information. The Receiving Party further agrees to limit access to Confidential Information to its affiliates, employees, and agents having a need to know in connection with the purposes of this Agreement and to use reasonable efforts to ensure that anyone receiving or having access to Confidential Information understands its confidential nature and agrees not to make any unauthorized disclosure or use thereof. The Receiving Party additionally agrees to employ no less than the same measures to protect Confidential Information that it uses to protect its own valuable information.

3. Exceptions to Confidentiality and Nonuse. Notwithstanding any other provisions of this Agreement to the contrary, a Receiving Party shall be free from any obligations of confidentiality and nonuse hereunder regarding any information which is or becomes: (i) already known to the Receiving Party, other than under an obligation of confidentiality, at the time of disclosure; (ii) generally available to the public or otherwise part of the public domain at the time of disclosure to the Receiving Party; (iii) generally available to the public or otherwise part of the public domain after its disclosure other than through any act or omission of the Receiving Party in breach of this Agreement or other agreement or legal obligation; (iv) subsequently lawfully disclosed to the Receiving Party by a third party; (v) independently developed by the Receiving Party as documented by written evidence; (vi) approved for release by written authorization of the Disclosing Party; (vii) furnished to a thirty party by the Disclosing Party without a similar confidentiality restriction on the third party's rights; or (viii) disclosed pursuant to the requirement of a governmental agency or legally required to be disclosed, including with respect to the *your agency,* disclosures of public records pursuant to the State Public Records Act xxxx [and with respect to Company, disclosures of public records pursuant to the {applicable law}].

4. Identification of Confidential Information. The Disclosing Party will take reasonable measures to mark and identify all Confidential Information as confidential. Confidential Information disclosed in oral form will be identified as such by the Disclosing Party to the Receiving Party in writing within thirty (30) days of any such disclosure. Upon termination of the Project and to the extent otherwise consistent with this Agreement, any Confidential Information of the Disclosing Party in the possession of the Receiving Party will be promptly returned or destroyed upon written request of the Disclosing Party.

5. Retention of Rights. The parties agree that in no event will the Receiving Party have any right or license, express or implied, to the Disclosing Party's intellectual property nor to use the Confidential Information except to the limited extent and only for such period of time necessary to facilitate the Authorized Use. All Confidential Information disclosed under this Agreement will remain the property of the Disclosing Party.

6. No Implied Commitments or Restrictions. The parties understand and agree that neither this Agreement nor the disclosure of Confidential Information under this Agreement will be interpreted as any understanding or commitment by either party to enter into any kind of future business or other relationship or to make any disclosures of any other information in the future. In no event will the obligations of confidentiality set forth in this Agreement be construed to limit either party's right to independently develop products or conduct research without the use of the other party's Confidential Information.

7. Term and Termination; Termination of Obligation. This Agreement will begin on the Effective Date and end one (1) year after the Effective Date, unless earlier terminated. Either party may terminate this Agreement upon ten (10) days' written notice to the other party. Unless otherwise mutually agreed to in writing, the obligations regarding nondisclosure, protection and nonuse of Confidential Information set forth in this Agreement will, in any event, end two (2) years after disclosure of Confidential Information.

8. Relationship of the Parties. The parties hereby agree that they are at all times each acting as independent contractors. Nothing in this Agreement will be construed or deemed to create a relationship of employer and employee, partner, joint venturer, or principal and agent between *your agency* and Company, their faculty, employees, agents or officers. The parties understand and agree that nothing herein shall be interpreted as establishing any form of exclusive relationship between the parties. The parties further understand and agree that nothing herein shall be interpreted as precluding either party from entering into agreements similar to this Agreement with third parties or from conducting educational, research or other activities that may involve the same or similar subject matter as this Agreement, the conduct of which is outside and independent of this Agreement, providing that any such educational, research or other activities are not done in a manner that is inconsistent with the rights and obligations of the parties to this Agreement.

9. Representations, Warranties, Disclaimers, and Limitations. Each party represents and warrants that it has the legal right and authority to disclose and receive, as the case may be, the Confidential Information disclosed under the terms of this Agreement. Excepting only the foregoing, neither party to this Agreement makes any warranties and hereby disclaims any such warranties with respect to the Confidential Information and its use.

10. Notices. All notices, demands, requests or other communications required to be given or sent by a party under this Agreement will be in writing and will be delivered by at least one of the following methods: (i) in person, (ii) mailed by first-class mail, postage prepaid, (iii) transmitted by facsimile, or (iv) transmitted by electronic mail (e-mail) addressed as set forth below, providing a party may designate a change of address at any time by notice in writing to the other party. All notices, demands, requests, or communications that are mailed by first class mail will be deemed received five (5) business days after deposit in the U.S. mail, postage prepaid, and all notices transmitted by facsimile or by e-mail will be deemed received upon written confirmation by the receiving party of successful facsimile or e-mail transmission.

To *your agency:*

    [Company]
    [Street Address]
    [Mailing Address, if different]
    [City, State, Zip]

    (___) _____ (Voice)
    (___) _____ (Facsimile)
    _____@_____ (Electronic Mail)

To the Company:

    [Company]
    [Street Address]
    [Mailing Address, if different]
    [City, State, Zip]

    (___) _____ (Voice)
    (___) _____ (Facsimile)
    _____@_____ (Electronic Mail)

    With a copy to

11. <u>Disputes.</u> Prior to commencing any legal action, the parties will attempt in good faith to resolve through negotiation any dispute, claim or controversy arising out of or relating to this Agreement. Either party may initiate such negotiations by providing written notice to the other party specifying that this provision of this Agreement is being utilized and setting forth the subject of the dispute and the relief requested. The party receiving such notice will respond in writing within ten (10) business days with a statement of its position on and recommended solution to the dispute. If the dispute is not resolved by this exchange of correspondence, then representatives of each party with full settlement authority shall meet at a mutually agreeable time and place within ten (10) business days of the date of the initial notice in order to exchange relevant information and perspectives, and to attempt in good faith to resolve the dispute. If the dispute is not resolved by these negotiations, the matter will be submitted to a mutually agreeable and recognized nonbinding mediation service prior to initiating legal action. Any such mediation shall be conducted in *city, state* and the costs of the mediation service shall be shared equally by the parties.

12. <u>Governing Law, Jurisdiction and Venue.</u> This Agreement shall be governed by and enforced according to the laws of the State of *xxx* and the United States, without giving effect to its or any other jurisdiction's choice of law provisions.

13. <u>Attorney Fees.</u> The prevailing party in any action sought to enforce or interpret this Agreement or any provision of this Agreement shall be entitled to its reasonable attorney's fees and costs, including any appeals thereon, as determined by a court in conjunction with any such legal proceeding.

14. <u>Export Control.</u> The parties understand that they are subject to and that their respective obligations under this Agreement are contingent upon compliance with certain laws and regulations of the United States applicable to the export of technical data and information, computer software, laboratory prototypes and other commodities (including without limitation the Arms Export Control Act, as amended, and the Export Administration Act of 1979) ("Export-Controlled Materials"). The parties understand that the transfer of any Export-Controlled Materials under this Agreement, including transfers to a party's affiliates and permitted uses by certain third parties, may require a license from a cognizant agency of the United States Government and/or written assurances by a party that it shall not transfer Export-Controlled Materials to certain foreign countries without the prior approval of an appropriate agency of the United States government. The parties neither represent that any such export license shall not be required, nor that, if required, it shall be issued. The parties agree that they will not provide nor make accessible to each other or their employees, officers, or agents any Export-Controlled Materials without first notifying the other in writing of the existence and nature of the Export-Controlled Materials and obtaining the

prior written agreement of the other party, through a duly authorized representative, for the party to receive such Export-Controlled Materials. All Export-Controlled Materials shall be conspicuously labeled "Export Controlled" together with any applicable Export Control Classification Number.

15. <u>Entire Agreement.</u> This Agreement constitutes the entire agreement between the parties, and supersedes all prior oral or written agreements, commitments, or understandings concerning the matters provided for herein.

16. <u>Amendment.</u> This Agreement may only be modified by a subsequent written agreement executed by the duly authorized representatives of the parties.

17. <u>Severability.</u> If any provision of this Agreement or of any other agreement, document or writing pursuant to or in connection with this Agreement shall be wholly or partially invalid or unenforceable under applicable law, said provision will be ineffective to that extent only, without in any way affecting the remaining parts or provision of said agreement, provided that the remaining provisions continue to effect the purposes of this Agreement.

18. <u>Waiver.</u> Neither the waiver by any of the parties hereto of a breach of or a default under any of the provisions of this Agreement, not the failure of either of the parties, on one or more occasions, to enforce any of the provisions of this Agreement or to exercise any right or privilege hereunder will thereafter be construed as a waiver of any subsequent breach or default of a similar nature, or as a waiver of any such provisions, rights or privileges hereunder.

19. <u>Assignment and Successors in Interest.</u> Except as otherwise provided herein no party may assign, subcontract, or delegate any right or obligation under this Agreement, in whole or in part, without the express prior written consent of the other party. This Agreement shall inure to the benefit of and be binding upon each party's successors and assigns.

20. <u>Counterparts.</u> This Agreement may be executed in any number of counterparts or, if mutually agreeable to the undersigned authorized signatories for the parties, through the exchange by facsimile or other electronic means of duly signed duplicates hereof, each of which shall be deemed an original, but all of which together shall constitute one and the same instrument.

[Signature Page Follows]

Your Agency   **[Company Name]**

By:_____   By:_____

Print Name:_____   Print Name:_____

Title:_____   Title:_____

Date:_____   Date:_____

READ AND REVIEWED:

Your Agency Representative   Company Representative

By:_____   By:_____

Print Name:_____   Print Name:_____

Title:_____   Title:_____

Date:_____   Date:_____

Nondisclosure Agreement

THIS AGREEMENT (the "**Agreement**") is entered into on this _____ day of _____ by and between _____, located at _____ (the" **Disclosing Party"**), and _____ with an address at _____ (the "**Recipient**" or the "**Receiving Party"**).

The Recipient hereto desires to participate in discussions regarding _____ (the "**Transaction**"). During these discussions, Disclosing Party may share certain proprietary information with the Recipient. Therefore, in consideration of the mutual promises and covenants contained in this Agreement, and other good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, the parties hereto agree as follows:

1. **Definition of Confidential Information.**
   (a) For purposes of this Agreement, "**Confidential Information**" means any data or information that is proprietary to the Disclosing Party and not generally known to the public, whether in tangible or intangible form, whenever and however disclosed, including, but not limited to: (i) any marketing strategies, plans, financial information, or projections, operations, sales estimates, business plans and performance results relating to the past, present or future business activities of such party, its affiliates, subsidiaries and affiliated companies; (ii) plans for products or services, and customer or supplier lists; (iii) any scientific or technical information, invention, design, process, procedure, formula, improvement, technology or method; (iv) any concepts, reports, data, know-how, works-in-progress, designs, development tools, specifications, computer software, source code, object code, flow charts, databases, inventions, information and trade secrets; and (v) any other information that should reasonably be recognized as confidential information of the Disclosing Party. Confidential Information need not be novel, unique, patentable, copyrightable or constitute a trade secret in order to be designated Confidential Information. The Receiving Party acknowledges that the Confidential Information is proprietary to the Disclosing Party, has been developed and obtained through great efforts by the Disclosing Party and that Disclosing Party regards all of its Confidential Information as trade secrets.
   (b) Notwithstanding anything in the foregoing to the contrary, Confidential Information shall not include information which: (i) was known by the Receiving Party prior to receiving the Confidential Information from the Disclosing Party; (ii) becomes rightfully known to the Receiving Party from a third-party source not known (after diligent inquiry) by the Receiving Party to be under an obligation to Disclosing Party to maintain confidentiality; (iii) is or becomes publicly available through no fault of or failure to act by the Receiving Party in breach of this Agreement; (iv) is required to be disclosed in a judicial or administrative proceeding, or is otherwise requested or required to be disclosed by law or regulation, although the requirements of paragraph 4 hereof shall apply prior to any disclosure being made; and (v) is or has been independently developed by employees, consultants or agents of the Receiving Party without violation of the terms of this Agreement or reference or access to any Confidential Information.

2. **Disclosure of Confidential Information.**
   From time to time, the Disclosing Party may disclose Confidential Information to the Receiving Party. The Receiving Party will: (a) limit disclosure of any Confidential Information to its directors, officers, employees, agents or representatives (collectively "**Representatives**") who have a need to know such Confidential Information in connection with the current or contemplated business relationship between the parties to which this Agreement relates, and only for that purpose; (b) advise its Representatives of the proprietary nature of the Confidential Information and of the obligations set forth in this Agreement and require such Representatives to keep the Confidential Information confidential; (c) shall keep all Confidential

Information strictly confidential by using a reasonable degree of care, but not less than the degree of care used by it in safeguarding its own confidential information; and (d) not disclose any Confidential Information received by it to any third parties (except as otherwise provided for herein).

Each party shall be responsible for any breach of this Agreement by any of their respective Representatives.

3. **Use of Confidential Information.**

The Receiving Party agrees to use the Confidential Information solely in connection with the current or contemplated business relationship between the parties and not for any purpose other than as authorized by this Agreement without the prior written consent of an authorized representative of the Disclosing Party. No other right or license, whether expressed or implied, in the Confidential Information is granted to the Receiving Party hereunder. Title to the Confidential Information will remain solely in the Disclosing Party. All use of Confidential Information by the Receiving Party shall be for the benefit of the Disclosing Party and any modifications and improvements thereof by the Receiving Party shall be the sole property of the Disclosing Party. Nothing contained herein is intended to modify the parties' existing agreement that their discussions in furtherance of a potential business relationship are governed by Federal Rule of Evidence 408.

4. **Compelled Disclosure of Confidential Information.**

Notwithstanding anything in the foregoing to the contrary, the Receiving Party may disclose Confidential Information pursuant to any governmental, judicial, or administrative order, subpoena, discovery request, regulatory request or similar method, provided that the Receiving Party promptly notifies, to the extent practicable, the Disclosing Party in writing of such demand for disclosure so that the Disclosing Party, at its sole expense, may seek to make such disclosure subject to a protective order or other appropriate remedy to preserve the confidentiality of the Confidential Information; provided in the case of a broad regulatory request with respect to the Receiving Party's business (not targeted at Disclosing Party), the Receiving Party may promptly comply with such request provided the Receiving Party give (if permitted by such regulator) the Disclosing Party prompt notice of such disclosure. The Receiving Party agrees that it shall not oppose and shall cooperate with efforts by, to the extent practicable, the Disclosing Party with respect to any such request for a protective order or other relief. Notwithstanding the foregoing, if the Disclosing Party is unable to obtain or does not seek a protective order and the Receiving Party is legally requested or required to disclose such Confidential Information, disclosure of such Confidential Information may be made without liability.

5. **Term.**

This Agreement shall remain in effect for a two-year term (subject to a one year extension if the parties are still discussing and considering the Transaction at the end of the second year). Notwithstanding the foregoing, the parties' duty to hold in confidence Confidential Information that was disclosed during term shall remain in effect indefinitely.

6. **Remedies.**

Both parties acknowledge that the Confidential Information to be disclosed hereunder is of a unique and valuable character, and that the unauthorized dissemination of the Confidential Information would destroy or diminish the value of such information. The damages to Disclosing Party that would result from the unauthorized dissemination of the Confidential Information would be impossible to calculate. Therefore, both parties hereby agree that the Disclosing Party shall be entitled to injunctive relief preventing the dissemination of any Confidential Information in violation of the terms hereof. Such injunctive relief shall be in addition to any other remedies available hereunder, whether at law or in equity. Disclosing Party shall be entitled to recover its costs and fees, including reasonable attorneys' fees, incurred in obtaining any such relief. Further, in the event of litigation relating to this Agreement, the prevailing party shall be entitled to recover its reasonable attorney's fees and expenses.

7. **Return of Confidential Information.**

Receiving Party shall immediately return and redeliver to the other all tangible material embodying the Confidential Information provided hereunder and all notes, summaries, memoranda, drawings, manuals, records, excerpts or derivative information deriving there from and all other documents or materials ("Notes") (and all copies of any of the foregoing, including "copies" that have been converted to computerized media in the form of image, data or word processing files either manually or by image capture) based on or including any Confidential Information, in whatever form of storage or retrieval, upon the earlier of (a) the completion or termination of the dealings between the parties contemplated hereunder; (b) the termination of this Agreement; or (c) at such time as the Disclosing Party may so request; provided however that the Receiving Party may retain much of its documents as is necessary to enable it to comply with its document retention policies. Alternatively, the Receiving Party, with the written consent of the Disclosing Party may (or in the case of Notes, at the Receiving Party's option) immediately destroy any of the foregoing embodying Confidential Information (or the reasonably non-recoverable

data erasure of computerized data) and, upon request, certify in writing such destruction by an authorized officer of the Receiving Party supervising the destruction.

8. **Notice of Breach.**

   Receiving Party shall notify the Disclosing Party immediately upon discovery of any unauthorized use or disclosure of Confidential Information by Receiving Party or its Representatives, or any other breach of this Agreement by Receiving Party or its Representatives, and will cooperate with efforts by the Disclosing Party to help the Disclosing Party regain possession of Confidential Information and prevent its further unauthorized use.

9. **No Binding Agreement for Transaction.**

   The parties agree that neither party will be under any legal obligation of any kind what-soever with respect to a Transaction by virtue of this Agreement, except for the matters specifically agreed to herein. The parties further acknowledge and agree that they each reserve the right, in their sole and absolute discretion, to reject any and all proposals and to terminate discussions and negotiations with respect to a Transaction at any time. This Agreement does not create a joint venture or partnership between the parties. If a Transaction goes forward, the non-disclosure provisions of any applicable transaction documents entered into between the parties (or their respective affiliates) for the Transaction shall supersede this Agreement. In the event such provision is not provided for in said transaction documents, this Agreement shall control.

10. **Warranty.**

    Each party warrants that it has the right to make the disclosures under this Agreement. **NO WARRANTIES ARE MADE BY EITHER PARTY UNDER THIS AGREEMENT WHATSOEVER.** The parties acknowledge that although they shall each endeavor to include in the Confidential Information all information that they each believe relevant for the purpose of the evaluation of a Transaction, the parties understand that no representation or warranty as to the accuracy or completeness of the Confidential Information is being made by either party as the Disclosing Party. Further, neither party is under any obligation under this Agreement to disclose any Confidential Information it chooses not to disclose. Neither Party hereto shall have any liability to the other party or to the other party's Representatives resulting from any use of the Confidential Information except with respect to disclosure of such Confidential Information in violation of this Agreement.

11. **Miscellaneous.**

    (a) This Agreement constitutes the entire understanding between the parties and supersedes any and all prior or contemporaneous understandings and agreements, whether oral or written, between the parties, with respect to the subject matter hereof. This Agreement can only be modified by a written amendment signed by the party against whom enforcement of such modification is sought.

    (b) The validity, construction and performance of this Agreement shall be governed and construed in accordance with the laws of _____ (state) applicable to contracts made and to be wholly performed within such state, without giving effect to any conflict of laws provisions thereof. The Federal and state courts located in _____ (state) shall have sole and exclusive jurisdiction over any disputes arising under the terms of this Agreement.

    (c) Any failure by either party to enforce the other party's strict performance of any provision of this Agreement will not constitute a waiver of its right to subsequently enforce such provision or any other provision of this Agreement.

    (d) Although the restrictions contained in this Agreement are considered by the parties to be reasonable for the purpose of protecting the Confidential Information, if any such restriction is found by a court of competent jurisdiction to be unenforceable, such provision will be modified, rewritten or interpreted to include as much of its nature and scope as will render it enforceable. If it cannot be so modified, rewritten or interpreted to be enforceable in any respect, it will not be given effect, and the remainder of the Agreement will be enforced as if such provision was not included.

    (e) Any notices or communications required or permitted to be given hereunder may be delivered by hand, deposited with a nationally recognized overnight carrier, electronic-mail, or mailed by certified mail, return receipt requested, postage prepaid, in each case, to the address of the other party first indicated above (or such other addressee as may be furnished by a party in accordance with this paragraph). All such notices or communications shall be deemed to have been given and received a) in the case of personal delivery or electronic-mail, on the date of such delivery, b) in the case of delivery by a nationally recognized overnight carrier, on the third business day following dispatch and c) in the case of mailing, on the seventh business day following such mailing.

    (f) This Agreement is personal in nature, and neither party may directly or indirectly assign or transfer it by operation of law or otherwise without the prior written consent of the other party, which consent will not be unreasonably withheld. All obligations contained in this Agreement shall extend to and be binding upon the parties to this Agreement and their respective successors, assigns and designees.

(g) The receipt of Confidential Information pursuant to this Agreement will not prevent or in any way limit either party from: (i) developing, making or marketing products or services that are or may be competitive with the products or services of the other; or (ii) providing products or services to others who compete with the other.

(h) Paragraph headings used in this Agreement are for reference only and shall not be used or relied upon in the interpretation of this Agreement.

   IN WITNESS WHEREOF, the parties hereto have executed this Agreement as of the date first above written.

Disclosing Party   **Receiving Party**

By   By

Name: Name:

Title: Title:

Abbreviations and acronyms used without definitions in TRB publications:

A4A	Airlines for America
AAAE	American Association of Airport Executives
AASHO	American Association of State Highway Officials
AASHTO	American Association of State Highway and Transportation Officials
ACI–NA	Airports Council International–North America
ACRP	Airport Cooperative Research Program
ADA	Americans with Disabilities Act
APTA	American Public Transportation Association
ASCE	American Society of Civil Engineers
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
ATA	American Trucking Associations
CTAA	Community Transportation Association of America
CTBSSP	Commercial Truck and Bus Safety Synthesis Program
DHS	Department of Homeland Security
DOE	Department of Energy
EPA	Environmental Protection Agency
FAA	Federal Aviation Administration
FHWA	Federal Highway Administration
FMCSA	Federal Motor Carrier Safety Administration
FRA	Federal Railroad Administration
FTA	Federal Transit Administration
HMCRP	Hazardous Materials Cooperative Research Program
IEEE	Institute of Electrical and Electronics Engineers
ISTEA	Intermodal Surface Transportation Efficiency Act of 1991
ITE	Institute of Transportation Engineers
MAP-21	Moving Ahead for Progress in the 21st Century Act (2012)
NASA	National Aeronautics and Space Administration
NASAO	National Association of State Aviation Officials
NCFRP	National Cooperative Freight Research Program
NCHRP	National Cooperative Highway Research Program
NHTSA	National Highway Traffic Safety Administration
NTSB	National Transportation Safety Board
PHMSA	Pipeline and Hazardous Materials Safety Administration
RITA	Research and Innovative Technology Administration
SAE	Society of Automotive Engineers
SAFETEA-LU	Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (2005)
TCRP	Transit Cooperative Research Program
TEA-21	Transportation Equity Act for the 21st Century (1998)
TRB	Transportation Research Board
TSA	Transportation Security Administration
U.S.DOT	United States Department of Transportation