

STATE OF NEVADA  
DEPARTMENT OF TRANSPORTATION

# REQUEST FOR INFORMATION

## 584-17-067

Specifications, Instructions and  
Submittal Information for a

### Creation of a Right-of-Way GIS Dataset

Statewide

Due Date: January 2, 2018



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Department of Transportation

## Table of Contents

- 1. General Information ..... 3
  - 1.1. Introduction ..... 3
  - 1.2. Vendor Submissions..... 3
  - 1.3. RFI Schedule ..... 4
  - 1.4. RFI Coordinator ..... 4
  - 1.5. Submission of Questions..... 5
  - 1.6. Response Format ..... 5
  - 1.7. Vendor Presentation ..... 5
  - 1.8. Cost of Preparing Response ..... 5
  - 1.9. General Terms and Conditions..... 6
  - 1.10. Request for Confidential Treatment ..... 6
- 2. Background ..... 7
  - 2.1. Current Working System ..... 7
- 3. Information to be provided by submitting vendors ..... 8
  - 3.1. DEPARTMENT Needs:..... 8
  - 3.2. Optional Functionality..... 9
- 4.1. INTRODUCTION ..... 10
- 4.2. DATABASE PRODUCTS AND STANDARDS..... 10
- 4.3. APPLICATION DEVELOPMENT PRODUCTS AND STANDARDS ..... 11
- 4.4. SYSTEM PRODUCTS AND STANDARDS ..... 13
- 4.5. WEB PRODUCTS AND STANDARDS ..... 13
- 4.6. GEOGRAPHIC INFORMATION SYSTEMS PRODUCTS AND STANDARDS ..... 13

## 1. General Information

### 1.1. Introduction

The purpose of this Request for Information (RFI) is to allow all interested vendors an opportunity to present information of available products and solutions that address the specifications within this RFI. The Nevada Department of Transportation, herein "DEPARTMENT", is seeking information for the purpose of creating a Right-of-Way dataset in an ESRI Geodatabase, herein "GIS for ROW".

The intent of this RFI is to elicit the advice and the best recommendations of knowledgeable persons in the vendor community, not to select a proposed solution or a vendor. Subsequently, and depending upon knowledge gained from the response to this RFI, the DEPARTMENT may, in its sole discretion, prepare and issue a Request for Proposal (RFP) that will meet the requirements of its stakeholders. The collective information provided by vendors will be used to develop alternatives for consideration and to estimate costs related to acquisition of a proposed solution.

Vendors may respond to this RFI with information about deploying a project management solution using the latest data governance practices and budgetary costs the DEPARTMENT should expect to incur when procuring, implementing and supporting such project management solution.

### 1.2. Vendor Submissions

Vendor responses are due by **11:00 A.M. PT, January 2, 2018**. Please include **one (1) electronic PDF** submitted to [agreeservices@dot.nv.gov](mailto:agreeservices@dot.nv.gov). If a vendor has multiple solutions, each solution must be submitted separately.

Confidential Information, Trade Secrets, and/or Proprietary Information must be marked as such in the Response. The failure to mark this information as per NRS 333.020 and 333.333 shall constitute a complete waiver of any and all claims for damages caused by release of the information by the DEPARTMENT. If the DEPARTMENT reviews the confidential information and determines that the information is not considered confidential pursuant to NRS Chapter 333, the DEPARTMENT will contact the Vendor. The Vendor must advise the DEPARTMENT as to whether it either accepts the DEPARTMENT's determination that the information is not confidential, or withdraws the information. The Vendor will not be allowed to alter the Response after the date and time set for receipt of Responses shown above. Notwithstanding the provisions in NRS Chapter 333, the DEPARTMENT retains its immunity pursuant to the provisions of NRS 239.012 for any "good faith" release of information, and the immunities from liability provided to it pursuant to NRS Chapter 41.

### 1.3.RFI Schedule

Description	Timeline
Release of RFI	11/09/2017
Submission of Questions	11/28/2017 at 11:00 A.M. PT
Responses to Submitted Questions	12/12/2017
Vendor Submissions	01/02/2018 at 11:00 A.M. PT
Optional Vendor Demonstrations	01/25/2018 and 01/26/2018

### 1.4.RFI Coordinator

The following rules of contact shall apply during this RFI:

After release of the RFI the Vendors shall ONLY correspond with the DEPARTMENT regarding this RFI through the DEPARTMENT's designated representative as per NAC 333.155. The designated representative's contact information is:

RFI Coordinator	Procurement Person
<b>Name</b>	Jessica Cutts
<b>Address</b>	Nevada Department of Transportation Administrative Services Division 1263 S. Stewart Street, # 101A Carson City, NV 89712
<b>Phone</b>	(775) 888-7070, ext. 2124
<b>E-mail</b>	<a href="mailto:agreeservices@dot.nv.gov">agreeservices@dot.nv.gov</a>

The Vendors shall not contact the DEPARTMENT's employees, including DEPARTMENT heads and/or any official who will participate in the review of Responses, except through the process identified above. Any communications determined to be improper may result in disqualification, at the sole discretion of the DEPARTMENT. Any official information regarding the RFI will be disseminated by the DEPARTMENT. Specific information necessary for the preparation of Responses will be disclosed to all Vendors. The DEPARTMENT will not be responsible for any oral exchange or any other information or exchange that occurs outside the official process specified herein. Failure to comply with these rules of contact may result in a Response being rejected in the DEPARTMENT's sole discretion.

### 1.5.Submission of Questions

Any irregularities or lack of clarity in the RFI must be brought to Agreement Service's attention, in writing, as soon as possible, so that corrective addenda may be furnished by the DEPARTMENT in a timely manner to all Vendors.

Any questions raised by Vendors must be submitted in writing to Agreement Services, emailed to [agreeservices@dot.nv.gov](mailto:agreeservices@dot.nv.gov) no later than **11:00 A.M. PT, on November 28, 2017**. The DEPARTMENT will respond to questions regarding the RFI, including requests for clarification and requests to correct errors, on or before **December 12, 2017**. Only requests submitted through email will be considered. No requests for additional information or clarification to any other DEPARTMENT office, consultant, employee, or the Federal Highway Administration (FHWA) will be considered.

### 1.6.Response Format

Vendors should recommend a solution to the DEPARTMENT based on the minimum criteria in Section 3 below. In addition to the below required format for responses, vendors may include letters of interest and technical submittals to the DEPARTMENT that identify, at a minimum, the company and contact person, product/services offered, experience and qualification of the firm, and include sales brochures and catalogs, technical data sheets, list price schedules and references.

The responses shall be submitted in the following format (see Section 1.3):

- Section 1 – Executive Summary
- Section 2 – Implementation Approach
- Section 3 – Proposed Solution
- Section 4 – Concept of Operations
- Section 5 – Cost
- Section 6 – Past Performance
- Section 7 – Project Questions

### 1.7.Vendor Presentation

Vendors **may** be invited to give a presentation at a time and date to be determined after review of the responses. In the event such presentations are deemed necessary, the DEPARTMENT anticipates that vendor demonstrations will be scheduled between **January 25, 2018 and January 26, 2018, in Carson City, Nevada**. The DEPARTMENT reserves the right to change these dates.

### 1.8.Cost of Preparing Response

The DEPARTMENT assumes no financial responsibility in connection with the vendors' costs incurred in the preparation and submission of the RFI response, or by attending the presentation, if such presentations are conducted by the DEPARTMENT in its sole discretion.

### 1.9. General Terms and Conditions

Issuance of this RFI shall in no way constitute a commitment by the DEPARTMENT to issue a Request for Proposal (RFP) or execute an agreement. The DEPARTMENT reserves the right to reject any or all submittals received in response to this RFI, or to cancel this RFI if it is deemed in the best interest of the State to do so.

Information submitted in response to this RFI will become the property of the DEPARTMENT. The DEPARTMENT will not pay for any information herein requested, nor will it be liable for any other costs incurred by any respondent related to the preparation or delivery of the response to this RFI or any subsequent presentation.

The DEPARTMENT reserves the right to issue addenda to this RFI prior to the closing date. If a vendor chooses to download this RFI from the [www.nevadadot.com](http://www.nevadadot.com) website, it is the vendor's responsibility to check for any addendums to this RFI from the [www.nevadadot.com](http://www.nevadadot.com) website.

By submitting a response, the vendor agrees that the DEPARTMENT may copy the response information for purposes of facilitating review or to respond to requests for public records. The vendor consents to such copy by submitting a response and warrants that such copying will not violate the rights of any third party. The DEPARTMENT will have the right to use ideas or adaptations presented in the responses.

The DEPARTMENT reserves the right to reject any and all responses to the RFI, in whole and in part, at any time. This RFI is designed to provide vendors with the information necessary for the preparation of informative response proposals and demonstrations of product. This RFI process is for DEPARTMENT's benefit and is intended to provide future selection of goods and services. The RFI is not intended to be comprehensive and each vendor is responsible for determining all factors necessary for submission of comprehensive response and complete product capability demonstration. The RFI response and demonstration will not be subject to an RFP type evaluation but only to a review of suggested product performance, cost of processes offered, and abilities to perform services that may be of use to DEPARTMENT. Cost shall be estimated by the vendor. When the estimated cost is submitted, the vendor shall state that it is an estimated or approximate cost.

The DEPARTMENT will not be responsible for any oral exchange or any other information or exchange that occurs outside the official process specified herein.

### 1.10. Request for Confidential Treatment

The State of Nevada will treat all information submitted by a vendor as public information unless the vendor properly requests that the information be treated as confidential at the time of submitting the response. Any requests for confidential treatment of information must be included in a cover letter with the vendor's RFI response. The request must also include the name, address, and telephone number of the person authorized by the vendor to respond to any inquiries concerning the confidential status of the materials.

A single confidential page in the document will classify the whole document as being confidential. Each page shall be marked as containing confidential information. The confidential information must

be clearly identifiable to the reader on the outside of the document, cover letter, and on each page of the document.

## 2. Background

A right-of-way layer has been identified as one of the primary and critical data sets required for a fully-functional Transportation Geographic Information System. The Department of Transportation currently does not have right-of-way boundaries or ownership types established as a dataset in GIS format.

Throughout the Department of Transportation, there is an immediate need to properly track and maintain the land areas in which the department has a vested interest by mapping right-of-way (ROW) boundaries using GIS technologies. Many Divisions within the Department have a need to access and review transportation right-of-way and accessibility within the current Enterprise ESRI Geodatabase to ensure proper action is being taken based on the ownership of the land and the assets or features involved. Examples of the areas and features affected include, but are not limited to: roadways, material sites, structures, utilities, hydraulic features, and stormwater assets. The current absence of a right-of-way data layer causes divisions within the Department of Transportation undue hardships as they are not able to quickly determine responsibility for actions being taken in and around the Department's right-of-way. Adding a GIS layer data set will ensure the Department of Transportation is aware of the features and assets that the department is responsible for.

### 2.1. Current Working System

Several years ago, the Right-of-Way Division (ROW) was required by the Nevada Legislature to verify and index all state right-of-way boundaries for state-maintained roadways within Nevada. The information was translated into a map format by comparing and compiling map, deed, and agreement data within the Department's historical Document Management System – Application Extender (AX) and Integrated Right-of-Way Information Network (IRWIN). The maps for each section of road were then converted into printable PDF maps that can be distributed and used to fulfill the ROW information requests received from the public, NDOT divisions, and NDOT Districts.

This compiled set of right-of-way data resides as marked-up paper maps in hard copy format called right-of-way verification maps. These maps are updated and maintained by the Right-of-Way Survey Services (RWSS) section within the Department. The maps display the right-of-way separated into three basic types of property rights using different-colored highlighter markings: 1) Fee Simple, 2) Prescriptive, and 3) Easement.

While the maps give a general understanding of where the right-of-way resides, they are usually depicted as short segments along a route, and each page may or may not have a survey tie or point of reference. Because the maps depict only a short segment at a time, it is difficult to visualize the entire right-of-way configuration for state-maintained roadways within Nevada.

Currently, all requests for right-of-way information are being provided to both internal and external users of the Department. Staff in the Right-of-Way Survey Services Section use a variety of

information including paper maps, electronic maps and other property information or documentation to fulfill the different types of requests received from users.

### 3. Information to be provided by submitting vendors

Submitting vendors should recommend a solution to the DEPARTMENT based upon the desired criteria below.

#### 3.1. DEPARTMENT Needs:

Below are the essential needs identified by the DEPARTMENT. Costs associated with addressing these needs shall be identified and annotated in Section 5 of VENDOR responses to the DEPARTMENT. Project budget will be constructed based on responses to the below items.

- 1. The DEPARTMENT needs a VENDOR to create a Resource-grade right-of-way dataset of the DEPARTMENT's existing right-of-way in a format to be used in an ESRI Geodatabase.**
  - a. Work with DEPARTMENT staff to identify relevant sources of data and information and assess quality and usage of existing digital and paper sources.
  - b. Research, interpret, and define the DEPARTMENT's right-of-way based on deeds, resolutions, or any recorded documents containing a legal description, assessor maps, RWSS verification maps, mileposts, and any other sources identified as applicable.
  - c. Creation of Resource-grade data points, lines, and curves defining the three (3) primary right-of-way types:
    - i. Fee Simple
    - ii. Prescriptive
    - iii. Easement
- 2. The DEPARTMENT needs a VENDOR to develop the relevant policies, processes, and procedures for maintaining the right-of-way dataset in ArcGIS.**
  - a. Conduct interviews with DEPARTMENT staff to determine the best course of action to develop and maintain a right-of-way layer, ensure quality mapping, and accommodate future expansion.
  - b. Assist with the creation and implementation of new policies, processes, and procedures for the maintenance of the right-of-way layer.
- 3. The DEPARTMENT needs a VENDOR to transition the right-of-way dataset into the production environment for day-to-day operations.**

- a. Delivery of a Resource-grade right-of-way dataset in a format to be used in the DEPARTMENT's Enterprise ESRI Geodatabase by developing a transition plan with the DEPARTMENT's Information Technology GIS Team and leading efforts for full implementation into the DEPARTMENT's production environment, viewable for GIS web-based applications.
- 4. The DEPARTMENT needs a VENDOR to conduct knowledge transfer to data stewards, data editors, and data consumers.**
- a. Training key personnel on the collection, maintenance, and sharing of the right-of-way dataset in accordance with developed policies, processes, and procedures referenced in Need #2.

### 3.2. Optional Functionality:

Below are the non-essential need(s) identified by the DEPARTMENT – annotated as “Optional Functionality.” Separate costing solutions and options addressing the below items shall be identified and annotated in Section 5 of VENDOR responses to the DEPARTMENT. Additional considerations for the project budget will be referenced based on responses to the below items.

- 1. The DEPARTMENT wants a VENDOR to create an additional Survey-grade right-of-way dataset of the DEPARTMENT's existing right-of-way in a format to be used in a ESRI Geodatabase.**
  - a. Work with DEPARTMENT staff to identify relevant sources of data and information and assess existing CADD data available from roadway projects and professional surveys.
  - b. Prioritize identified data and information.
  - c. Creation of Survey-grade data points, lines, and curves defining the three (3) primary right-of-way types:
    - i. Fee Simple
    - ii. Prescriptive
    - iii. Easement
  - d. Define the accuracy of the right-of-way based on criteria, such as:
    - i. Survey grade recently set and acquired, or existing right-of-way surveyed, on the current updated datum.
    - ii. Right-of-way that is offset from a recently surveyed centerline (i.e. 200 feet each side of centerline).
    - iii. Right-of-way that is offset from a centerline that is not currently surveyed.

## 4. Appendix A – DEPARTMENT Technical Standards

### 4.1 INTRODUCTION

The purpose of this document is to provide Nevada Department of Transportation (DEPARTMENT) vendors with the following IT Architectural Standards as a guideline to facilitate the implementation and management of DEPARTMENT enterprise information systems. This document will provide standards that includes, but is not limited to: planning, designing, building, creating, developing, enhancing, implementing, maintaining, and using DEPARTMENT networks, gateways, front-ends, information systems, applications, databases, computer-based tools, and information assets.

The following products and standards pertain to all vendors that the DEPARTMENT engages to conduct business. The vendor's product and/or service must comply with these standards. In addition, these standards apply to any entity connecting to DEPARTMENT IT resources to conduct business. Vendors are responsible for developing and maintaining procedures to facilitate and monitor the implementation of these standards. Additionally, the DEPARTMENT's IT Division has adopted the use of Scrum as its preferred project management approach across all functional areas (Application Development, Systems, Networking, etc.) and prefers vendors with familiarity and/or fluency in Agile methods, however, the DEPARTMENT's IT division can accommodate other methodologies upon approval.

Below are the products and standards used within the DEPARTMENT – effective as of 19 September 2017. The standards are constantly changing due to technological advances at the DEPARTMENT; therefore, consultants should follow these guidelines and should also check with the DEPARTMENT's IT Division for any recent changes to the current specifications or requirements. Depending upon individual project specifications, there may or may not be additional policies, procedures or standards which vendors must adhere, however, these will be discussed on an as-needed basis.

### 4.2 DATABASE PRODUCTS AND STANDARDS

DEPARTMENT has established Microsoft SQL-Server as the Relational Database Management System (RDBMS) for the primary database standard.

1. Database management system (DBMS) based on relational or object-oriented model.
2. Microsoft SQL Server 2016 is recommended. Microsoft SQL Server 2014 at a minimum. Please note that the DEPARTMENT will upgrade to SQL 2014 by 2017.
3. Estimate of database size.
4. Setup and maintain separate environments (development, test, and production).
5. Restrict vendor from direct database access.
6. Provide contact list.
7. Personally Identifiable Information (PII) data, Protected Health Information (PHI) data, and Payment Card Information (PCI) data must be encrypted in transit and at rest per Nevada Revised Statute (NRS 603A), the Health Insurance Portability And Accountability Act of 1996 (HIPAA), and the Privacy Act of 1974.
8. SQL Server database deployments and changes will be scripted, Oracle schemas will be scripted.
9. Oracle 12c is currently used.
10. Oracle NLS\_Character set needs to be we8mswin1252.
11. Oracle NLS\_NChar\_Character set needs to be AL16UTF16.
12. Online Transaction Processing (OLTP) databases:

- a. Data logic and business rules must be encapsulated.
- b. Ad hoc queries and data modifications are disallowed.
- c. Errors must be handled in procedure code without being passed directly to client applications.
- d. Revoke or deny all permissions to the underlying tables for all roles and users in the database.

#### 4.3 APPLICATION DEVELOPMENT PRODUCTS AND STANDARDS

Application developers and administrators must follow the Software Development Life Cycle (SDLC) process to ensure proper coding and avoid programming deficiencies. The SDLC procedures include fundamentals to ensure security risks do not expose the DEPARTMENT's data and information systems. Applications for end users should be developed in the web software environment. Application developers should keep in mind that some remote offices and public access users still only have limited Internet connectivity. Additional requirements on Web, database, network security, and other IT related issues should be investigated with the IT division.

1. Must be developed on thin client.
2. Must use the DEPARTMENT's standard User Interface theme (look and feel).
3. The use of Beta software is prohibited unless approved by the DEPARTMENT IT Chief.
4. Development based on three-tier architecture (client, business logic, and database tier):
  - a. All user interactions with the database are through the middle tier.
  - b. The middle tier returns data to the User Interactions tier.
5. WebAPI is used for web services and other communications in the middle tier.
6. Following coding standards:
  - a. Web-based Applications:
    - i. ASP.net using VB.net (used only for maintenance of existing products), C#.net (new Projects)
    - ii. MVC using C#.net
    - iii. HTML5
    - iv. Bootstrap
    - v. Java-script for client-side
    - vi. JQuery, Angular JS or similar development library
    - vii. Ext.net (used only for maintenance of existing products)
    - viii. Site.css stylesheet (no inline css)
  - b. Desktop Applications (Developing this type of application must be approved by management):
    - i. C#
7. Applications should be developed and coded in .NET framework v.4.5. as a minimum.
8. The DEPARMTNET is currently using Oracle's OBIEE for standard reporting, however future reporting efforts are intended to use Microsoft PowerBI or SQL Reporting Services. PowerBI (Government version) will likely replace OBIEE as the DEPARTMENT standard.
9. Restrict development tools in Production environment.
10. Documentation standard:
  - a. Code will be documented with comments;
  - b. GhostDoc XML documentation;
  - c. Software Specification Documentation.
  - d. The database will be documented at a minimum, with:

- i. Entity Relationship Diagram (ERD); and
  - ii. Data Dictionary.
11. Database programming standards:
  - a. Development of applications hosted on premise to use SQL Server.
  - b. Development of applications hosted off premise may use a database platform of the vendor's choosing.
  - c. Users will be limited to the minimum level needed to complete their tasks.
  - d. The database will be normalized to level 3mod.
  - e. Existing DEPARTMENT data and data models will be used where appropriate:
    - i. The DEPARTMENT will provide the vendor data tables with data when they are to be used by the vendor in their development.
12. Software developed for NDOT must adhere to the following secure coding practices:
  - a. Validate input from all data sources before use.
  - b. Compile code using the highest warning level available for your compiler and eliminate warnings by modifying the code.
  - c. Architect and design for security policies. Create a software architecture and design your software to implement and enforce security policies.
  - d. Keep the design as simple and small as possible.
  - e. Default deny. Base access decisions on permission rather than exclusion.
  - f. Adhere to the principle of least privilege. Every process should execute with the least set of privileges necessary to complete the job. Any elevated permission should be held for a minimum time.
  - g. Sanitize data sent to complex subsystems such as command shells, relational databases, and commercial off-the-shelf (COTS) components.
  - h. Practice defense in depth. Manage risk with multiple defensive strategies, so that if one layer of defense turns out to be inadequate, another layer of defense can prevent a security flaw from becoming an exploitable vulnerability and/or limit the consequences of a successful exploit.
  - i. Use effective quality assurance techniques. Good quality assurance techniques can be effective in identifying and eliminating vulnerabilities. Fuzz testing, penetration testing, and source code audits should all be incorporated as part of an effective quality assurance program.
  - j. Adopt a secure coding standard. Develop and/or apply a secure coding standard for your target development language and platform.
  - k. Identify and document security requirements early in the development life cycle and make sure that subsequent development artifacts are evaluated for compliance with those requirements.
  - l. Use threat modeling to anticipate the threats to which the software will be subjected. Threat modeling involves identifying key assets, decomposing the application, identifying and categorizing the threats to each asset or component, rating the threats based on a risk ranking, and then developing threat mitigation strategies that are implemented in designs, code, and test cases.

#### 4.4 SYSTEM PRODUCTS AND STANDARDS

It is important to maintain the configuration of DEPARTMENT servers. These servers store, process and transmit critical information. Privileged access must be strictly limited. System administrators will control granting access privileges to users in accordance to the DEPARTMENT's policies.

Only DEPARTMENT-approved software shall be installed on any DEPARTMENT workstations, laptop, or server. To avoid technological incompatibility issues, security exposures, software incompatibility issues, and management issues, no one can install non-DEPARTMENT issued software.

1. Windows Server 2016.
2. Desktop Operating System: Windows 10 & 7 backwards compatibility. Please note the DEPARTMENT started migration to Windows 10 in 2016
3. Server: Dell (Model and specifics to be specified by Staff based on application needs).
4. Redundant power supply.
5. Minimum 64GB RAM or higher.
6. Minimum 500GB Drive Array (Solid State Drive (SSD) preferred).
7. Redundant raid array (RAID 5 Minimum).
8. 10gb Network Interface Controller (NIC).
9. DRAC Capable if branch office.

#### 4.5 WEB PRODUCTS AND STANDARDS

The following products and standards should be considered when developing web-based solutions.

1. Browser support – Current version plus one previous version
  - a. Microsoft Edge (latest version plus two versions);
  - b. Internet Explorer (11.x and newer);
  - c. Firefox (latest version plus two previous versions);
  - d. Safari (latest version plus two previous versions); and
  - e. Chrome (latest version plus two previous versions).
2. Applications developed using the latest in Responsive Web Techniques (Mobile First Design) to allow for use on various devices including, but not limited to: desktop, mobile, tablets, etc.
3. webDAV usage is not allowed.
4. Use of Flash is prohibited.
5. Use of Silverlight is prohibited.

#### 4.6 GEOGRAPHIC INFORMATION SYSTEMS PRODUCTS AND STANDARDS

The DEPARTMENT is implementing an Enterprise Geographic Information System built upon the ESRI software platform and using ArcGIS for Portal, ArcGIS Online, and ESRI Roads and Highways.

1. GIS Software Compatibility
  - a. All routes and event tables must support ESRI's Roads and Highways version 10.5.1 or higher
  - b. Any server-side processes must use ArcGIS Server Geoprocessing services, ArcGIS Web API, Runtime SDK (such as Qt or .NET), Python API, Server Object Extensions (SOE), or Server Object Interceptor (SOI) for ArcGIS Server 10.3 or higher. ArcGIS Desktop/Pro or other client-based software cannot be installed on DEPARTMENT servers.

- c. Currently, ArcGIS Server 10.3 or newer with SQL Server 2008 R2 or newer.
  - d. The DEPARTMENT will migrate to ArcGIS 10.5.1 platform with SQL Server 2014 by April 2018.
2. GIS Data and Services
- a. All spatial data developed and delivered by the vendor must reside on and be actively managed on the DEPARTMENT's Enterprise Geodatabases or Portal's Data Store.
  - b. All data should be delivered as a file geodatabase with dataset structure approved by the DEPARTMENT's business unit. This includes geodatabase domains and subtypes.
  - c. All Linear Referencing System (LRS) events shall be registered with the DEPARTMENT's ArcGIS Roads and Highways which shall reside on the DEPARTMENT's Enterprise Geodatabase.
  - d. DEPARTMENT-owned GIS data utilized by a web application will be delivered using a Map Service hosted by the DEPARTMENT or on the DEPARTMENT's ArcGIS Online organizational account.
  - e. To keep data current and prevent import/export work by staff, GIS data used in a web application will be provided using an NDOT ArcGIS Server map service, Portal hosted feature service, or ArcGIS Online registered featured service. All data will reside on the DEPARTMENT's Enterprise Geodatabase or Portal Data Store.
  - f. Vendors who deliver a solution based on web services must provide a map document, map package, layer file, or layer package that has been approved and finalized by the DEPARTMENT's business unit – including: all symbology, map scales, and labels or annotation prior to deliver to the DEPARTMENT's IT GIS Team for publishing as a map service.
  - g. The addition and removal of fields in any dataset must first be configured in Development and Test Environments. Due to web application and geoprocessing tool dependencies, vendors do not have permission to add/remove fields or add/remove datasets in the Production environment. Once GIS data has been updated in the Test environment, the DEPARTMENT's IT GIS Team will move the data into production.
3. Data Dictionary, Metadata and Data Projections
- a. The DEPARTMENT prefers that all data sets use the UTM NAD83 Zone 11N map projection.
  - b. All geospatial data must be provided with a data dictionary approved by the DEPARTMENT's business unit – including: the full names of attributes, meanings of codes, scale of source data, and accuracies of locations.
  - c. All geospatial data must contain Federal Geographic Data Committee (FGDC) metadata within the dataset or as a separate XML file.
4. GIS Applications
- a. Custom-built mapping applications must use the ArcGIS Platform for Developers.
  - b. Custom tools running within client software will not be supported by Department GIS staff after the developer contract is terminated.
5. Mobile Data Collection
- a. Collector for ArcGIS or Survey123 is preferred.
  - b. Mobile web applications must be built to support the iOS platform.
  - c. If the DEPARTMENT's business unit is planning to collect data on a GPS unit, please refer to the DEPARTMENT's business unit for hardware requirements.
  - d. Mobile Devices using geospatial data must allow offline syncing and disconnected editing for spatial data.

#### 4.7 General Security Standards

1. All data in transit must be protected using the TLS 1.2 or newer protocol.
2. All communication Channels between NDOT systems and non-NDOT systems which carry sensitive data must use a virtual private network (VPN) connection.
3. Self-signed encryption certificates are prohibited.