

Streamlining and Integrating Right-of-Way and Utility Processes With Planning, Environmental, and Design Processes in Australia and Canada



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16. Abstract <p>Many transportation projects require acquisition of land and accommodation of utility facilities in the right-of-way. The Federal Highway Administration, American Association of State Highway and Transportation Officials, and National Cooperative Highway Research Program sponsored a scanning study of Australia and Canada to learn about innovative practices for right-of-way and utility processes. The study complemented a 2000 study of European countries.</p> <p>The scan team identified nine priorities for U.S. implementation: promote incentive-based reimbursement for utility relocations, pursue corridor preservation strategies, use an alliance contract approach to integrate right-of-way acquisition and utility coordination, enhance cooperative relationships with property owners to facilitate timely property acquisition, develop GIS-based right-of-way project and asset management systems, promote visualization techniques to communicate project impacts, promote use of multiple-level MOU structures, promote use of utility coordination best practices during construction, and develop a framework to establish proficiency of right-of-way and utility professionals.</p>					
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- Department for Transport, Energy, and Infrastructure, South Australia
- Roads Corporation, Victoria
- Alberta Transportation, Alberta
- Ministry of Transportation, Ontario

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International Technology Scanning Program

The International Technology Scanning Program, sponsored by the Federal Highway Administration (FHWA), the American Association of State Highway and Transportation Officials (AASHTO), and the National Cooperative Highway Research Program (NCHRP), evaluates innovative foreign technologies and practices that could significantly benefit U.S. highway transportation systems. This approach allows for advanced technology to be adapted and put into practice much more efficiently without spending scarce research funds to re-create advances already developed by other countries.

FHWA and AASHTO, with recommendations from NCHRP, jointly determine priority topics for teams of U.S. experts to study. Teams in the specific areas being investigated are formed and sent to countries where significant advances and innovations have been made in technology, management practices, organizational structure, program delivery, and financing. Scan teams usually include representatives from FHWA, State departments of transportation, local governments, transportation trade and research groups, the private sector, and academia.

After a scan is completed, team members evaluate findings and develop comprehensive reports, including recommendations for further research and pilot projects to verify the value of adapting innovations for U.S. use. Scan reports, as well as the results of pilot programs and research, are circulated throughout the country to State and local transportation officials and the private sector. Since 1990, more than 80 international scans have been organized on topics such as pavements, bridge construction and maintenance, contracting, intermodal transport, organizational management, winter road maintenance, safety, intelligent transportation systems, planning, and policy.

The International Technology Scanning Program has resulted in significant improvements and savings in road program technologies and practices throughout the United States. In some cases, scan studies have

facilitated joint research and technology-sharing projects with international counterparts, further conserving resources and advancing the state of the art. Scan studies have also exposed transportation professionals to remarkable advancements and inspired implementation of hundreds of innovations. The result: large savings of research dollars and time, as well as significant improvements in the Nation's transportation system.

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Abbreviations and Acronyms

AACI Accredited Appraiser Canadian Institute

AASHTO American Association of State Highway and Transportation Officials

AIC Appraisal Institute of Canada

ASCE American Society of Civil Engineers

ASRD Alberta Sustainable Resource Development

BLIMS Building and Land Inventory Management System

DOT Department of Transportation

DTEI Department for Transport, Energy, and Infrastructure

ECI early contractor involvement

eDAM Electronic Development Application Management

FHWA Federal Highway Administration

FUCC Florida Utilities Coordinating Committee

GIS geographic information system

IRWA International Right of Way Association

LAIS land automated information system

LAJTCA Land Acquisition (Just Terms Compensation) Act

LPMC Land Process Management Committee

MOU memorandum of understanding

MTO Ministry of Transportation of Ontario

NCHRP National Cooperative Highway Research Program

NEPA National Environmental Policy Act

NHI National Highway Institute

NSW New South Wales

PIMS Property Information Management System

PLEC Power Line Environment Committee

PPP public-private partnership

RDA restricted development area

RTA Road and Traffic Authority

SHRP Strategic Highway Research Program

SPIN 2 Spatial Information System

SR/WA Senior Right-of-Way Agent

STEP Surface Transportation Environment and Planning

SUE subsurface utility engineering

TIP Transportation Improvement Program

TUC transportation and utility corridors

VICROADS Roads Corporation

VRI VicRoads International

Terms

Terms used in Australian and Canadian practice, along with the corresponding term commonly used in the United States:

CARRIAGEWAY <i>(Australia)</i>	roadway
COMPULSORY ACQUISITION <i>(Australia)</i>	eminent domain
EXPROPRIATION <i>(Canada)</i>	eminent domain
FOOTWAY <i>(Australia)</i>	sidewalk
VALUER <i>(Australia)</i>	appraiser
ROAD RESERVE <i>(Australia)</i>	road right-of-way
CROWN LAND <i>(Australia, Canada)</i>	public land <i>(Federal or State)</i>

Executive Summary

OVERVIEW

An effective transportation system is an essential requirement for developing and maintaining the economic strength of organized society. Planning, designing, and executing successful transportation projects require applying sound strategies to ensure the optimum use and management of scarce resources while, at the same time, addressing a variety of constraints and challenges, many of which are external to the agencies responsible for developing the projects.

Many transportation projects require the acquisition of land and other property interests as well as proper consideration of the accommodation and potential relocation of existing utility facilities in the right-of-way. A critical requirement for the successful completion of those projects is the judicious application of sound engineering and management principles during the right-of-way and utility processes. These requirements are particularly evident in urbanized areas, where land use is more intensive and project costs related to right-of-way acquisition and utility relocation tend to be greater.

Managing acquired right-of-way assets and the accommodation of utilities within those assets is a continuous activity at transportation agencies. Nationwide, transportation agencies are responsible for managing millions of acres of land that provide right-of-way to transportation corridors. Managing this extensive and valuable right-of-way asset involves considerable resources and integration of numerous business processes, including determining right-of-way boundaries; inventorying roadside features; preparing right-of-way maps; buying, selling, and leasing assets; regulating the accommodation of utilities in the right-of-way; and preparing reports documenting right-of-way assets. In general, ready access to right-of-way asset data is a key requirement not just to streamline project delivery, but also to effectively manage the right-of-way asset throughout the lifetime of a transportation facility.

In September 2008, the scan team visited Australia and Canada to learn about innovative practices for right-of-way and utility processes that might be applicable for implementation in the United States. The study team

visited four state transportation agencies in Australia: the Road and Traffic Authority (RTA) in Sydney, New South Wales (NSW); the Department of Main Roads in Brisbane, Queensland; the Department for Transport, Energy, and Infrastructure (DTEI) in Adelaide, South Australia; and the Roads Corporation (VicRoads) in Melbourne, Victoria. In Canada, the study team visited Alberta Transportation in Edmonton (Alberta) and the Ministry of Transportation of Ontario (MTO) in St. Catharines. The 2008 scanning study of Australia and Canada complemented a 2000 scanning study of European countries, which covered Germany, the Netherlands, Norway, and the United Kingdom.

Objectives for the 2008 scanning study included the following:

- **Alternative project delivery methods.** Determine the experience of other nations with public-private partnerships and other alternative project delivery methods in addressing right-of-way and utility needs, and how integration of right-of-way and utility processes with design and construction has improved project delivery, including cost, schedule, and quality.
- **Long-range planning process.** Determine how other nations coordinate right-of-way and utility activities with the planning process to identify critical future transportation (highway) corridors, manage right-of-way acquisition and utility relocation costs (e.g., by using corridor preservation and access management techniques), and identify the impact of right-of-way and utilities on project schedule, funding, and programming.
- **Design process.** Identify how other nations coordinate right-of-way and utility activities with the project development process to reduce costs and delays associated with late plan changes, addition of required parcels, changes in access requirements, and accommodation of utilities.
- **Environmental process.** Determine how other nations coordinate right-of-way and utility activities with the environmental process to facilitate construction permit approvals, acquire land for environmental

mitigation, acquire parcels containing contaminated or hazardous materials, streamline the project development process, and minimize environmental and project development impacts.

- **Utility property right acquisition and accommodation.** Determine how other nations acquire and accommodate property rights and facilities owned by utility companies as a component feature of the planning, environmental, and design processes; coordinate utility relocation activities to accelerate project delivery; and manage relationships and conflicts with other stakeholders (e.g., railroads).
- **Right-of-way property asset management strategies.** Determine how other nations manage right-of-way assets, including the use of performance measures; technology-based tools to inventory, track, and manage assets; and methods to maximize benefits from right-of-way assets, including nontraditional strategies such as revenue generation and multiple public uses.
- **Project team, training, and professional development strategies.** Identify how other nations integrate right-of-way and utility professionals into the project development and delivery process, and what techniques and strategies those nations follow to address the urgent need for succession planning through recruitment, retention, education, and professional development.

To assist in the discussion with host country officials, the study team prepared a series of amplifying questions before the scan tour to provide additional insight about the motivation and objectives of the scan.

Summary of Findings

Australia

Lessons learned from the meetings with RTA, Main Roads, DTEI, and VicRoads include the following:

- **Business approach to operations and emphasis on good working relationships.** The study team perceived a strong emphasis on entrepreneurship and the application of sound business principles to department of transportation (DOT) operations, including right-of-way and utility coordination. Examples of business approach strategies include an emphasis on strategic planning, a clear

understanding of the agency's mandate to maintain high levels of performance and customer satisfaction, consideration of long-term right-of-way needs in transportation facility management, and an understanding of the critical need to develop and maintain good working relationships with other stakeholders of the road reserve. An emphasis on effective communications, appropriate performance measurement, and customer satisfaction has resulted in some of the agencies visited being ranked among the highest in their states on public satisfaction with their performance.

- **Alliance contracting approach.** The alliance contracting approach is gaining popularity in Australia, particularly when there are significant uncertainties about the optimum solution for a project. Uncertainties can include unpredictable risks, a project that is difficult to scope or for tenderers to price, time pressures, and the state's desire for breakthroughs and innovation.

In the alliance approach, the transportation agency uses an early contractor involvement model that focuses on assembling and integrating the best possible leadership, management, and project execution teams based on qualifications and experience. Following a "best-for-project" approach, each team can include participants from the selected consortium and/or the transportation agency, depending on the specific expertise area needed.

An early contractor involvement approach means the alliance team is involved during the project scoping and design phases. Because no bidding occurs at the end of the design phase (since the consortium was selected earlier), the alliance approach requires transparent communications between the parties, particularly on compensation and cost structures. Strategies to achieve this goal include establishing a fee structure for all direct project costs that uses open-book accounting and is viewable by all parties, a separate corporate overhead and profit calculation, and clear gainshare-painshare arrangements. Gainshare provisions include establishing how to share any net monetary savings at the end of the project.

In general, the alliance team is responsible for coordinating effectively with utilities early and finding optimum relocation strategies. Only one

team interacts with utilities during the design and construction phases. The alliance team also presents a unified front for dealing and negotiating with property owners.

- **Training and professional development.** Australian states use a variety of approaches to promote training and professional development opportunities. For example, several universities offer formal educational programs for property valuers. A typical full-time, 3-year program offers a degree with a major in property. Coursework usually covers areas such as accounting, construction, property valuation, contract law, statistics, business finance, marketing, geographic information systems (GIS), property economics, property law, planning and environmental law, and property and asset management.

In New South Wales, the NSW Streets Opening Conference sponsored the development of a pilot training course for transportation and utility personnel involved in locating utility facilities in the field. The training course will provide the foundation for a formal accreditation process for utility location services.

Through VicRoads International (VRI), VicRoads has an active presence abroad. An integral component of the VRI program is to provide staff members with the opportunity to travel and work abroad, which in the long term benefits VicRoads because it promotes personal growth and professional development. VicRoads also promotes VRI as a recruitment strategy.

- **Road reserve.** The concepts of road reserve and road right-of-way (as applied in the United States) share many similarities. However, the treatment of the road reserve in Australian legislation historically has been stronger and more centralized than the treatment of the right-of-way in the United States. Australian states have also benefited from the application of more centralized land use practices as well as high-level planning and land title registration offices that work with ministries of transportation and other state agencies to provide orderly, coordinated land use planning.
- **Corridor preservation.** Australian states have a number of tools that facilitate the preservation of

corridors for future transportation use. Examples include the requirement to register transportation plans with the state land title registration office, the ability of these offices to add notes or caveats to title certificates on the future use of a corridor, the ability to control building setbacks on corridors designated for future road expansion, and the ability of the transportation agency to acquire parcels during the planning phase.

- **Appraiser-legal representation fees and right-of-way negotiation process.** Australian states routinely reimburse property owners for reasonable expenses (including attorney fees) related to the appraisal and negotiation process. Further, in Australian practice, property owners are encouraged to become informed and seek professional help to assist them in that process. In addition, Australian states routinely share appraisal reports with property owners (or their representatives). Additional innovative right-of-way acquisition practices include reconciliation of professional opinions, the use of lease agreements with property owners to facilitate early right of entry to the property, in-kind compensation, exchange of surplus property for required property, and reliance on appraisals by independent bodies.

Combined, these features result in a more cooperative, less adversarial relationship with property owners, which can result in more effective property acquisition practices and earlier access to property needed for project completion.

- **Use of technology to support the right-of-way acquisition and property management processes.** It is customary for Australian states to use GIS-based applications to manage the right-of-way acquisition process, including corridor preservation, as well as property management activities. The use of GIS technology is supported by the use of public acquisition overlays during the planning process to illustrate the extent of the road reserve, the requirement to register transportation plans with the state land title registration office, and the integration of parcel databases into georeferenced data repositories that facilitate data exchange among stakeholders.

Through the alliance contracting approach, Australian states are beginning to experiment with the use of visualization techniques to assist in the

right-of-way acquisition process (e.g., by using three-dimensional visualization techniques and posting video clips on the Internet to explain the project to a wide audience).

- **Dial Before You Dig.** “Dial Before You Dig” is a referral system for information on underground utility installations. It is a voluntary national organization with members from all states and territories. It is similar to utility one-call centers in the United States, with two major differences. First, membership includes not just utility owners and operators, but also transportation agencies and railroads (under the premise that these agencies can also provide information about the assets they own to parties that request it). Second, Dial Before You Dig encourages the use of the service earlier in the project development process than is customary in the United States.
- **Reimbursement of utility relocations.** Australian states normally reimburse utility interests for the relocation of utility facilities (but not for betterments). Historically, most utility owners and operators have been government entities. As a result, it does not really matter who pays for the relocation since funding for it comes from the same source. For simplicity, the policy is that the agency responsible for the transportation project that causes the need for the utility relocation is also responsible for relocation costs. In recent years, the Australian utility industry has undergone deregulation, with a large percentage of utility interests now in private hands. However, the policy for reimbursing utility relocation costs continues.
- **Multilevel memorandum of understanding (MOU) approach with utilities.** In Australia, several states are exploring a variety of MOUs and agreements with utilities to facilitate the cooperation and coordination process. In a typical situation, a high-level MOU sets forth general principles and the intent of both parties to work cooperatively. This MOU is normally signed by the parties at the executive director level. To ensure the MOU is a living document, it may include attachments and other agreements that discuss specific issues, such as standards, specifications, and general procedures for resolving conflicts. Typically, technical personnel from both organizations prepare these documents. There may

also be contract-level details and specific provisions that the higher-level MOU, attachments, or agreements do not address.

The multilevel MOU concept is also used in the United States. However, the study team’s impression is that Australian MOUs are more elaborate and stringent than those in the United States. Utility accommodation policies or rules at the State level govern the accommodation of utilities on the State right-of-way in the United States, but a similar concept does not appear to exist in Australia (which could explain in part the need for more comprehensive MOUs). Nonetheless, the study team noticed several advantages in the Australian MOU concept worth considering for implementation in the United States.

MOUs with telecommunication providers in Australia appear particularly critical, considering that telecommunications in that country are governed by federal legislation (rather than state legislation, as is the case for other utilities) that, in general, is weak on the power given to the agencies responsible for the road reserves to regulate the accommodation of telecommunication facilities.

Related to the implementation of the MOUs is the NSW Streets Opening Conference, which started in Sydney in 1909 as a focal point for discussing common transportation and utility issues. The association’s objectives include establishing roadside allocations and recommended practices for providing utility services; fostering coordination; encouraging the use of agreed-on codes and practices for excavation, backfilling, and roadway reconstruction; and minimizing the impact of excavations. Membership includes utility owners, local government and road authorities, light rail operators, other government agencies, consultants, and other groups interested in utility issues.

Canada

Lessons learned from the meetings with Alberta Transportation and MTO include the following:

- **Appraisal sharing.** As in the Australian states, Alberta Transportation and MTO share appraisal reports in full disclosure to achieve transparency with property owners. Both agencies also reimburse property owners for reasonable costs, including

appraisal, engineering reports, and planning reports.

■ **Corridor preservation and setback control.**

Alberta and Ontario have legislation that enables the provincial transportation agency to regulate the type of development (including utilities) that takes place within a certain distance from the road centerline or the property line. In Alberta, the extent of the land under regulation varies by road type. For example, according to a regulation now under development, the extent of land under regulation will be 150 meters (m) (492 feet (ft)) from the right-of-way line for minor provincial highways and 300 m (984 ft) from the right-of-way line for multilane provincial highways. In Ontario, regulation tools at MTO's disposal cover encroachments and utility installations, buildings and land use, signs, and highway access. The minimum setback for new buildings or other structures varies by road type and proposed development. For example, in the case of controlled-access highways, the control area within which all development is subject to permit requirements from the ministry is 45 m (148 ft) from the right-of-way. This permit area extends up to 395 m (1,296 ft) at interchanges.

■ **Transportation and utility corridors.** In Alberta, the Government Organization Act enabled the establishment of restricted development areas (RDAs) to coordinate and regulate the development and use of certain areas. The Calgary and Edmonton RDAs are of particular interest because of the designation of transportation and utility corridors (TUCs) in those RDAs. The TUCs were established on the principle that long-term planning for the accommodation of a number of transportation and utility facilities in a TUC can maximize its use. The TUCs protect ring road and utility alignments from advancing urban development. Advantages to the use of TUCs include land conservation, limited environmental disruption, administrative efficiency, safety, land use certainty, assured alignments for future users, and open space use.

■ **Reversal of trend to outsource most work.**

Alberta Transportation outsources most work, including right-of-way acquisition and utility coordination. However, the agency is revisiting its 100 percent commitment to outsourcing. MTO

outsources much of its work except right-of-way acquisition, but has begun to do more work internally. This trend highlights the need to develop in-house expertise to address needs such as succession planning, the ability to provide needed services, and the management of services that continue to be outsourced.

Recommendations and Planned Implementation Actions

The study team identified some 20 potential implementation ideas that merit consideration in the United States. Of those ideas, the study team considers the following the top priorities for implementation:

- Integrate right-of-way acquisition and utility coordination in an alliance contract approach.
- Enhance cooperative relationships with property owners to facilitate timely property acquisition.
- Promote visualization techniques to communicate anticipated project impacts to property owners.
- Develop a framework to establish proficiency of right-of-way and utility professionals in core disciplines.
- Promote incentive-based reimbursement for utility relocations.
- Pursue strategies to facilitate corridor preservation.
- Promote the use of a multiple-level MOU structure among transportation and utility interests.
- Develop GIS-based right-of-way project and asset management systems.
- Promote the use of best practices in utility coordination during the construction phase.

With the 2000 and 2008 scans, the United States now has a sizable database of effective right-of-way and utility practices and strategies covering at least six industrialized nations on three continents. The fact that some of those strategies and practices are used in all or most of those nations is an additional indication of the strength and benefit derived from them, further highlighting the value of their potential implementation in the United States. Taking into consideration that the United States is already implementing several recommendations from the 2000 scan, a valid recommendation would be to evaluate (if not now, possibly within the next 5 to 8 years) which recommendations from the 2000 and 2008 scans have become accepted practice in the United States (and to what degree). For example, the Federal Highway

Administration recently facilitated a peer exchange to evaluate the concept of voluntary incentives for right-of-way acquisition and relocation, one of the recommendations from the 2000 scan. The peer exchange noted 13 pilot voluntary incentive applications from eight States.

CHAPTER 1 | Introduction

An effective transportation system is an essential requirement for developing and maintaining the economic strength of organized society. Planning, designing, and executing successful transportation projects requires the application of sound strategies to ensure the optimum use and management of scarce resources while, at the same time, addressing a variety of constraints and challenges, many of which are external to the agencies responsible for developing the projects.

Many transportation projects require the acquisition of land and other property interests as well as proper consideration of the accommodation and potential relocation of existing utility facilities in the right-of-way. A critical requirement for the successful completion of those projects is the judicious application of sound engineering and management principles during the right-of-way and utility processes. These requirements are particularly evident in urbanized areas, where land use is more intensive and project costs related to right-of-way acquisition and utility relocation tend to be greater.

Managing acquired right-of-way assets and accommodating utilities within those assets are continuous activities at transportation agencies. Nationwide, transportation agencies are responsible for managing millions of acres of land that provide right-of-way to transportation corridors. Managing this extensive and valuable right-of-way asset involves considerable resources and integration of numerous business processes, including determining right-of-way boundaries; inventorying roadside features; preparing right-of-way maps; buying, selling, and leasing assets; regulating the accommodation of utilities in the right-of-way; and preparing reports documenting right-of-way assets. In general, ready access to right-of-way asset data is a key requirement not just

to streamline project delivery, but also to effectively manage the right-of-way asset throughout the lifetime of a transportation facility.

In September 2008, the scan team visited Australia and Canada to learn about innovative practices for right-of-way and utility processes that might be applicable for implementation in the United States (see table 1, figure 1, and figure 2). Appendix A lists the team members. The study team visited four state transportation agencies in Australia: the Road and Traffic Authority (RTA) in New South Wales, the Department of Main Roads in Queensland, the Department for Transport, Energy, and Infrastructure (DTEI) in South Australia, and the Roads Corporation (VicRoads)

Table 1. Basic information on Australian states and Canadian provinces visited.

Country	State/Province	Area ^(1,2) x 1,000 km ² (mi ²)	Population ^(3,4) (million)	City Visited
Australia	New South Wales	801 (309)	6.9	Sydney
	Queensland	1,731 (668)	4.3	Brisbane
	South Australia	983 (380)	1.6	Adelaide
	Victoria	227 (88)	5.3	Melbourne
Canada	Alberta	642 (248)	3.6	Edmonton
	Ontario	918 (354)	13.0	St. Catharines



Figure 1. Australian states.



Figure 2. Canadian provinces.

in Victoria. In Canada, the study team visited Alberta Transportation in Alberta and the Ministry of Transportation of Ontario (MTO). Appendix B lists points of contact and other officials the team met with during the scanning study. This scanning study complemented a 2000 scan of European countries, which covered Germany, the Netherlands, Norway, and the United Kingdom.⁽⁵⁾

Objectives of the 2008 scanning study included:

- **Alternative project delivery methods.** Determine the experience of other nations with public-private partnerships and other alternative project delivery methods in addressing right-of-way and utility needs, and how integration of right-of-way and utility processes with design and construction has improved project delivery, including cost, schedule, and quality.
- **Long-range planning process.** Determine how other nations coordinate right-of-way and utility activities with the planning process to identify critical future transportation (highway) corridors, manage right-of-way acquisition and utility relocation costs (e.g., by using corridor preservation and access management techniques), and identify the impact of right-of-way and utilities on project schedule, funding, and programming.
- **Design process.** Identify how other nations coordinate right-of-way and utility activities with the project development process to reduce costs and delays associated with late plan changes, addition of required parcels, changes in access requirements, and accommodation of utilities.

- **Environmental process.** Determine how other nations coordinate right-of-way and utility activities with the environmental process to facilitate construction permit approvals, acquire land for environmental mitigation, acquire parcels containing contaminated or hazardous materials, streamline the project development process, and minimize environmental and project development impacts.

- **Utility property right acquisition and accommodation.** Determine how other nations acquire and accommodate property rights and facilities owned by utility companies as a component feature of the planning, environmental, and design processes; coordinate utility relocation activities to accelerate project delivery; and manage relationships and conflicts with other stakeholders (e.g., railroads).

- **Right-of-way property asset management strategies.** Determine how other nations manage right-of-way assets, including the use of performance measures; technology-based tools to inventory, track, and manage assets; and methods to maximize benefits from right-of-way assets, including nontraditional strategies such as revenue generation and multiple public uses.

- **Project team, training, and professional development strategies.** Identify how other nations integrate right-of-way and utility professionals into the project development and delivery process, and what techniques and strategies those nations follow to address the urgent need for succession planning through recruitment, retention, education, and professional development.

To assist in the discussion with host country officials, the study team prepared a series of amplifying questions before the scan tour to provide additional insight about the motivation and objectives of the scan. The amplifying questions (see Appendix C) covered the following subject areas:

- Legal framework for right-of-way and utility policies and practices
- Transportation project delivery methods
- Project development process
- Environmental impacts
- Right-of-way acquisition
- Utility coordination and utility conflict management
- Real property management
- Project team strategies, training, and professional development

CHAPTER 2 | Project Delivery

Planning, Programming, and Project Development Strategies

In Australia, the study team perceived a strong emphasis on entrepreneurship and the application of sound business principles to department of transportation (DOT) operations, including right-of-way acquisition and management and utility coordination. Examples of business strategies include the following:

- Emphasis on strategic planning and thinking
- A clear understanding of the agency’s mandate to maintain high levels of performance and customer and public satisfaction
- Consideration of long-term right-of-way needs in managing transportation facilities
- Understanding of the critical need to develop and maintain good working relationships with other stakeholders of the road reserve (including property owners, utility companies, other transportation agencies, and the general public)
- Implementation of commercial services and ventures, including international activities

An emphasis on effective communications, appropriate performance measurement (that focuses on measuring what matters), and customer satisfaction (through an institutional environment and business culture that fosters a good relationship between the DOT and the public and other transportation stakeholders) has resulted in some of the agencies visited being ranked among the highest in their states on public satisfaction with their performance.

Through a consensus process, the Australian Transport Council developed a Transport System Management Framework (figure 3) that focuses on strategic plan delivery and review, strategic alignment of activities, sound justification of activities, identification of future transportation needs, and definition of activities consistent with future plans.⁽⁶⁾ A key component of the framework is the emphasis on iterative feedback throughout the lifetime of a transportation facility, including the use of performance measures to determine the effectiveness of initiatives, programs, and strategies, enabling a direct link between the operation and management of a transportation facility and overall planning activities.

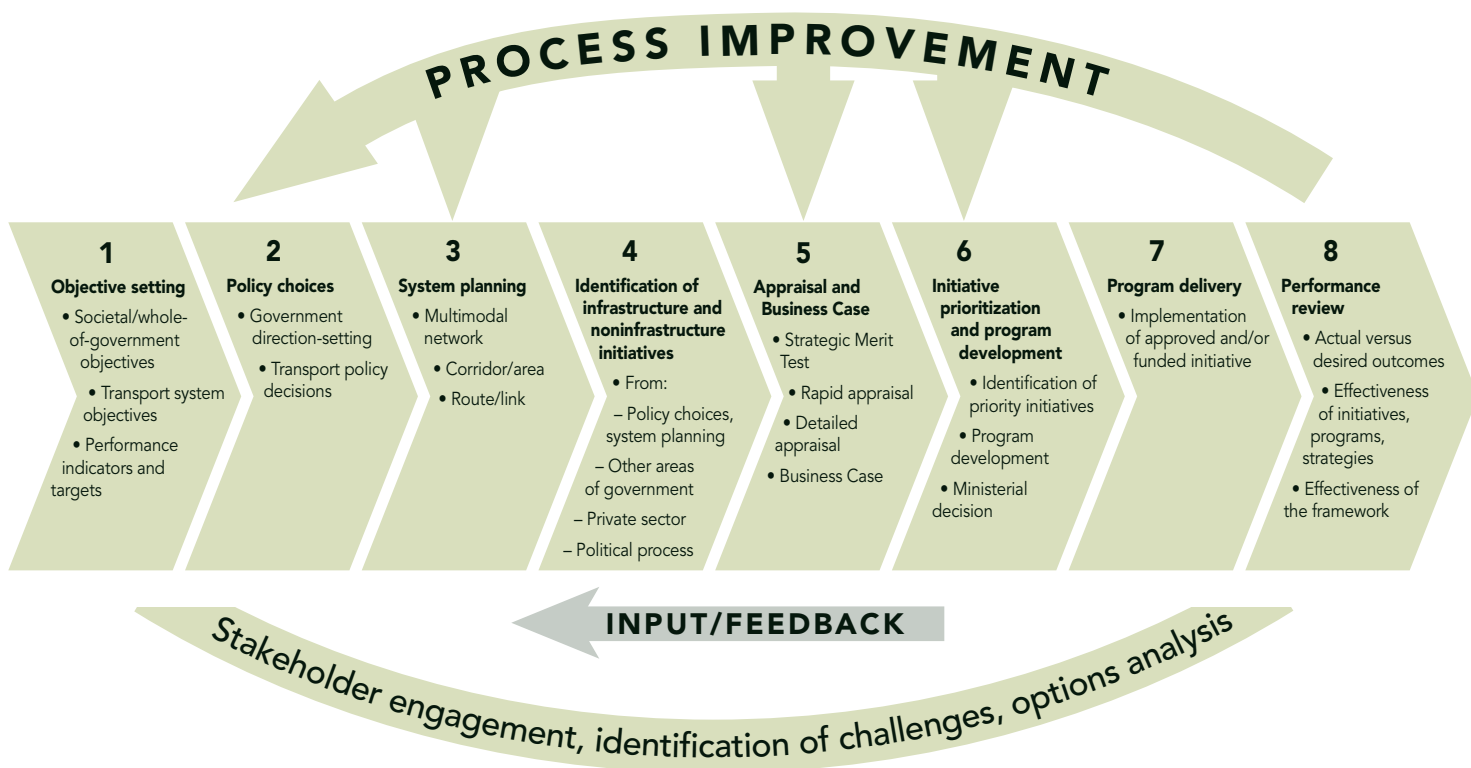


Figure 3. Australia Transport System Management Framework.⁽⁶⁾

COURTESY OF AUSTRALIAN TRANSPORT COUNCIL

Individual states have processes consistent with the national framework. For example, figure 4 shows the project initiation process that South Australia's DTEI follows for developing and implementing transportation projects. This process relies heavily on the preparation of certain critical documents, such as a risk assessment and a business case to provide adequate justification

for projects. The risk management approach extends to the assessment of risks and cost contingencies associated with property acquisition and relocation of utilities. Queensland's road planning framework (figure 5) also relies heavily on strategic planning, resource management, performance measurement, evaluation, and continuous improvement.

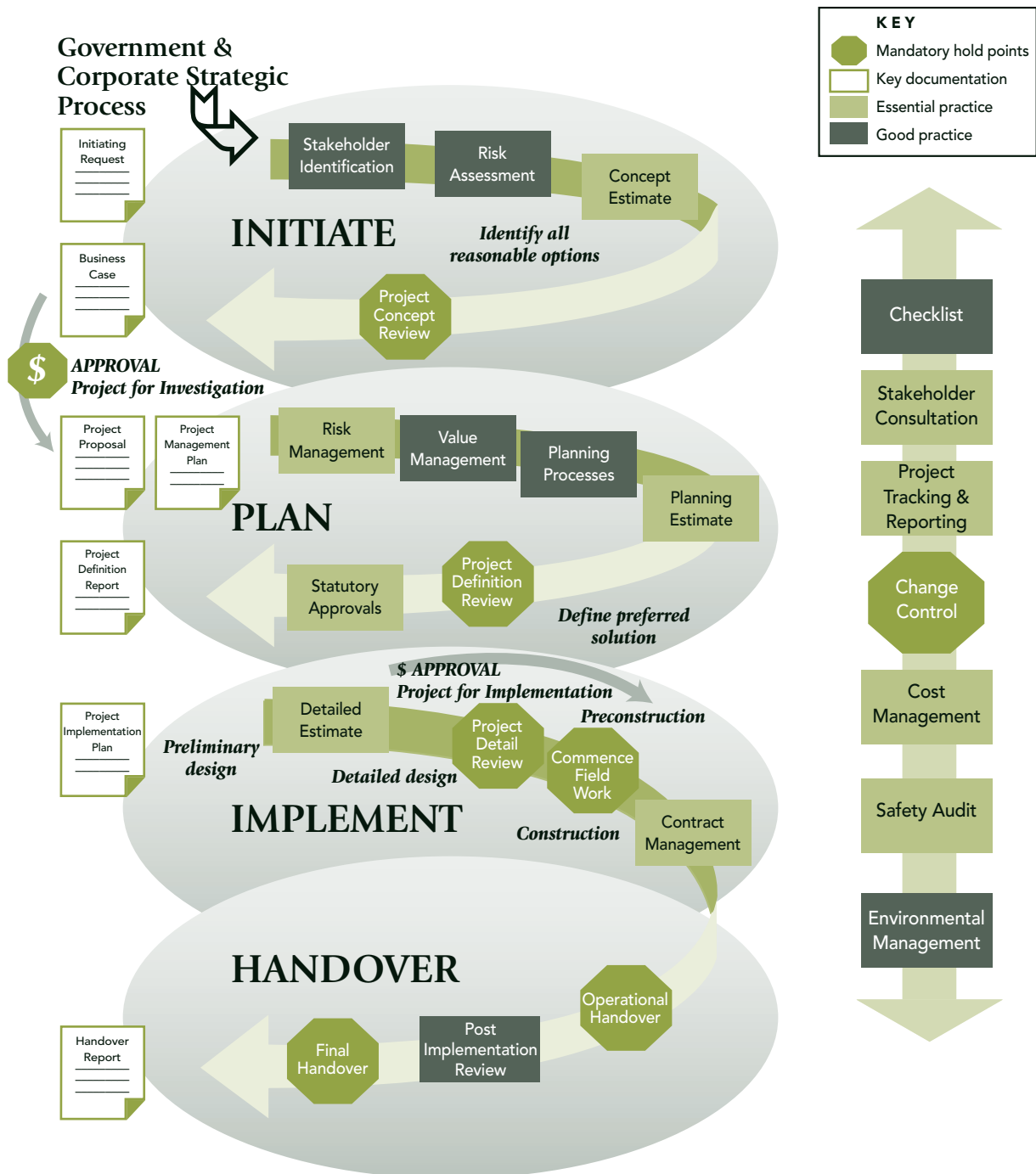


Figure 4. DTEI's project initiation process.

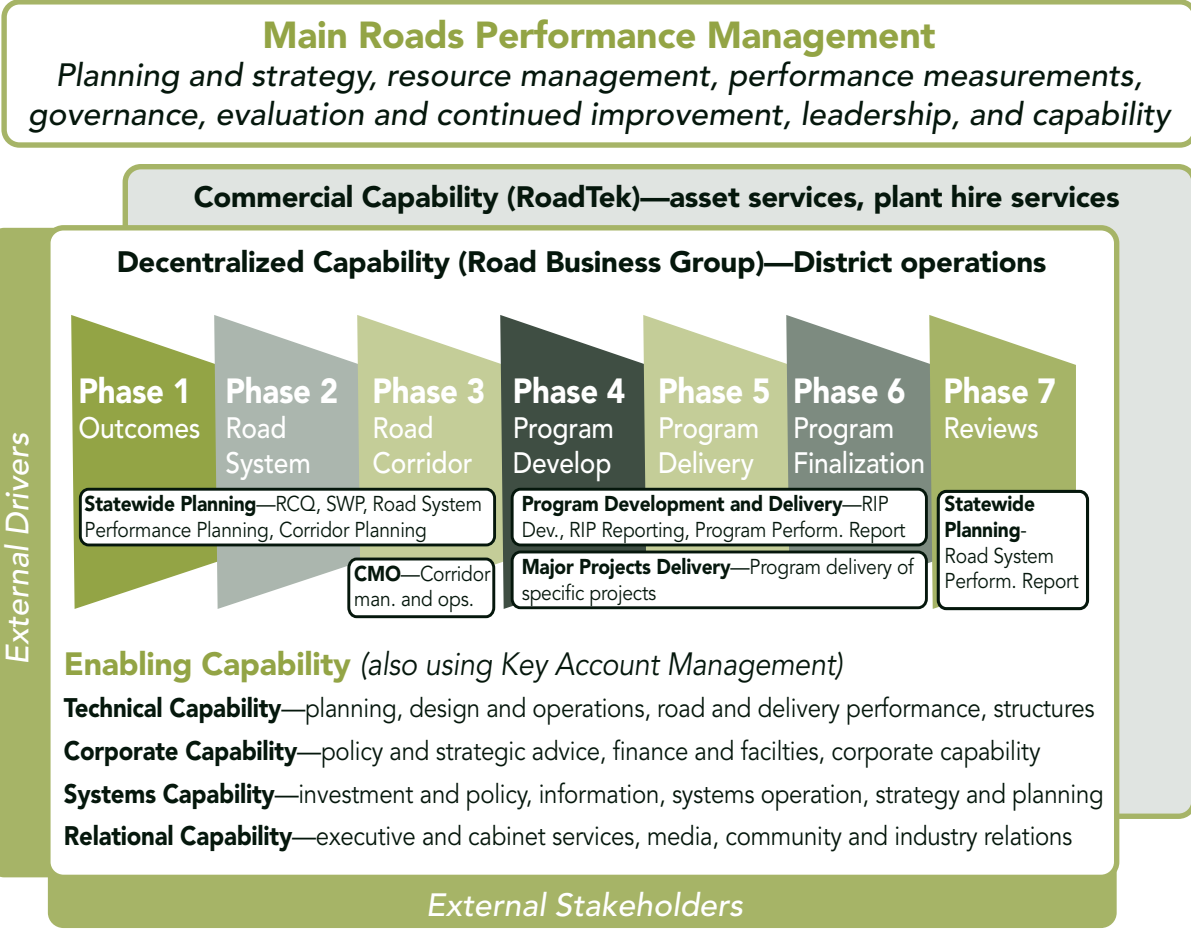


Figure 5. Queensland’s road planning framework.

In Canada, substantial differences exist between Alberta and Ontario on transportation planning challenges, practices, and strategies for project development. Alberta’s energy sector is largely responsible for the large budget surpluses the province has enjoyed in recent years. The budget surpluses give the province considerable flexibility in developing and delivering transportation projects. However, rapid growth in population and economic activity is putting considerable pressure on Alberta’s ability to respond to public needs and requirements in a timely fashion. In contrast, Ontario has a mature manufacturing economy, which imposes significant limitations on the province’s ability to deliver needed transportation projects.

Before 1995, nine commissions handled land use planning in Alberta. In 1995, in response to requests from local jurisdictions for more local control, municipalities were given greater authority for land use decisions (Alberta has about 300 municipalities, 200 of which are in the southern

region). Although well intentioned, more local control resulted in practices that were not necessarily consistent or appropriate (e.g., allowing disproportionately massive developments at certain locations, charging much lower development permit fees at some locations than at other locations, and requesting highway interchanges at locations that were not appropriate from a network connectivity perspective). Alberta Transportation is addressing this issue by tying the provincial contribution to locally requested projects to the number of years into the future the department was already considering those projects for construction (90 percent for 1 year, 80 percent for 2 years, 70 percent for 3 years, and 0 to 60 percent for more than 3 years).⁽⁷⁾ For Alberta Transportation to consider a cost-sharing plan, the project must be included in the department’s business plan.

Recently, the government of Alberta developed a new land use framework for the province that will consolidate land use planning into six planning regions.⁽⁸⁾ Strategies

for land use planning consolidation include creating a cabinet-level overseeing committee; establishing regional advisory councils; developing a cumulative effects management strategy to manage development impacts on land, water, and air resources; developing a strategy for managing private and public lands; establishing an information, monitoring, and knowledge system; and including the aboriginal population in land use planning. Additional priorities include developing strategies for managing surface and subsurface activities (e.g., completing an oil and gas policy integration initiative, reviewing the process for identifying major surface concerns before public offerings of Crown mineral rights, and developing a major transportation and utility corridor (TUC) strategy).

Project Delivery Methods

A number of contracting approaches have been implemented in the United States for delivering projects in addition to the traditional design-bid-build (DBB) approach. Examples of public-private partnerships (PPPs) that enable greater private sector participation in delivering and financing transportation projects than conventional delivery methods include the following:⁽⁹⁾

- Design-build (DB)
- Design-build-operate (maintain)
- Design-build-finance-operate (DBFO)

PPP approaches are common in Australia and Canada. In New South Wales, Australia, the limit for traditional design-bid-build contracts is Au\$100 million. For design-build-maintain contracts, the range is Au\$100 million to Au\$300 million. Regardless of project delivery method, RTA usually retains the responsibility for acquiring property. Likewise, RTA's goal is to relocate utilities before construction starts. In practice, meeting this goal is not always possible. For the traditional delivery method, RTA reserves a certain amount to coordinate utility relocation activities with utilities. As needed, RTA asks utilities to request quotes or bids from potential contractors, which RTA uses to review and approve the proposed work and budget. Recently,

RTA started to require contractors to have utility coordinators at the jobsite. According to RTA officials, this tactic has been very effective.

A contracting approach gaining popularity in Australia is the "alliance" contracting approach. First developed by British Petroleum (BP) in the 1990s in connection with problematic, risky oil reserves in the North Sea,⁽¹⁰⁾ the alliance contracting approach requires project owners and contractors to work together as a single team, with clearly defined shared risk and reward contractual provisions. Australian states use the alliance approach in situations with significant uncertainties on the optimum solution for a project. Those uncertainties include unpredictable risks, a project that is difficult to scope or for tenderers to price, time pressures, and the state's desire for breakthroughs and innovation.

For example, on the Seacliff Bridge project in New South Wales (figure 6), a road segment between Coalcliff and Clifton was closed to traffic for more than 2 years because of geotechnical instabilities (including frequent rock falls and slippage of road sections into the sea) and intolerable risks to the public. RTA chose an alliance approach



Figure 6. Seacliff Bridge project in New South Wales.

COURTESY OF RTA

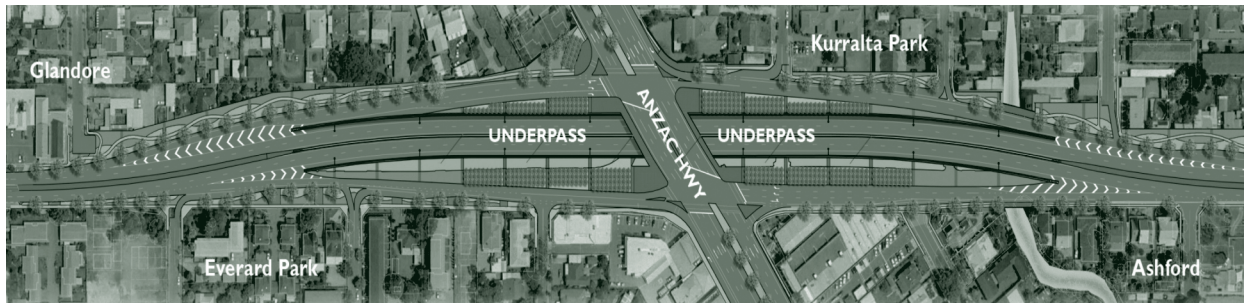


Figure 7. North-South Transport Corridor in Adelaide, South Australia, with Anzac Highway underpass.

because it was difficult to define the scope and the optimum solution and because strong pressure from the community to reopen the road as soon as possible resulted in a tight delivery schedule.

In the case of the North-South Transport Corridor in Adelaide, South Australia, DTEI faces numerous challenges to realize the vision of a free-flow corridor in a complex urban environment that includes numerous signalized intersections—some with major arterials, right-of-way acquisition, and utility relocations. Figure 7 shows the final design of the underpass at Anzac Highway. DTEI chose an alliance approach because of the complexity of the project and the requirement for a constructable solution.

On the Tullamarine–Calder interchange project on the south side of Essendon Airport in Melbourne, Victoria, VicRoads chose an alliance approach because of the complexity of the project environment and the need for a speedy completion schedule (figure 8). In this case, the alliance was not directly responsible for land acquisition, although it played a key role in negotiating outcomes that allowed the project to proceed. Utility relocations were the responsibility of the alliance, which was also able to modify the design to mitigate utility relocation costs. Flexibility in design allowed additional shortening of one runway for a slightly larger land take, eliminating the need for retaining walls.

In the alliance approach, the transportation agency uses an early contractor involvement (ECI) model that focuses on assembling and integrating the best possible leadership, management, and project execution teams based on qualifications and experience. Each team includes participants from both the selected consortium and the transportation agency. For example, for the Tullamarine–Calder interchange project in Melbourne, Victoria, VicRoads used an alliance management framework that included an

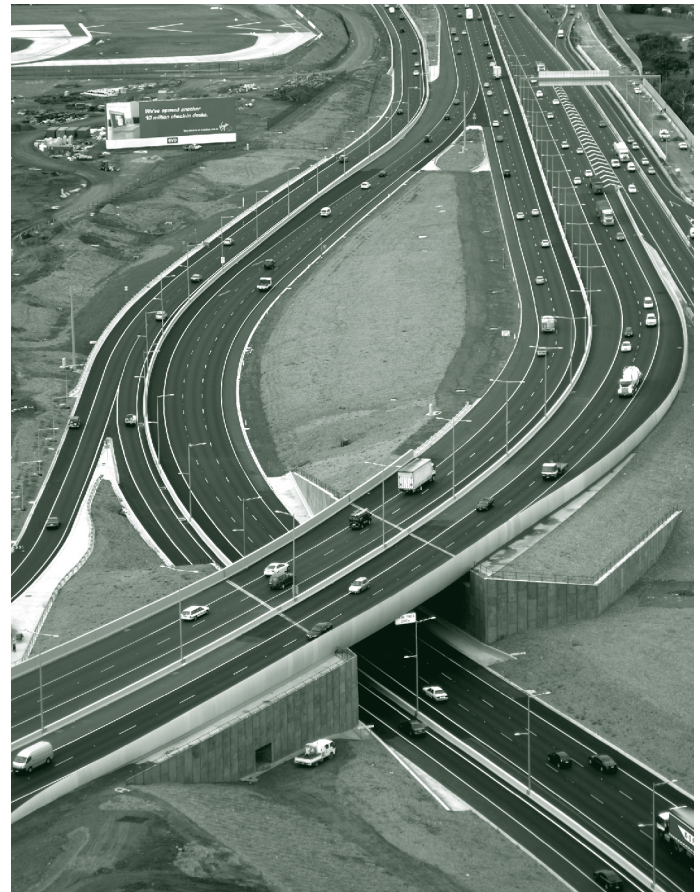


Figure 8. Tullamarine–Calder interchange project in Melbourne, Victoria.

alliance leadership team to provide overall leadership for the project, an alliance management team in charge of day-to-day alliance management responsibilities, and a wider project team in charge of delivering the project (figure 9 on next page).

In the alliance approach, decisions are made on a “best-for-project” basis (as opposed to a “best-for-individual” basis) since the alliance wins or loses as a group.⁽¹⁰⁾ In the case of the Tullamarine–Calder

interchange project, a best-for-project approach included the selection by the alliance management team of the most suitable individuals for specific project roles (figure 9). As table 2 shows, those individuals could be from the selected consortium or the transportation agency, depending on the specific expertise area needed. In some cases,

VicRoads determined that one party would be best suited for certain roles. For example, VicRoads determined that bridge design and construction would be the responsibility of the selected consortium. Conversely, it determined that right-of-way acquisition would remain the responsibility of VicRoads or a specially appointed consultant.

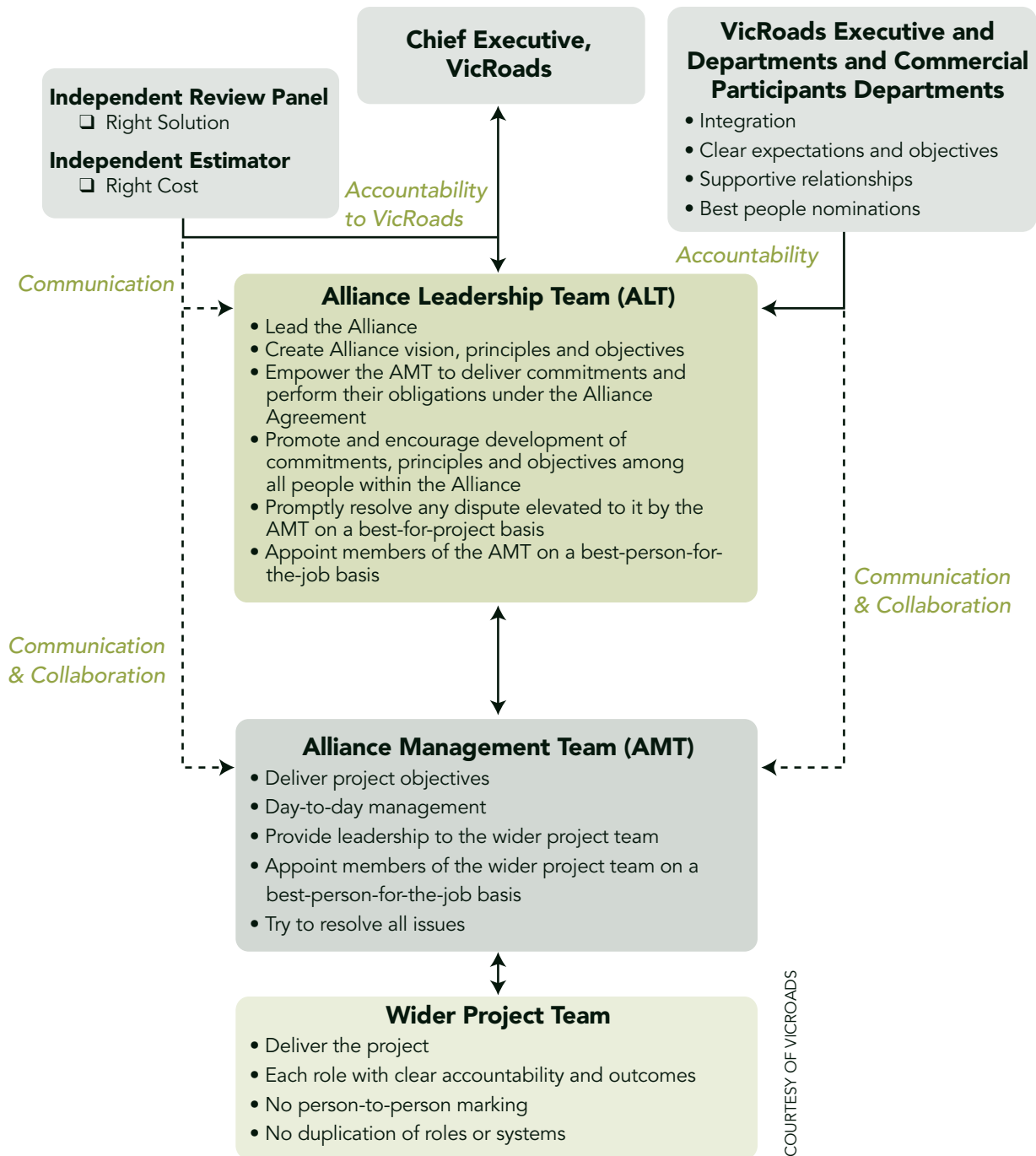


Figure 9. VicRoads alliance management framework for the Tullamarine–Calder interchange project in Melbourne, Victoria.⁽¹¹⁾

Table 2. VicRoads alliance expertise areas for the Tullamarine–Calder interchange project in Melbourne, Victoria.⁽¹¹⁾

Core Competence/Skill Area	Primary Source of Resources(s)		
	VicRoads or direct consultant	Proponent	Best for project basis
Road design (grade separated)		✓	
Road construction		✓	
Traffic management during construction		✓	
Bridge design		✓	
Bridge construction		✓	
Drainage system design		✓	
Project management, controls and reporting		✓	
Estimating		✓	
Multidisciplinary design management and coordination		✓	
OH&S Management		✓	
IR		✓	
Environmental management during construction		✓	
Maintenance provision during construction		✓	
Land acquisition	✓		
Service relocation			✓
Airport facility design			✓
Airport facility construction			✓
Traffic management/planning/modeling (design)			✓
ITS			✓
Noise design			✓
Geotechnical investigation			✓
Feature survey			✓
Pavement design			✓
Lighting design			✓
Road safety audit			✓
Environmental design/landscaping, flora, etc.			✓
Legal advice re subcontracts/suballiances			✓
Community relations management			✓
Communications/PR			✓
Community consultation			✓
Legal advice re stakeholder agreements			✓
Maintenance provision during defects liability period			✓

COURTESY OF VICROADS

An early contractor involvement approach means the alliance team is involved during the project scoping and design phases. Because no bidding occurs at the end of the design phase (since the consortium was selected earlier), the alliance approach requires transparent

communications between the parties, particularly on compensation and cost structures, to ensure the best possible result while minimizing the risk of cost overruns. Strategies to achieve this goal include establishing a fee structure for all direct project costs that uses open-book

accounting and is viewable by all parties, a separate corporate overhead and profit calculation (e.g., as a fixed lump sum set as a percentage of the target cost), and clear gainshare-painshare arrangements.⁽¹⁰⁾ Development of the target cost is one of the most important elements because that cost is used as a benchmark against which actual costs are compared at the end of the project.

Gainshare-painshare arrangements involve sharing risks as well as opportunities. For example, if a pipeline is unexpectedly found during construction, the focus is on finding a solution instead of blaming one of the parties for not identifying the pipeline earlier during the planning and design phases. In general, the alliance team is responsible for coordinating effectively with utilities early and finding optimum relocation strategies. Only one team interacts with utilities during the design and construction phases. The alliance team also presents a unified front for dealing and negotiating with property owners.

Gainshare provisions include establishing how to share any net monetary savings at the end of the project (e.g., x percent for the DOT and y percent for the commercial partner). To minimize risk, the DOT has a clearly identified list of objectives it wants to achieve during the life of the project, including good working relationships with other transportation agencies and adjacent property owners and no disruptions to traffic. Innovation is also encouraged. For example, as part of the North-South Transport Corridor in Adelaide, South Australia, the alliance team has used three-dimensional (3-D) visualization techniques and posted video clips on the Internet to explain the project to a wide audience.

At Alberta Transportation, regardless of project delivery method, right-of-way acquisition is usually the responsibility of the department because the agency's power of expropriation cannot be extended to the highway contractor easily. Without this power, assigning the contractor right-of-way acquisition responsibilities would have a large negative impact on the costs and schedule. In the case of DBFO projects (e.g., the Northwest Anthony Henday Drive project, which is part of the Edmonton Transportation/Utility Corridor⁽¹²⁾), if the contractor decides that additional land outside of the right-of-way is required for the project, the contractor is responsible for acquiring that additional land. After the DBFO contract expires, the contractor transfers the land to the department for a nominal purchase price of \$1.

In the traditional DBB project delivery method, Alberta Transportation (via its consultant) retains responsibility for ensuring that all utility relocations are completed or at least prearranged before letting the highway construction project. For DB and DBFO projects, the contractor is responsible for the road design and therefore is responsible for coordinating utility relocations. Depending on the magnitude of the utility relocation effort, some preliminary investigation of relocation requirements may take place during the tendering phase when bidders establish contact with utility stakeholders. The department might also establish contact with utility stakeholders on behalf of the bidding teams (e.g., by holding utility stakeholder meetings or even starting some relocation work early when it is clear that the relocation work would otherwise jeopardize the project schedule if left to start at the time of project award).

In reality, Alberta Transportation is able to determine actual utility relocation costs only in the case of DBB projects. For DB and DBFO projects, utility relocation costs are typically buried in the overall bid prices. Alberta Transportation officials suspect that bidders inflate their bids with contingency allocations because it is not possible for bidders to advance their designs far enough during the bid stage, which, in turn, forces utility companies to provide conservative utility relocation cost estimates. The department accepts this additional cost as a reasonable premium to pay to transfer the utility relocation risks to the contractor.

In Ontario, MTO has relatively limited experience with alternative project delivery methods. Highway 407ETR is the only example of a finance-operate model, and only a few smaller contracts have followed the DB model. In cases in which MTO has used an alternative project delivery method, it has retained responsibility for the right-of-way acquisition process because it could not extend expropriation powers to the private partner.

In recent years, developers have built a number of transportation structures in Ontario, particularly interchanges. In this case, the developer is responsible for everything, including right-of-way acquisition, utility relocations, design, and construction. MTO provides oversight at every step to ensure the developer complies with appropriate MTO standards and specifications. At the end of the project, MTO takes ownership. As part of the agreement, MTO charges an upfront fee to cover anticipated operation and maintenance costs of the new

facility. The fee is based on a life-cycle cost analysis. On occasion, developers have agreements with local municipalities in which the municipalities agree to assume responsibility for maintaining the facility. In this case, MTO considers both options, always ensuring a cost-neutral situation for the ministry.

Training and Professional Development

In general, training and professional development takes place at the project level. Requirements and programs vary, but all the agencies visited place a strong emphasis on training, professional development, and continuing education.

In Australia, several universities offer formal educational programs for property valuers. A typical full-time, 3-year program offers a degree with a major in property. Coursework usually covers areas such as accounting, construction, property valuation, contract law, statistics, business finance, marketing, geographic information systems (GIS), property economics, property law, planning and environmental law, and property and asset management. Valuers have the opportunity to become members of the Australian Property Institute. In New South Wales, valuers must be registered with the Office of Fair Trading before undertaking valuation work. Other Australian states do not have similar licensing or registration requirements.

In New South Wales, the NSW Streets Opening Conference sponsored the development of a pilot training course for transportation and utility personnel involved in locating utility facilities in the field. The focus of the course was to increase awareness and provide basic information about the different types of utility infrastructure within the road reserve. The course includes several modules, one for each type of utility (e.g., water, electric, communications, and so on), and includes descriptions of commonly used utility features as well as sample pictures and corresponding drawing symbols. The material also includes tips on how to read and understand record plans. The training course will provide the foundation for a formal accreditation process for utility location services.

Through VicRoads International, VicRoads has an active presence abroad. VRI is a commercial arm of VicRoads that provides export opportunities for Victoria's practices and technology by leveraging VicRoads' technical

support and knowledge base. VRI works with Australian and international business partners to export its road-related consultancy services. VRI has delivered project management and consultancy services in more than 25 countries across numerous project disciplines. An integral component of the VRI program is to provide staff members with the opportunity to travel and work abroad, which in the long term benefits VicRoads because it promotes personal growth and professional development. Staff members who participate in the program usually report high levels of personal satisfaction. VicRoads also promotes its presence abroad as a recruitment strategy.

In Alberta, Alberta Transportation outsources most work, including right-of-way acquisition and utility coordination. However, the agency is revisiting its 100 percent commitment to outsourcing. Alberta Transportation property agents are required to have the Accredited Appraiser Canadian Institute (AACI) designation with the Appraisal Institute of Canada (AIC) or Senior Right-of-Way Agent (SR/WA) designation with the International Right of Way Association (IRWA) and be members of either association. Department staff members attend the annual Alberta Expropriation Conference and semiannual partnering conferences with consultant land agents and engineering consultants.

Most employees at Alberta Infrastructure's Realty Services are also members of AIC or IRWA. Realty Services is a corporate member of the Alberta Expropriation Association. To promote the government as an employer of choice for right-of-way professionals, a member of the Land Process Management Committee (LPMC) (a cross-departmental committee with members from both Alberta Transportation and Alberta Infrastructure) gives annual presentations at institutions such as Olds College (which has a 2-year program to train land agents).

In Ontario, MTO outsources much of its work, except right-of-way acquisition, although some regional offices prepare some appraisals. Similar to Alberta Transportation, MTO has begun to do more work internally to develop in-house expertise to address needs such as succession planning, the ability to provide needed services, and the management of services that continue to be outsourced. Retention and professional development opportunities at MTO include flexibility and training, usually through outside sources such as professional organizations (e.g., AIC or IRWA).

CHAPTER 3 | Right-of-Way Acquisition and Property Management

Right-of-Way Acquisition

In Australia, the road reserve includes the land occupied by the road as well as the roadside that extends to the adjacent property lines. The concepts of road reserve and road right-of-way (as applied in the United States) have many similarities. However, the treatment of the road reserve in Australian legislation historically has been stronger and more centralized than the treatment of the right-of-way in the United States, which has implications for the application of practices and strategies related to transportation planning and asset management. Australian states have also benefited from the application of more centralized land use practices as well as high-level planning and land title registration offices that work with ministries of transportation and other state agencies to provide orderly, coordinated land use planning.

In Canada, right-of-way acquisition and management practices tend to be more similar to those in the United States. In both Alberta and Ontario, however, the provincial transportation departments have the power to regulate not just access to the road right-of-way but also development on adjacent land, more specifically by regulating minimum setbacks for buildings and other structures to help preserve corridors in case the road ever needs expansion.

Both Australia and Canada place strong emphasis on preservation of future corridors, as well as on preservation of current corridors for future use.

Australia—New South Wales

In New South Wales, all property acquisitions by local councils or state government agencies, including RTA, are governed by the Land Acquisition (Just Terms Compensation) Act 1991 (LAJTCA).⁽¹³⁾ In New South Wales, RTA owns freeways and toll roads. The rest of the transportation network is vested in local councils, although RTA is responsible for road maintenance (i.e., from curb to curb) on these corridors. The Sydney region has 40 local councils. The Roads Act 1993⁽¹⁴⁾ enables RTA to acquire property in accordance with LAJTCA provisions.

Properties required for RTA road construction are acquired in the name of the Roads and Traffic Authority of New South Wales on titles registered at the NSW Department of Lands,⁽¹⁵⁾ which is the largest centralized land title registry in Australia. Most land titles in Australia are Torrens titles, which are based on registered plans that define the boundaries of each land parcel. For each land parcel registered, the Department of Lands issues a certificate of title to provide proof of ownership. A very small proportion of land in New South Wales is still owned under the common law deed-based system used before the introduction of the Torrens system in 1863. The department is converting those remaining parcels to the Torrens system.

LAJTCA encourages acquisition by negotiated purchase, similar to buying a property on the open market, rather than by compulsory acquisition. For RTA-initiated acquisitions, RTA prepares a letter advising property owners that a valuer representing RTA will value their property for the purpose of submitting a formal offer for the owners' consideration.⁽¹⁶⁾ The letter also invites property owners to submit an asking price and specifies the maximum amount that RTA will reimburse property owners if they engage the services of registered valuers (i.e., registered appraisers).

Despite the additional cost, RTA has found the practice of engaging registered valuers effective in facilitating the acquisition process. In general, after the RTA appraiser prepares an evaluation report, RTA submits an offer to the property owner. If the property owner asks for a copy of the evaluation report, RTA indicates its willingness to exchange evaluation reports. This practice further encourages property owners to engage the services of registered valuers.

Before March 2006, the NSW Department of Planning acquired vacant land reserved for county roads and held that land until it was transferred to RTA at the time of construction. The process under LAJTCA is different. Owners of land or improved property reserved for county roads can have their property acquired ahead of road

construction only if the owners can demonstrate that hardship conditions apply. For RTA-initiated acquisitions, RTA typically starts the purchase of land when the project enters the design phase.

Frequently, corridor preservation strategies are not feasible because of the high costs associated with right-of-way acquisitions. In the Sydney area, only about 50 percent of a typical project budget actually goes to the road itself, 20 to 30 percent of the total budget goes to right-of-way acquisition, and the remaining percentage goes to utility relocation. RTA engages registered valuers early in the project development process to develop preliminary property acquisition cost estimates.

RTA frequently signs lease agreements with property owners while the acquisition process continues to provide early right of entry to the property and reduce delay in construction timing. In practice, most owners do not negotiate the rental fee and simply accept what RTA proposes.

While negotiations with an owner take place, RTA develops a parallel compulsory acquisition time line to make sure the land is acquired by the anticipated road construction contract date. Compulsory acquisition follows a well-established protocol that includes publication in the *NSW Government Gazette*, a valuation by the NSW Office of the Valuer General, and other steps to ensure compliance with LAJTCA. (The Office of the Valuer General, under the Department of Lands, has statutory responsibility for providing land valuations for rating and taxing purposes, as well as determining compensation following compulsory acquisition.^(17,18) Related Department of Lands offices are the Office of the Surveyor General, responsible for official surveying and cadastral and topographic mapping, and the Office of the Registrar General, responsible for registration of plans and land titles.) Gazettal of compulsory acquisition gives legal title to RTA (therefore converting the former owner's interest in the land to an entitlement to compensation), but not possession. Possession takes place after LAJTCA processes have been completed, usually about 120 days after gazettal. In general, property owners have 90 days to accept the amount of compensation or file an objection with the NSW Land and Environment Court.

Australia—Queensland

Under the Transport Planning and Coordination Act 1994,⁽¹⁹⁾ Main Roads has the power to acquire land for

transportation infrastructure purposes. Other enabling pieces of legislation include the Transport Infrastructure Act 1994,⁽²⁰⁾ the Integrated Planning Act 1997,⁽²¹⁾ the Land Act 1994,⁽²²⁾ and the Acquisition of Land Act 1967.⁽²³⁾ The Transport Infrastructure Act 1994 enables Main Roads to, among other functions, declare state-controlled roads, regulate other parties that wish to conduct construction work or otherwise interfere with state-controlled roads, and manage access of utility facilities within those roads.

In Queensland, the Department of Natural Resources, Mines, and Water administers all state land and acts as owner of the land. Following the Land Act 1994, the department vests dedicated roads (by gazettal) to local governments, although dedicated roads may also be declared state-controlled roads by Main Roads.

The property acquisition process is similar to other Australian states. Consultation with landowners starts early once the preferred route is identified. Main Roads officials attend community consultation with project engineers to identify and overcome issues that may delay the property acquisition process. Main Roads acquires land either through a "voluntary purchase" or through a "resumption" process. Main Roads uses the voluntary purchase option for early acquisitions of property, mainly in cases of owner hardship or when it is advantageous to the state (e.g., for corridor preservation purposes). The resumption process includes serving a "Notice of Intention to Resume" to property owners and executing a series of steps that end with the land becoming the property of the Crown (which takes place after an appropriate notice is published in the *Government Gazette*), the interest of the owner becoming a right to claim compensation, and the previous owner receiving compensation.

In general, the compensation basis is an independent valuation of the property's market value that Main Roads obtains at the date of gazette (although Main Roads reimburses property owners reasonable fees for the services of registered valuers and legal counsel). Main Roads also has the ability to issue an advance payment against compensation. Main Roads also includes allowances for costs such as relocation costs, redirection and reconnection of utility services, and costs associated with the purchase of replacement property (such as conveyance, surveying, and building inspection). Main Roads does not reimburse for the services of consultants that help the property owner object to a project.

Main Roads does not have the ability to use incentives (only market value and items such as disturbance are allowed) or “solatium” (i.e., the determination of intangible and any nonmonetary disadvantages resulting from the acquisition, which is common in other Australian states). Recently Main Roads attempted to change the Acquisition of Land Act 1967 to allow for solatium, but was unsuccessful.

Main Roads’ Property Services office acquires all property required for road purposes throughout Queensland. In this capacity, the Property Services office acquires land on behalf of agencies such as Queensland Transport, TransLink, Brisbane City Council, and Airport Link and Northern Busway.

Australia—South Australia

The Highways Act 1926 gives DTEI the authority to acquire property needed for road projects.^(24,25) The act also enables DTEI to acquire land in excess of the requirement as the commissioner of highways deems expedient and as approved by the minister. The Land Acquisition Act 1969 contains provisions for the acquisition of property, including compulsory acquisition.⁽²⁶⁾ In general, DTEI prefers negotiated purchases to compulsory acquisitions.

Acquisition by negotiated purchase can occur during early planning phases or after an approved alignment has been announced. As figure 10 (see next page) shows, during the early planning phases of a project, DTEI may agree to a property purchase when property owners have difficulty selling their property in the open market. In practice, DTEI has a large number of properties it acquires and needs to manage and maintain for a long time in anticipation of future transportation projects.

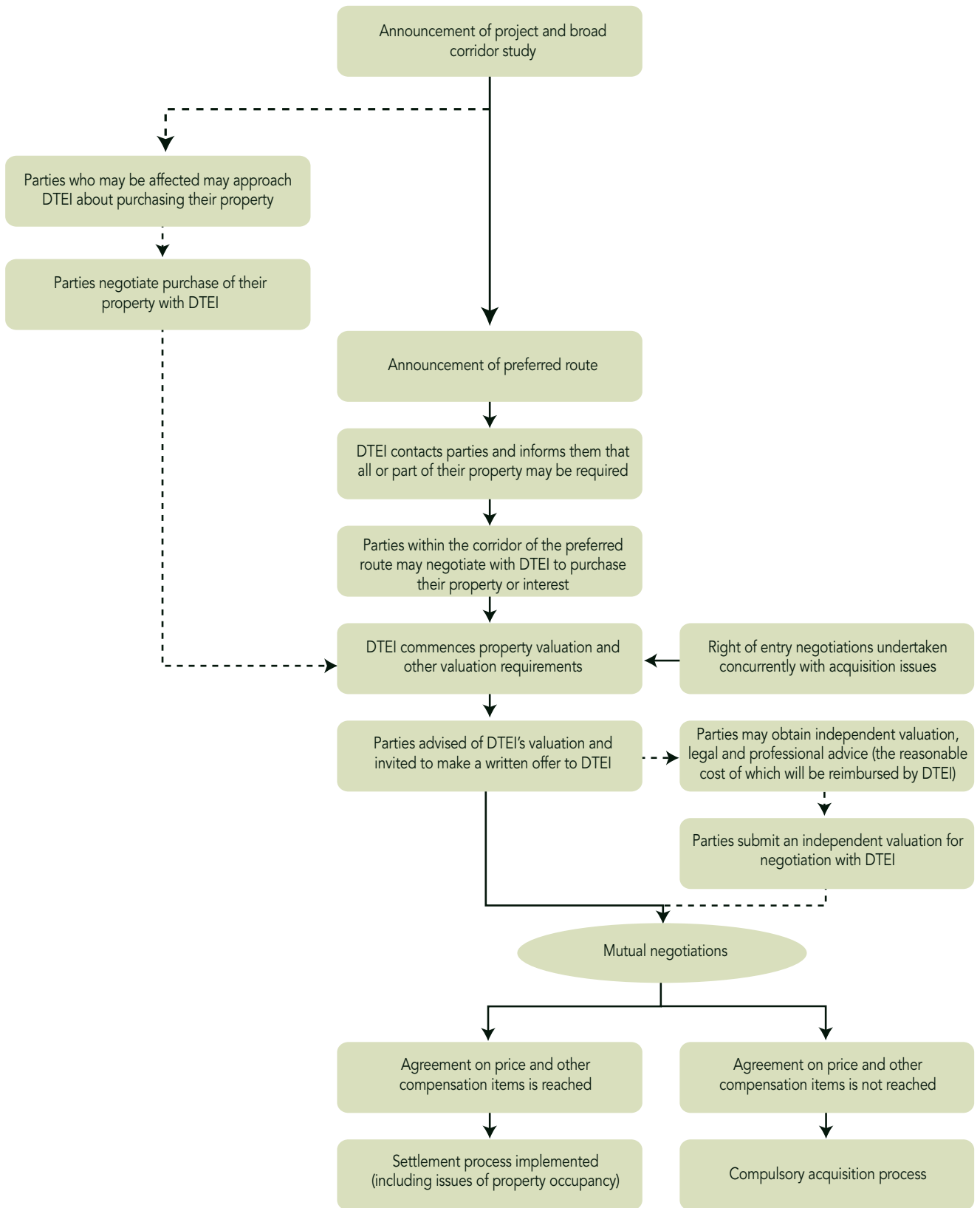
A tool for corridor preservation in South Australia is the Metropolitan Adelaide Road Widening Plan Act 1972.⁽²⁷⁾ This act requires the commissioner of highways to prepare a plan called the Metropolitan Adelaide Road Widening Plan (which identifies corridors for future transportation expansion and may be subject to revision from time to time) and to file this plan with the Registrar General of Deeds in the General Registry Office. The act also gives the commissioner the power to approve certain types of building work on the land shown on the plan as possibly required for road expansion and all land within 6 meters (m) (about 20 feet (ft)) of the boundary of that land. All real estate transactions on those corridors have a note on the title certificate about the future use of the corridor.

One provision in the Land Acquisition Act 1969 is that it is necessary to give a notice of intention to acquire land to each person whose interest in the land is subject to acquisition. To this effect, DTEI asks the registered owner of a property to identify anyone else who has an interest in the property but whose name does not appear on the title certificate (e.g., a lessee, an equitable owner, a holder of an encumbrance or a lien, a mortgagee, or a business operator). Each party must be compensated individually. Part of the process of interacting with each property interest holder is taking into consideration the need to preserve basic services to the community. As an illustration, DTEI officials mentioned the case of a surgeon’s practice, in which DTEI made sure the surgeon’s offices were completely relocated over a weekend to ensure the surgeon’s ability to see patients at the new location on Monday morning. Each affected party is entitled to engage an appraiser to provide a valuation. DTEI reimburses reasonable costs of obtaining the independent advice. DTEI advises appraisers to discuss their proposed charges with DTEI before carrying out the valuation. Accompanying the notice of intention is a request that the parties grant DTEI the right to enter the property to conduct preliminary activities such as surveying, soil testing, and evaluation of utility facilities.

DTEI’s compulsory acquisition process can take months to years, depending on the situation and whether the standard or accelerated process is followed. With the standard process, it can take about 14 months for DTEI to obtain the right of entry to the property (negotiations on compensation can continue until settlement). With the accelerated process, the parties agree to waive the right for detailed information about the project and the right to object to the acquisition, which can result in the property owner granting DTEI right of entry to the property in about 6 weeks. In addition, settlement and compensation can occur in less than 6 months.

DTEI has also implemented a number of acquisition incentives, including the following:

- Exchange of surplus property for required property
- In-kind compensation, such as completing some work on the remainder (e.g., building a dam for a landowner with the same value as the property being acquired) or offering land at a different location (provided that land is not used for transportation purposes)
- Inclusion of caveats in the certificate of title after the



COURTESY OF DTEI

Figure 10. DTEI's property acquisition process by negotiated purchase.⁽²⁴⁾

notice of intention to prevent additional transactions without the knowledge and permission of DTEI

implementation of clearways (i.e., clear zones) on declared arterial roads.

Australia—Victoria

In Victoria, two critical pieces of legislation are the Road Management Act 2004^(28,29) and the Land Acquisition and Compensation Act 1986.⁽³⁰⁾ The Road Management Act 2004 established a new statutory framework for managing the road network that took into consideration various road reserve uses, including roadways, pathways, and other types of infrastructure. The act outlined rights and duties of road users; defined roles, functions, and powers of a road authority; required development of codes of practice to provide practical guidance on road management; and provided a new process for declaring and classifying roads and reallocating management responsibility for roads.

The Land Acquisition and Compensation Act 1986 established a framework for acquiring land by authorities that, through special acts, have acquisition powers. VicRoads and utilities are “authorities” and can acquire interests in property. Through acts of parliament, privately held utilities have similar powers. In general, for land acquisition to occur, the land must be reserved for a public purpose. Project-specific legislation has also provided a short-cut process that facilitates development of a project framework in situations in which several local jurisdictions and agencies are involved and it is important to outline the roles, rights, and responsibilities of each. VicRoads has used this mechanism to facilitate development of projects such as the EastLink Project and the Melbourne CityLink Project.⁽²⁸⁾ Lands in Victoria are registered with the Registrar of Titles.⁽³¹⁾ This office records property ownership changes, mortgages, property transactions, and new subdivisions.

The Road Management Act 2004 mandated the establishment of codes of practice to provide practical guidance on road management. The following codes of practice have been developed through a process of public consultation:⁽²⁹⁾

- The **Code of Practice for Operational Responsibility for Public Roads** provides guidance on determining the physical limits of operational responsibility among road authorities for the different elements in the road reserve.
- The **Code of Practice for Clearways on Declared Arterial Roads** provides guidance on establishing management and consultation processes for

- The **Code of Practice for Road Management Plans** provides guidance on developing a management plan for inspecting, maintaining, and repairing public roads.
- The **Code of Practice for Management of Infrastructure in Road Reserves** provides guidance to road authorities, utilities, and public transportation providers on planning and managing their infrastructure in road reserves.
- The **Code of Practice for Worksite Safety–Traffic Management** provides guidance on conducting, or proposing to conduct, road works in Victoria.

One provision in the Land Acquisition and Compensation Act 1986 is the need (with some exceptions) to give a notice of intention to acquire land to each person whose interest in the land is subject to acquisition. The act also requires filing the notice of intention with the Registrar of Titles. In turn, the Registrar of Titles must make a recording of the notice in the register and make the notice of intention available for inspection.

Serving the notice of intention to acquire property and registering the notice with the Registrar of Titles enables the coordinating road authority to control any type of development that might negatively affect that authority's ability to acquire the property. For example, any agency processing planning permits or building permits that relate to land on which a notice of intention to acquire has been served must forward a copy of the application to the coordinating road authority. Likewise, the road authority has the capability to consent to any transaction or improvement affecting the property in question (in fact, the Registrar of Titles must notify the road authority of any documents filed that pertain to that property).

Although road reserves are identified early in the planning process using public acquisition overlays, there is no legislation locking the land use. As a result, when VicRoads acquires property, it needs to do so at the conditions prevalent at the time of purchase. If the property owner is the same from the original public acquisition overlay, a provision allows compensation for the loss of the ability to develop the land. Victoria does not have laws in place requiring compensation for impacts

caused by highway projects to property not acquired, such as noise, business interruption, access denial, and construction inconvenience. In addition, VicRoads does not use incentives other than the acquisition price (and compensation for professional representation). The only mechanism to provide more compensation (up to 10 percent of market value) is solatium (i.e., the determination of intangible and any nonmonetary disadvantages resulting from the acquisition).

In Victoria, when the market value of the land or the combined value of two or more properties, parcels, allotments, or titles is less than Au\$250,000, it is mandatory to obtain one valuation, which could be from the Valuer General or a valuer who is a member of the Valuer General Valuation Services Panel.^(32,33) If the value is between Au\$250,000 and Au\$500,000, a valuation from the Valuer General is mandatory. A second valuation, which is optional, must be from a valuer who is a member of the Valuer General Valuation Services Panel. If the value is greater than Au\$500,000, two valuations are mandatory, one from the Valuer General and a second from a valuer who belongs to the Valuer General Valuation Services Panel. A second valuation is not mandatory when the transaction involves another state agency.

On a project-by-project basis, VicRoads used to purchase property with suitable habitats to replace losses resulting from projects (i.e., lose x and replace with x). Now, VicRoads has expanded the practice to include replacing x with $x + y$. Compulsory acquisition does not apply to this type of property acquisition.

Canada—Alberta

The Expropriation Act⁽³⁴⁾ covers the acquisition of private land for public works in Alberta, except in the case of acquisitions made by the federal government. The act sets out principles and procedures, including owner objection and appeal rights, as well as the determination of fair compensation, which includes both property market value and damages. The act also recognizes the owner's right to obtain (and receive compensation for reasonable costs related to) independent legal, appraisal, and other professional advice throughout the acquisition process. Alberta Transportation does not use signing bonuses or other incentives, but it has some flexibility on damage identification.

In addition, Alberta Transportation has established a minimum agreement value of Can\$500, which is used

for small partial purchases, such as corner cutoffs for intersection improvements. Land exchanges occur at the request of the landowner when and if an equitable parcel is available. Leasebacks may also be considered as part of the negotiation for a preferred or nominal compensation rate for demonstrated losses related to the sale. When only a partial purchase is necessary, it is possible to acquire a larger portion or even the entire parcel if a landowner requests it and appropriate justification exists.

Before any expropriation starts, an attempt must be made to acquire the property through negotiation. If negotiations break down but the only obstacle to entering into a voluntary agreement is market value compensation, Alberta Transportation offers the property owner the opportunity to enter into a voluntary expropriation under Section 30 of the Expropriation Act, which gives the landowner the right to make a further claim for compensation before the Land Compensation Board. At this point, the department gains possession of the land and the project can proceed. If these negotiations do not resolve the landowner's issues, the department considers an involuntary expropriation under Section 8 of the Expropriation Act. A minimum of 9 months is normally required to secure right-of-way when using a Section 8 expropriation.

In the case of roads on public lands (60 percent of the land in the province is Crown land), it is necessary to request a provisional roadway reservation from Alberta Sustainable Resource Development (ASRD), the agency responsible for managing all public lands in the province.

The acquisition of property for highway projects actually starts with project identification through a regional priority list and the results of a functional planning study, which includes meetings with and feedback from landowners. Once the project is selected, an independent appraiser is contracted to perform a project appraisal to determine the market value of the lands in the project.

One problem with the traditional approach to project selection is that some projects either never make it to the priority list or take a long time to be included. To address this limitation, Alberta Transportation is developing a new project selection process that involves the use of various asset management systems to project future highway, pavement, and bridge asset conditions. Through technical and safety ratings, projects will be identified for assignment to preliminary engineering and scope of work

well in advance of construction. High-risk projects will be identified for further consideration to ensure high-risk items are addressed as early as possible. With this new approach, Alberta Transportation will be able to start acquiring land for projects when the planning process is finished (i.e., well in advance of the design phase).

Alberta Transportation has experimented with a variety of property-related approaches to environmental mitigation, including the following:

- Compensation pooling (i.e., using one compensation project to offset the impacts of several projects)
- Compensation banking (developing a formal process to bank credits from habitat creation or restoration works to offset losses on other projects)
- Agreements with external agencies to develop and maintain habitat compensation
- Agreements with individual landowners to accept and maintain a transplanted vegetation community
- Agreements with municipalities to incorporate a fishway into the municipal water supply weir to compensate for fish habitat losses associated with a reservoir development
- Purchase of flood easements from landowners to compensate for increased flooding of their land because of increase in stream flow

In the case of acquisition of parcels containing contaminated or hazardous materials, Alberta Transportation attempts to gather as much information as possible during the project development phase. On occasion, it is possible to change the road alignment to avoid contaminated sites. In other cases, the task is to determine the most effective strategy to address the contamination, including remediation before construction, remediation during construction, and risk management. Environmental impacts related to utility relocations are rarely considered during the project development phase. In general, the policy is that utility companies are responsible for addressing any environmental issues that arise on the relocation of their facilities.

Under the Highways Development and Protection Act,⁽³⁵⁾ Alberta Transportation has the power to regulate access to the road right-of-way as well as development on adjacent land. One reason for this power is so Alberta Transportation can regulate building setbacks if the road ever needs expansion, preventing the agency from having to pay for unnecessary costly improvements. The extent of the land under regulation varies depending on the road

type. For example, according to a regulation now under development, the extent of land under regulation will be 150 m (492 ft) from the right-of-way line for minor provincial highways and 300 m (984 ft) from the right-of-way line for multilane provincial highways.⁽³⁶⁾

The Government Organization Act⁽³⁷⁾ enabled the establishment of restricted development areas (RDAs) to coordinate and regulate the development and use of certain areas in Alberta. The Calgary RDA⁽³⁸⁾ and the Edmonton RDA⁽³⁹⁾ are of particular interest because of the designation of TUCs within those RDAs.⁽⁴⁰⁾ Figure 11 shows the Calgary TUC and figure 12 (see next page) shows the Edmonton TUC.

Figure 13 (see next page) shows a typical TUC cross section, which illustrates some of the various land uses recognized by the regulation, including the following:

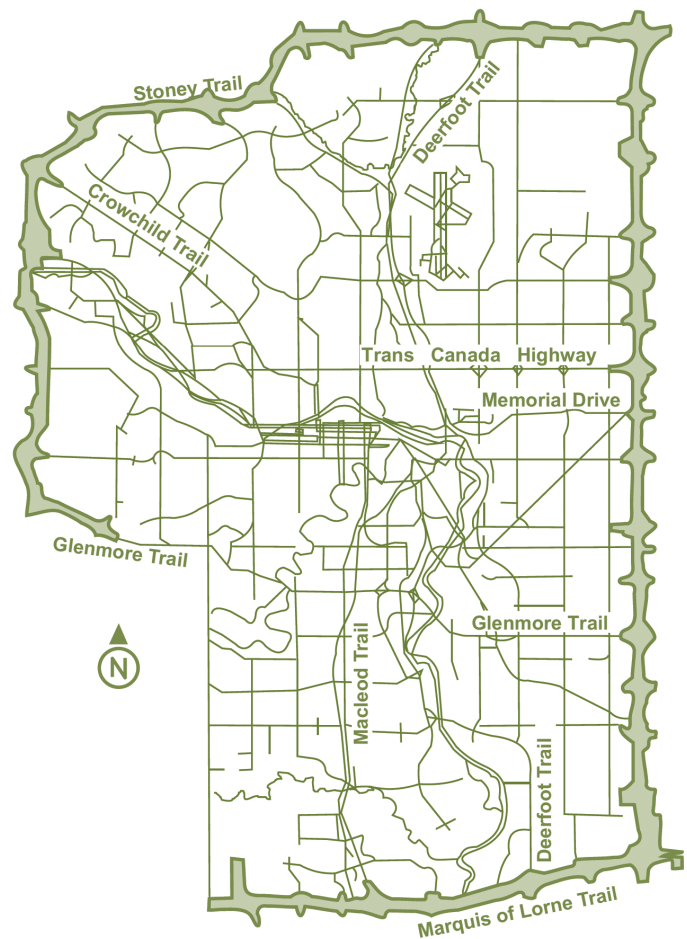


Figure 11. Calgary TUC.⁽⁴⁰⁾

NOTE: The TUC is the outer corridor between the thick right-of-way lines. The southwest TUC right-of-way is incomplete because of pending negotiations with a local tribe.

- Primary uses (i.e., roads, major utilities, and municipal services)
- Secondary uses (e.g., reestablished agricultural use, parking, and limited recreation activities)
- Original uses (e.g., agricultural leases, original farmsteads, and sand and gravel mining)

The RDA regulations require ministerial consent to allow any surface disturbance within the RDA boundaries. A restricted development area caveat is also placed on each title within the boundaries of the TUC, regardless of whether the land is privately or publicly owned (most of the land within the TUCs is provincial Crown land). Road allowances and road plans within the TUC, which lie under the jurisdiction of Calgary or Edmonton, are similarly bound by the regulations. The regulations also prevent any other provincial government department or quasigovernmental organization from issuing approvals for disturbances within the TUC without prior consent.

Canada—Ontario

Two important pieces of legislation in Ontario are the Public Transportation and Highway Improvement Act⁽⁴²⁾ and the Expropriations Act.⁽⁴³⁾ Following the Expropriations Act, allowable compensation to an owner includes the current market value of the land (i.e., without including any change in value resulting from the development or imminence of development), damages attributable to disturbance, damages for injurious affection (i.e., impact on neighboring land as a result of the project), any special relocation difficulties, and business losses. Business losses are not determined until the business has moved and been in operation for 6 months or until a 3-year period has elapsed, whichever occurs first. MTO also reimburses for reasonable costs, including appraisal, engineering reports, and planning reports. MTO estimates the total impact of these fees at about 15 percent of the total cost of the property.

COURTESY OF ALBERTA INFRASTRUCTURE

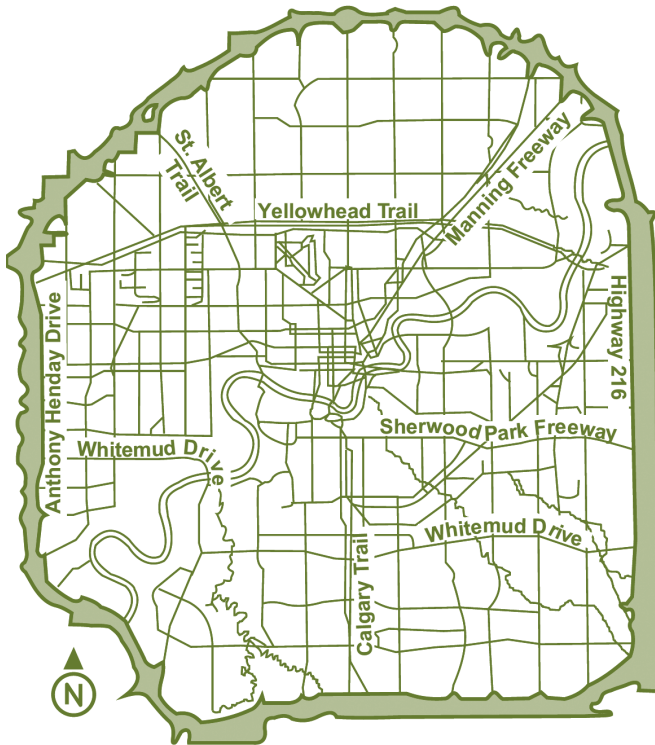


Figure 12. Edmonton TUC.⁽⁴⁰⁾

NOTE: The TUC is the outer corridor between the thick right-of-way lines.

COURTESY OF ALBERTA INFRASTRUCTURE

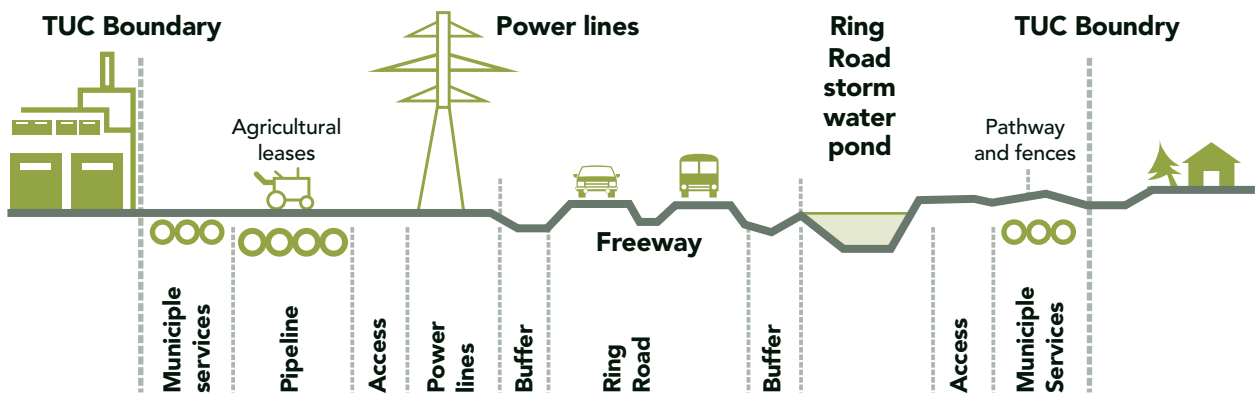


Figure 13. Typical TUC cross section.⁽⁴¹⁾

MTO is beginning to experiment with various incentives to encourage property owners to complete the acquisition process quickly, such as the following:⁽⁴⁴⁾

- **Inconvenience allowance.** This allowance is for property owners who accept an agreement before expropriation to speed up and simplify the acquisition process.
- **Bonus.** This allowance is for property owners who agree to sell their property earlier (e.g., Can\$1,000 if the owner agrees to sell within 30 days, Can\$500 if the owner agrees to sell within 45 days, and so on). Another incentive is a signing bonus based on the property value: 25 percent of the offer for acquisitions under Can\$10,000, a sliding scale for acquisitions between Can\$10,000 and Can\$1 million, and Can\$50,000 for acquisitions over \$1 million.

Along with the offer, MTO shares the appraisal report with the property owner. For high-value properties, MTO uses two or more appraisals. Appraisers are not involved in the negotiations. All appraisers are fee appraisers. In general, MTO serves notifications to each individual or party with an interest in a property.

Although MTO acquires most properties after the planning or preliminary design phase is completed to ensure certainty on which properties are affected, MTO can make advance purchases in owner hardship situations (in this case the owner typically initiates the transaction) or if the need is critical (in this case MTO typically initiates the transaction). In general, the expropriation tool is not available to MTO until the environmental process has ended.

MTO acquires property either by deed (i.e., amicably, which is the preferred approach) or by expropriation. Purchases by deed can take from 1 day to 9 months, depending on the nature of the property being acquired. Expropriations can take an additional 7 to 10 months. When an owner consents to the acquisition but not to the price, MTO purchases the property by deed at the price that MTO has offered. The former owner then has the right to appear before the Ontario Municipal Board to claim additional compensation within a 2-year period.

Under the Planning Act,⁽⁴⁵⁾ MTO has the power to regulate access to the road right-of-way (i.e., land dedicated to

roadway purposes) and development on adjacent land. As in Alberta, this power enables MTO to regulate building setbacks and utility installations in case the road ever needs expansion, preventing MTO from having to pay for unnecessary costly improvements. Regulation tools at MTO's disposal cover encroachments and utility installations, buildings and land use, signs, and highway access. The minimum setback for new buildings or other structures depends on the road type and proposed development. On controlled-access highways, for example, the control area within which all development is subject to permit requirements from the ministry is 45 m (148 ft) from the right-of-way. This permit area extends up to 395 m (1,296 ft) at interchanges. Detailed information about setback requirements and specific regulatory procedures is included in the *MTO Corridor Control and Permit Procedures Manual*.⁽⁴⁶⁾

Property and Right-of-Way Data Management

In New South Wales, RTA holds about 51,000 parcels of land in its Property Information Management System (PIMS). RTA is in the process of migrating this system to a GIS-based architecture. Property required for RTA road construction is acquired in the name of the Roads and Traffic Authority of New South Wales on titles registered at the NSW Department of Lands,⁽¹⁵⁾ the largest centralized land title registry in Australia. Most land titles in Australia are Torrens titles, which are based on registered plans that define the boundaries of each land parcel. For each land parcel registered, the Department of Lands issues a certificate of title to provide proof of ownership. A very small proportion of land in New South Wales is still owned under the common law deed-based system used before the introduction of the Torrens system in 1863. The department is converting those remaining parcels to the Torrens system.

In Queensland, Main Roads holds about 3,100 properties for future infrastructure projects, of which 1,000 properties are now rented. Main Roads is responsible for any property taxes on those properties. In some cases, the rent collected does not match the amount of property tax paid. However, clearing the land ahead of the transportation project is not always feasible because it would prevent neighbors from objecting to the transportation project. Main Roads owns a limited number of billboards. However, the agency does not normally rent billboards because of traffic safety considerations.

Although not related to property management, an electronic Development Application Management (eDAM) application is under development at Main Roads as a mechanism to automate the permitting process for urban developments. eDAM will receive development applications through a Web-based application (called Smart eDA) that the Department of Planning and Infrastructure developed to help the referral and permitting process in the state (the land development process now involves up to 14 agencies). The driving force behind Smart eDA and eDAM is the need to eliminate paperwork, facilitate communications between applicants and managers, and standardize the submission process. Main Roads is including a GIS interface. The interface includes dates such as date received and due date, which are state mandated. It also includes forms and supporting documentation. For electronic upload of documents, eDAM will rely on Smart eDA, which encourages applicants to submit files in PDF format (although the protocol also supports sending documentation by regular mail).

Main Roads has about Au\$23 million in excess property. According to the Acquisition of Land Act 1967, if resumed

property is no longer required for road purposes in 7 years, Main Roads must offer it back to the former owner at market value. If this is not feasible, Main Roads first offers the property to other government agencies (at market value) and then, if needed, sells the property by public auction or tender. In certain circumstances, it is possible to bypass the public auction requirement (e.g., in cases in which the property is of use only to an adjoining owner, a purchaser offers a premium price related to the intended use of the land, or special environmental, planning, or economic reasons exist).

In South Australia, DTEI has a GIS application that depicts the location and potential land affected by future corridors. In Victoria, VicRoads uses several systems to manage properties, including the GIS-based VISTA system. VISTA shows parcels being acquired in different colors as the acquisition process moves along, as well as properties VicRoads has had for a long time (figure 14). Parcel features in the system are time stamped and can be queried, which enables VicRoads to examine and overlay the history of parcel acquisitions going back to previous owners. The system also shows survey plans.

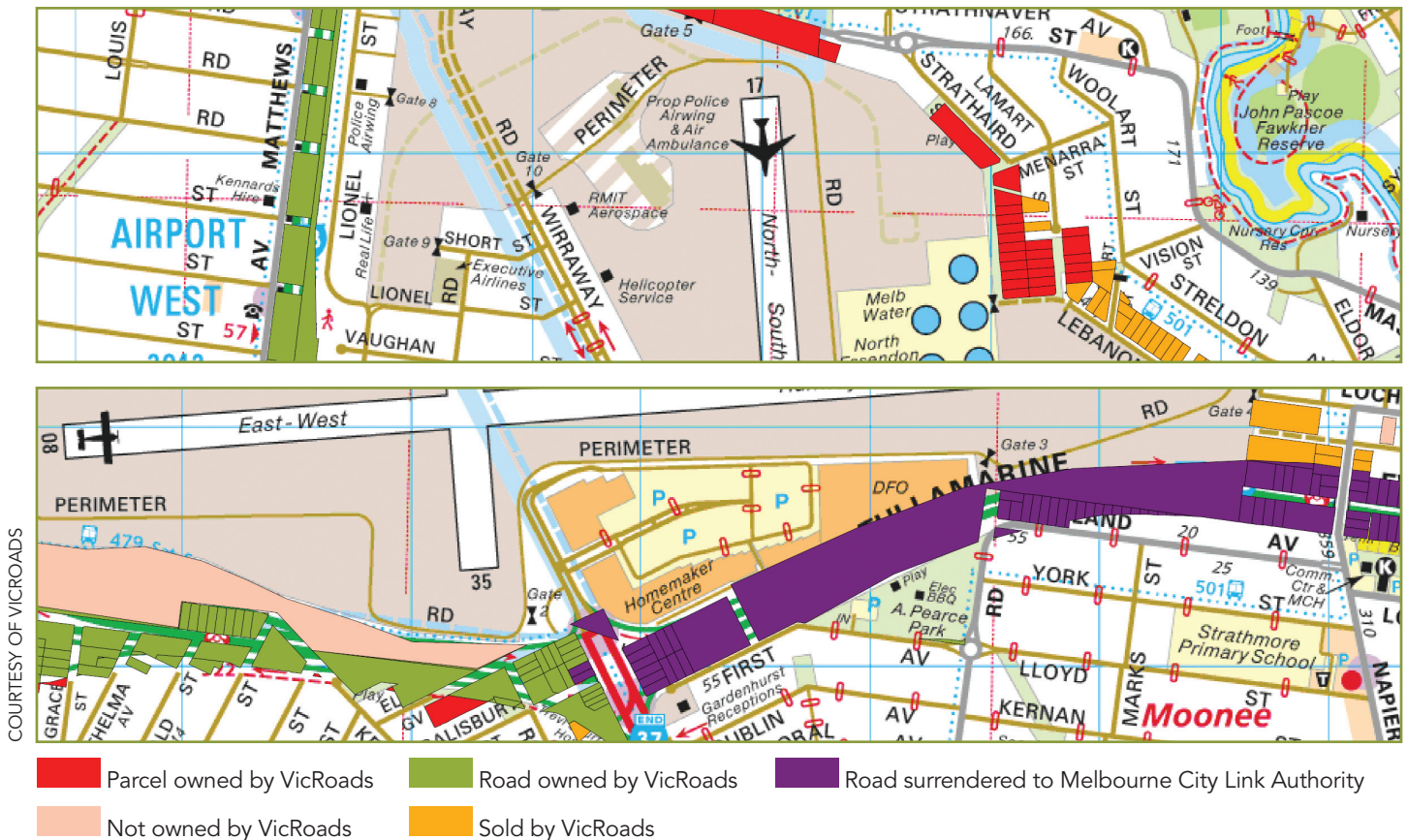


Figure 14. VicRoads GIS representation of parcels.

For faster rendering on user interfaces, the background layer is an image mashup that includes a number of layers of interest, such as roads, rivers, landmarks, and general parcel boundaries from the Registrar of Titles. VicRoads has also scanned all of the titles the agency had ever acquired.

The use of georeferenced data starts early with the identification of the road reserve (and corresponding registration with the Registrar of Titles) and the production during the planning process of public acquisition overlays that illustrate the extent of the road reserve in relation to existing parcels in the general vicinity of the project (figure 15).

In Victoria, VicRoads' property services office manages leases, licenses, and property sales. Victorian law requires property sales to be at market value, even among public agencies, although on occasion a property needs to be released at a lower value (e.g., because of zoning considerations). In general, VicRoads prefers licenses to leases because leases involve some assumption of exclusivity. On occasion, VicRoads receives requests to lease small sections of property, particularly from telecommunication providers. VicRoads' preference is to lease entire properties. Leases and licenses are also executed at market value. Revenue from leases goes to the general fund. VicRoads inspects residential properties every 6 months and other properties every year. In general, VicRoads owns property in fee simple, including the air space.

Victoria's Department of Sustainability and Environment is developing a GIS-based system that will show all government-owned properties. This system will enable government agencies to view what properties Victoria owns.

In Alberta, Alberta Infrastructure maintains a system called the Building and Land Inventory Management System (BLIMS), which records lands leased by or titled to the department. Examples of data captured in this system include location, legal description, acreage, improvements, sale or purchase price, ongoing rights or obligations associated with the land, leases, and acquisition or surplus file numbers. Alberta Infrastructure also uses a Web-based mapping application that identifies properties owned or leased by the agency. Alberta Transportation maintains a land automated information system (LAIS), which keeps track of inventory and status of properties acquired for Alberta Transportation projects.



COURTESY OF VICROADS

Figure 15. Sample public acquisition overlay showing proposed road reserve.

Alberta Infrastructure's Realty Services manages marketable excess properties from Alberta Transportation and other government departments. Realty Services first circulates properties identified as potentially surplus among province agencies. If no agency is interested, Realty Services requests that the minister of infrastructure declare the land surplus and reviews the property's suitability for affordable housing. If suitable, the property is placed on Alberta Municipal Affairs' affordable housing inventory list. If not suitable, Realty Services offers the property at its appraised value to the municipality where the property is located. If the municipality proposes to use the property in a manner that benefits two or more municipalities, it is possible to sell the land for a nominal sum if approved by the Treasury Board. If the municipality intends to use the property for redevelopment or resale, it must compete with any other interested purchasers through the multiple listing system process. If the municipality declines, Realty Services sells the property on the open market.

Service Alberta is responsible for maintaining land titles and surface and mineral rights in the province. The agency developed a system called the Spatial Information System (SPIN 2), which keeps track of land title data products,

registered survey plans, township images, survey control markers, and soil capability information. BLIMS uses updated information from SPIN 2.

In Ontario, the Ontario Realty Corporation (which reports to the Ministry of Public Infrastructure Renewal) manages the province's real estate portfolio. In general, ministries can dispose of excess property if no other provincial government agency needs the land. The province has a goal of selling properties at fair market value. It is possible to sell at less than fair market value, but in this case, the agency responsible for the property must pay the difference between the selling price and the estimated market value.

MTO has 7,100 properties in its database, of which 450 properties province wide are leased. MTO also has a cell tower lease program that allows cell towers to be located in the right-of-way. Accommodation of these facilities is by legal agreement, not by permit.

CHAPTER 4 | Utility Relocation and Accommodation

General Observations

In Australia, states normally reimburse utility interests for the relocation of utility facilities (but not for betterments). Historically, most utility owners and operators have been government entities. As a result, it does not really matter who pays for relocation because funding for it comes from the same source. For simplicity, the policy is that the agency responsible for the transportation project that causes the need for the relocation is also responsible for the utility relocation costs. In recent years, the Australian utility industry has undergone deregulation, with a large percentage of utility interests now in private hands. However, the policy for reimbursing utility relocations continues.

In Canada, reimbursing utility relocation costs is not as common or to the same degree as in Australia. For example, MTO in Ontario reimburses 50 percent of direct utility relocation costs. MTO does not reimburse engineering costs, except in cases in which MTO cancels or postpones the project or a highway design is changed after the original request for relocation. In Alberta, utility companies are generally responsible for utility relocation costs, with the exception of pipelines and low-pressure gas lines.

Laws and regulations at the state level govern the accommodation of most utilities on road reserves in Australia. The exception is telecommunications, which are governed by federal legislation. In general, the federal legislation is weak on the power given to the agencies responsible for the road reserves to regulate the accommodation of telecommunication facilities. As a result, telecommunication providers in most cases do not notify or even consult with the state agencies on the best location for and other characteristics of their proposed installations. State transportation officials indicated that this weakness in federal legislation limits their ability to manage the road reserve effectively.

In Australia, several states are exploring a variety of multilevel MOUs and agreements with utilities to facilitate

the cooperation and coordination process. A multilevel MOU structure typically includes a high-level MOU that sets forth general principles and the intent of both parties to work cooperatively, attachments and other agreements that cover specific topics of interest to both parties, and contract-level details and specific provisions that the higher-level MOU does not address.

Agreements and Cooperation With Utilities

In Australia, several states are exploring a variety of MOUs and agreements with utilities to facilitate the cooperation and coordination process. In a typical situation, a high-level MOU sets forth general principles and the intent of both parties to work cooperatively. This MOU is normally signed by parties at the executive director level. To ensure the MOU is a living document, it may include attachments and other agreements that discuss specific issues, such as standards, specifications, and general procedures for resolving conflicts. Typically, technical personnel from both organizations prepare these documents. There might also be contract-level details and specific provisions that the higher-level MOU, attachments, or agreements do not address.

The multilevel MOU concept is also used in the United States. However, the scan team's impression is that Australian MOUs are more elaborate and stringent than those in the United States. Utility accommodation policies or rules at the State level govern the accommodation of utilities on the State right-of-way in the United States, but a similar concept does not appear to exist in Australia (which could explain in part the need for more comprehensive MOUs). Nonetheless, the study team noticed several advantages in the Australian MOU concept worth considering for implementation in the United States.

Australia—New South Wales

RTA and the Sydney Water Corporation entered into an MOU to establish a framework that covers issues such as cost distribution, information sharing, strategic planning,

project management, and dispute resolution.⁽⁴⁷⁾ The agreement also includes case study scenarios that describe typical situations and provide additional information such as agreement and cost distribution. RTA is also working on a similar MOU with Energy Australia.

The NSW Streets Opening Conference is a voluntary association of member organizations that serves as a focal point for discussing common transportation and utility issues. The organization started in Sydney in 1909 as the Sydney Streets Opening Conference and in 1995 became the NSW Streets Opening Conference. The association's objectives include establishing roadside allocations and recommended practices for providing utility services; fostering coordination; encouraging the use of agreed-on codes and practices for excavation, backfilling, and roadway reconstruction; and minimizing the impact of excavations. Members include utility owners, local government and road authorities, light rail operators, other government agencies, consultants, and other groups interested in utility issues.

Over the years, the NSW Streets Opening Conference has undertaken major initiatives, such as the following:

- **Model Agreement for Strategic Alliances Between Utilities and Road Authorities.**⁽⁴⁸⁾

This document defines provisions for notifications, work execution, restoration, and asset relocation. It also outlines a policy and planning framework that includes coordination, performance standards, tree planting and landscape, and dispute resolution.

- **Guide to Codes and Practices for Street Opening.**⁽⁴⁹⁾ This document summarizes industry practices and provides essential information and guidance on managing street openings for providing underground utility services. The guide has been available for more than 35 years, although some of the codes and practices were adopted as early as 1932. The guide includes recommendations on a variety of topics, such as allocation of space in footways, joint trenching, trenchless techniques, preconstruction planning, excavation and backfilling, traffic control, and information recording.

- **AUS-SPEC #2 Specification 306/306U—Road Openings and Restorations.**⁽⁵⁰⁾ This specification deals with clearing, excavation, backfilling, and restoration activities associated with the installation of utility facilities.

- **Training.** The NSW Streets Opening Conference developed a pilot training course to improve the understanding of plans and identification of facility components by technicians and contractors.

Dial Before You Dig is a referral system for information on underground utility installations. It is a voluntary national organization with members from all states and territories. It is similar to utility one-call centers in the United States, with two major differences. First, membership includes not just utility owners and operators, but also transportation agencies and railroads (under the premise that these agencies can also provide information on assets they own to parties that request it). Second, Dial Before You Dig encourages the use of their services earlier in the project development process than is customary in the United States.

Australia—Queensland

Main Roads has two MOUs in place,⁽⁵¹⁾ one with a major electric utility (Energex) and one with a major telecommunication utility (Telstra). Two more MOUs are under development.

In the case of Energex, the MOU structure responded to the need to address issues in two general categories:

- Construction and maintenance operations
- Corridor planning, access, and infrastructure design

Officials from Main Roads and Energex outlined and prioritized issues to resolve according to their complexity and expected solution benefits. Some issues were related to the need for better communication and coordination between the two agencies (e.g., in relation to work sequencing, relocation timing, utility relocation costs, utility pole location details, information sharing, strategic utility plant locations within the road corridor to minimize future conflicts and utility relocation costs, and underground versus overhead installations). Main Roads and Energex resolved these issues through agreed-on outcomes, which were signed by either the chief executive officers of both organizations or a steering committee and then implemented in their working operations.

A working group from Main Roads and Energex is now working on a second level of priorities, including the following:

- **Electric utility relocations.** Energex and Main Roads recently developed a new protocol for better management of Energex assets on Main Roads

projects. The document defines obligations between the parties for addressing public consultation of proposed works, environmental considerations on relocation work, workplace health and safety obligations, and access and site management to ensure road safety.

- **Planned utility installations.** This document applies to planned Energex installations on state-controlled roads. It provides guidelines for document submissions to enable Main Roads to review proposals and respond to Energex in a timely fashion. It includes a process to ensure consistency at all regional offices on how installations in the road reserve are built. It also includes a protocol for early communication exchanges to allow Main Roads to assess the potential impact of Energex proposals on future road planning before Energex actually submits official proposals.
- **Backfill requirements.** The focus of this joint effort is to develop criteria and specifications for backfilling options that address both Main Roads' requirements for future road enhancements and Energex's requirement for a type of backfill that allows for appropriate underground cable heat dissipation.
- **Preliminary estimates.** This document is a catalog of typical Energex installations with an indication

of how much it would cost to relocate those installations (figure 16). It allows Main Roads to conduct a quick identification of Energex assets and produce a preliminary assessment of utility relocation costs, which is appropriate for developing early utility relocation cost estimates in the planning and programming phases. In the preliminary design and design phases, more detailed cost assessments are still necessary. The document, which is revised yearly, is distributed to all regional Main Roads offices.

- **Power pole safety.** Main Roads and Energex have entered into an agreement to develop practical guidelines and benchmarks of good practice for identifying high-risk poles and developing appropriate treatment solutions for those locations. The risk assessment procedure involves determining a pole risk score based on factors such as daily traffic volume, pole offset, road characteristics, curve characteristics, and vehicle speeds. The analysis concluded that poles with risk scores above 10,000 are high-risk locations that warrant further analyses to determine the optimum treatment (e.g., using guardrails or relocating poles outside the clear zone). For poles with risk scores higher than 50,000, the recommendation is to convert the aerial installation to underground. Main Roads and Energex are developing guidelines to implement the findings.



COURTESY OF MAIN ROADS

Figure 16. Preliminary estimates (in Australian dollars) for the relocation of power poles at Energex.

In the case of Telstra, the MOU structure responded to the need to address issues on asset protection and access to the road reserve.⁽⁵¹⁾ To address the first issue, both agencies developed a new process whereby Telstra plays a more proactive role helping Main Roads protect existing telecommunications assets that might be in conflict with proposed roadway work (figure 17).

Under the federal Telecommunications Act 1997,⁽⁵²⁾ telecommunication carriers have extensive powers to access the road reserve, which can cause considerable difficulties for Main Roads, particularly in situations in which a road is due for future upgrading. A land access agreement similar to that subscribed with Energex describes technical requirements for Telstra document submissions to enable Main Roads to review the documentation and reply to Telstra within the time frame required under the Telecommunications Act (10 business days).⁽⁵¹⁾

Australia—South Australia

In South Australia, DTEI controls the road from curb to curb, while local councils control the roadside. This arrangement imposes a number of challenges on the relationship between DTEI and the utility industry. For example, although DTEI has some regulatory power and has the ability to issue permits, DTEI's effective regulatory power is limited. In addition, because of deregulation and privatization, the utility industry tends to be more driven by the bottom line and less willing to work cooperatively with DTEI. Nonetheless, utility providers try to comply with DTEI requirements because they know they may need to deal with DTEI during roadway construction projects.

Over the past 10 years, DTEI has developed standards for excavation and backfills. In the past, DTEI was able to conduct inspections, but now this process is frequently not feasible. In its place, DTEI has implemented a 1-year warranty period for excavation and backfills, which appears to work well.

Utility relocations in metropolitan areas can be very expensive. According to DTEI officials, utility relocation in urban areas can be close to 20 percent of the total project cost.

DTEI is participating in a long-term initiative to convert power lines from overhead to underground. This initiative is coordinated by the Power Line Environment

Committee (PLEC), which includes eight members that represent a wide spectrum of interests, including transportation, local governments, electric utilities, tourism, conservation, and the community.^(53,54) For PLEC projects, DTEI provides funds for street lighting, project coordination, and tree planting. The remaining costs are shared by the local councils (two-thirds) and the electric utilities (one-third).

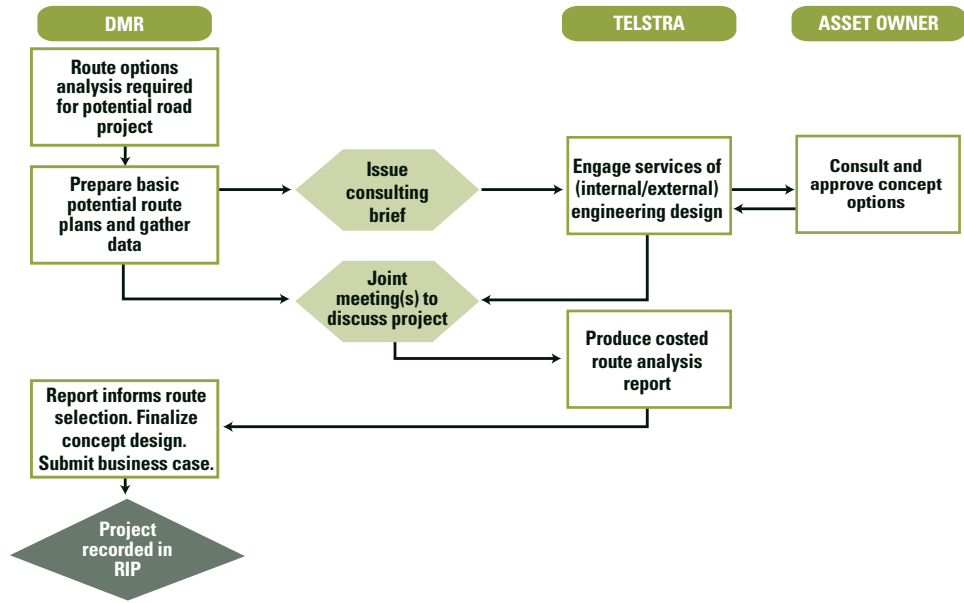
Australia—Victoria

In Victoria, VicRoads is responsible for the road from curb to curb, while local councils control the roadside. The Road Management Act 2004 established the division of roles more clearly.⁽²⁸⁾ No state legislation covers utility accommodation and relocation issues for road projects other than the Road Management Act 2004. This situation makes it necessary for the various parties to negotiate. Project-specific pieces of legislation (e.g., the CityLink Project and the EastLink Project) include provisions for utility relocation responsibilities, costs, minimization of disruption to utility services, and dispute resolution.

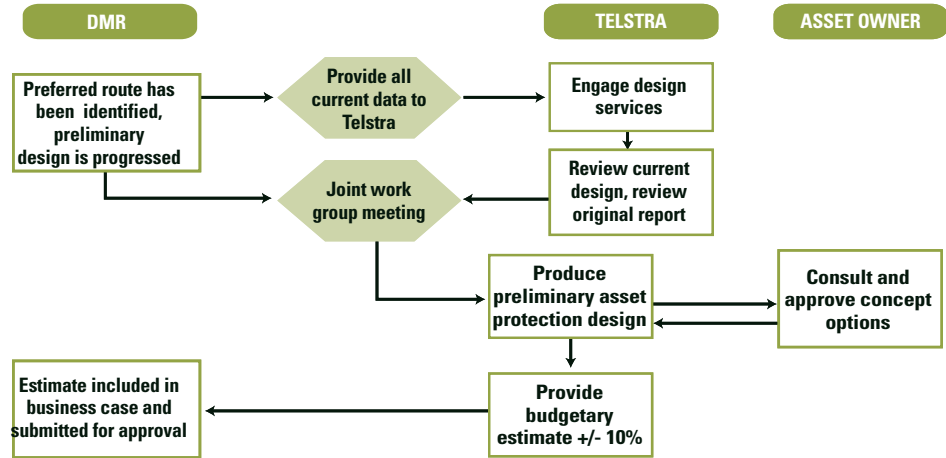
As required in the Road Management Act 2004, the Code of Practice for Management of Infrastructure in Road Reserves⁽⁵⁵⁾ provides guidance to road authorities, utilities, and public transportation providers on planning and managing their infrastructure in road reserves (figure 18, see page 36). More specifically, the code of practice supports road authorities and utilities in providing essential services to the public, provides guidance to ensure projects give priority to public transportation, provides guidance on collaboration between road authorities and utilities to minimize the total cost to the community, and provides guidance to road authorities on coordinating the installation of nonroad infrastructure on roads. For example, the code indicates that when considering options for positioning utility infrastructure, the cost analysis should take into consideration the total cost to the community of providing both road and utility infrastructure. Likewise, in the case of utility attachments to bridges and other road structures, the code recommends that the parties enter into a commercial agreement covering relevant terms and conditions, such as engineering evaluations, access for maintenance, indemnity for damage, attachment costs, and responsibility for relocation costs.

The code of practice also states that any proposed work affecting the road environment must have the consent of the coordinating road authority. In particular, the

Concept planning phase



Preliminary design phase



Design phase

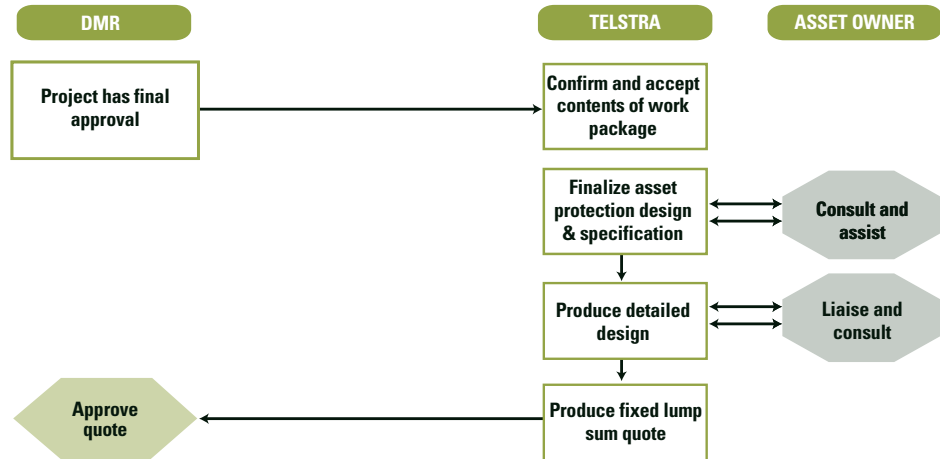


Figure 17. Interaction between Main Roads and Telstra during the project development process. ⁽⁵¹⁾

Government and Corporate Strategic Process

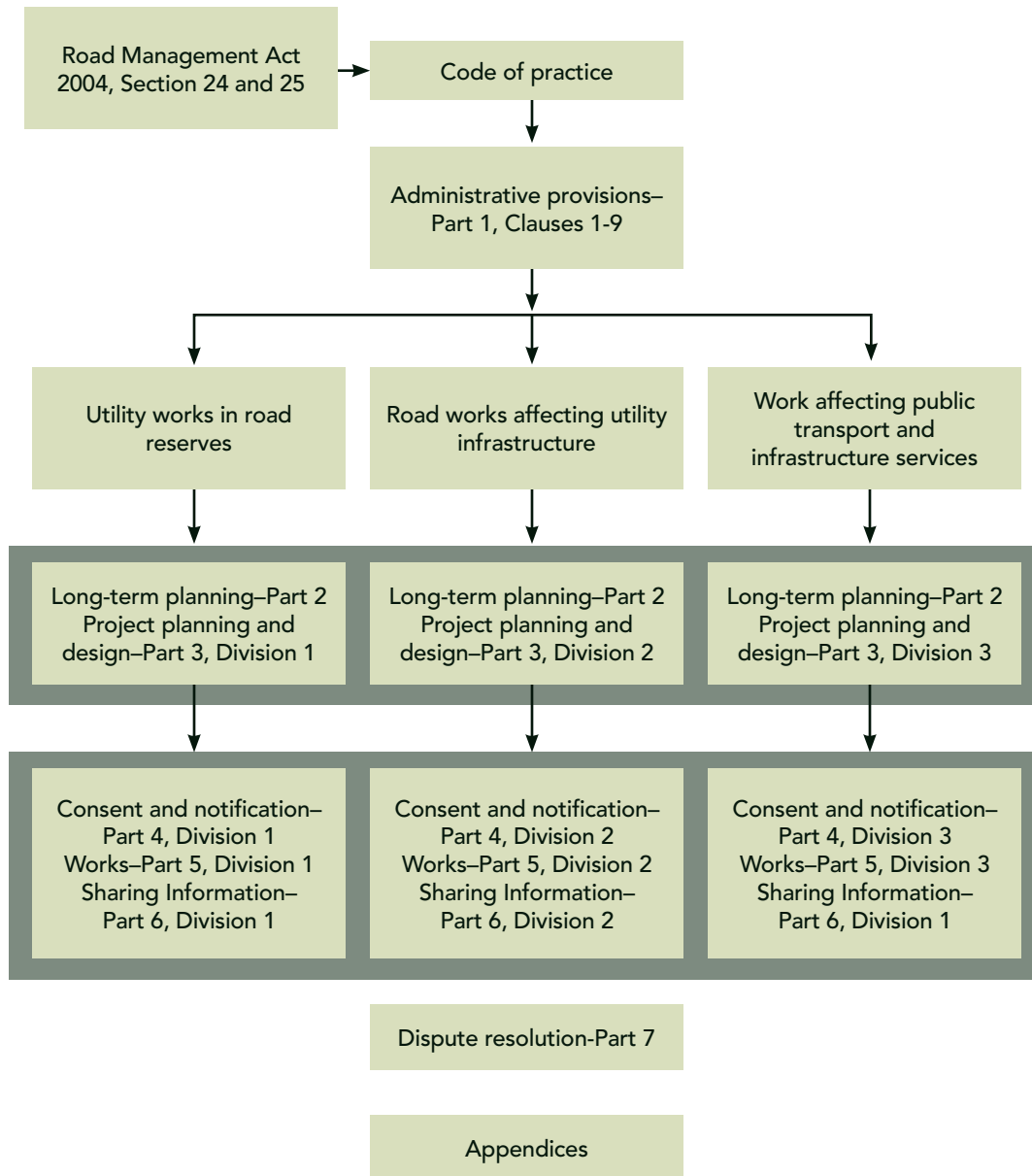


Figure 18. Framework of the Code of Practice for Management of Infrastructure in Road Reserves in Victoria.⁽⁵⁵⁾

code of practice requires utilities to prepare a risk management plan that includes elements such as the following:

- Analysis of risk areas to determine inherent risk ratings and treatment needs
- Proposed mitigation measures to reduce the risk to an acceptably low level
- Responsibility assignment for the operation of the risk management plan

- Training to staff and contractors to ensure the risk management plan is followed
- Monitoring and review plan

Specific risk areas to cover in the analysis include the following:

- Safety of all users of the road reserve
- Integrity of road infrastructure
- Traffic disruption

- Delays or interference with access to public transportation services
- Adverse effects on the future development of both road and nonroad infrastructure
- Efficient delivery of utility services

In the case of road projects that might affect utility infrastructure, the code of practice requires the road authority to carry out a risk management plan similar to that required for utilities. In this case, the risk areas to address include the following:

- Work zone and public safety
- Accidental damage to utility infrastructure
- Interruption of the delivery of utility services to the public

The code of practice includes requirements for both utilities and road authorities to maintain records of their entire infrastructure within the road reserve, particularly underground infrastructure, in geographic coordinates (Map Grid of Australia 1994), together with the best information available on vertical location. The code also recommends using the Dial Before You Dig referral service as a mechanism to share information. A utility that is not a member of Dial Before You Dig needs to advise the coordinating road authority how it plans to make information available on the location of its infrastructure to those who intend to carry out excavations in the road reserve.

The Road Management Act 2004 included provisions for implementing an Infrastructure Reference Panel to advise the Victorian government on issues related to the use of the road reserve by utilities. The Infrastructure Reference Panel is composed of 15 members representing various utilities and services, VicRoads, public transportation, and local governments. The panel provides advice in a number of areas, including coordination of utilities and other road reserve users, effectiveness of relevant codes of practice, and rulemaking. The panel also acts as a vehicle for consultation on the use of the road reserve by utilities and other stakeholders.

Canada—Alberta

Electric companies have model agreements with Alberta Transportation that apply to all present and future projects. Other utilities such as pipelines, telecommunication facilities, water, and sewer are required to sign project-level agreements. Typically, the contract includes a master agreement that addresses general provisions and a permit that includes detailed technical requirements such as

required cover depths. Utilities also must submit a traffic control plan. Right-of-way access is free, but if a utility facility is located in the road right-of-way as part of a roadway project, the utility company is responsible for relocation costs (except in the case of pipelines and low-pressure gas lines, which Alberta Transportation absorbs). Outside the right-of-way, the department is responsible for utility relocation costs.

The Calgary RDA⁽³⁸⁾ and the Edmonton RDA⁽³⁹⁾ include a TUC designation,⁽⁴⁰⁾ which formalizes the accommodation of utilities along prespecified corridors. As figure 13 shows, a typical TUC cross section may include primary uses (i.e., roads, major utilities, and municipal services), secondary uses (e.g., reestablished agricultural use, parking, and limited recreation activities), and original uses (e.g., agricultural leases, original farmsteads, and sand and gravel mining). Perceived benefits of the TUCs include the following:

- **Land conservation.** A TUC can accommodate more intense utility development than normal corridors. Grouping linear facilities in the corridor reduces land fragmentation.
- **Limited environmental disruption.** Environmental disruption from utility development is restricted to the corridor.
- **Administrative efficiency.** A single agency (Alberta Infrastructure) is responsible for all aspects of corridor management, including land acquisition.
- **Safety.** A planned corridor is easily identifiable, reducing the risk of accidental third-party damages to major utilities.
- **Land use certainty.** With a firm corridor planning program, developers and municipal authorities can plan accordingly for adjacent land. In Calgary, the southwest TUC right-of-way is incomplete because of pending negotiations with a local tribe (figure 11).
- **Open space use.** Land tracts occupied by only underground or overhead utilities present opportunities for additional compatible use.

Alberta Infrastructure manages provincial Crown lands within the TUCs. The agency grants a variety of authorizations, including leases, licenses, utility rights-of-way, rights of entry, and ministerial consents.⁽⁴⁰⁾ Typically, utility

rights-of-way are granted for the construction and maintenance of primary-use utilities. Because the use must be consistent with the long-term planning for primary uses within the TUC, utility rights-of-way are considered permanent. Alberta Infrastructure requires grantees to develop a survey plan for their facilities within the TUC, register both the utility right-of-way agreement and the survey plan with the Land Titles Office, and submit a certificate of compliance with this activity. Depending on the type of project, type of agency involved, and authorizations required, one or more of the following fees apply for projects within TUCs: lease rent, compensation fee, administration fee, and refundable financial security. In general, the plan includes access points (not from freeway lanes) for the construction and maintenance of facilities within TUCs.

Canada—Ontario

MTO developed a guideline document to provide a consistent approach for dealing with major utility companies (i.e., Bell Canada, Hydro One, Enbridge Gas, and Union Gas).⁽⁵⁶⁾ The document outlines major utility coordination activities during the roadway project preliminary design and design phases, as well as a detailed schedule of milestones, deliverables, and letters to stakeholders. During the preliminary design phase, an MTO consultant describes the project to each affected utility company and requests information such as confirmation of the primary owner, type of plant, approximate location, awareness of other utilities, and personnel assigned to the project. With this information, the consultant identifies the location of utilities in sufficient detail, as well as the location of potential utility conflicts, to support preliminary design recommendations. At the end of this phase, MTO sends a copy of the consultant's report to the utility companies for budgeting and scheduling purposes.

During the design phase, MTO notifies utility companies of the selection of the consultant retained to complete the detailed design. The consultant's responsibilities include verifying all existing and proposed utility information (including the use of test holes, if needed), preparing utility markups for the entire project (which includes a confirmation from the affected utility companies along with a proposed relocation strategy), determining the most cost-effective relocation strategy, and developing a utility relocation plan for each affected utility. With this information, MTO requests a detailed cost estimate and relocation schedule from each utility. If MTO agrees, it issues a "Moving of Utilities, Financial Breakdown"

document, which enables the utility company to proceed with the relocation. When relocation is finished, the utility company must provide a written confirmation of completion in accordance with the approved relocation plan. If the utility company fails to meet the completion date, it must provide a written explanation of why the completion was not met.

Forwarding the consultant's report to utility companies at the end of the preliminary design phase is important because utility companies often request a 1-year notice for larger projects to set up budgets and minimize negative impacts such as relocations during winter. Some utility companies have standardized relocation procedures. For example, the following are Hydro One guidelines:⁽⁵⁷⁾

- Five to 10 working days to schedule an onsite meeting after receiving a request to relocate
- Sixty days to provide final design and estimate after receiving the final roadway design drawing if the relocation cost does not exceed Can\$50,000, 90 days if the relocation cost is between Can\$50,000 and Can\$500,000, and a variable time limit if the relocation cost is greater than Can\$500,000
- Thirty days to start relocation after receiving the authorization to proceed if the relocation cost does not exceed Can\$50,000, 60 days if the relocation cost is between Can\$50,000 and Can\$500,000, and 120 days if the relocation cost is larger than Can\$500,000

The MTO *Corridor Control and Permit Procedures Manual*⁽⁴⁶⁾ provides guidance on installations initiated by utility companies. In addition to general requirements that pertain to all new utility installations, the manual includes specific templates for agreements that MTO has developed with electric, telephone, coaxial cable, and oil and gas utilities.

CHAPTER 5 | Summary of Findings

In September 2008, the scanning team visited Australia and Canada to learn about innovative practices for right-of-way and utility processes that might be applicable for implementation in the United States. The study team met with four state transportation agencies in Australia: RTA (New South Wales), Main Roads (Queensland), DTEI (South Australia), and VicRoads (Victoria). In Canada, the study team met with Alberta Transportation (Alberta) and MTO (Ontario). The 2008 scanning study complemented a 2000 scanning study of European countries that covered Germany, the Netherlands, Norway, and the United Kingdom.⁽¹⁾

With the 2000 and 2008 scans, the United States now has a sizable database of effective right-of-way and utility practices and strategies covering at least six industrialized nations on three continents. The fact that some of those strategies and practices are used in all or most of those nations is an additional indication of the strength and benefit derived from them, further highlighting the value of their potential implementation in the United States. Taking into consideration that the United States is already implementing several recommendations from the 2000 scan,⁽⁵⁸⁾ a valid recommendation would be to evaluate (if not now, possibly within the next 5 to 8 years) which recommendations from the 2000 and 2008 scans have become accepted practice in the United States (and to what degree). For example, FHWA recently facilitated a peer exchange to evaluate the concept of voluntary incentives for right-of-way acquisition and relocation, one of the recommendations from the 2000 scan.⁽⁵⁹⁾ The peer exchange noted 13 pilot voluntary incentive applications from eight States.

This chapter summarizes some of the lessons learned from the scanning study of Australia and Canada. Chapter 6 describes specific implementation ideas the scan team believes merit consideration in the United States.

Australia

Lessons learned from the meetings with RTA, Main Roads, DTEI, and VicRoads include the following:

- **Business approach to operations and emphasis on good working relationships.** The study team perceived a strong emphasis on entrepreneurship

and the application of sound business principles to DOT operations, including right-of-way and utility coordination. Examples of business approach strategies include an emphasis on strategic planning, a clear understanding of the agency's mandate to maintain high levels of performance and customer satisfaction, consideration of long-term right-of-way needs in transportation facility management, and understanding of the critical need to develop and maintain good working relationships with other stakeholders of the road reserve. An emphasis on effective communications, appropriate performance measurement, and customer satisfaction has resulted in some of the agencies visited being ranked among the highest in their states on public satisfaction with their performance.

- **Alliance contracting approach.** The alliance contracting approach is gaining popularity in Australia, particularly when there are significant uncertainties about the optimum solution for a project. Uncertainties can include unpredictable risks, a project that is difficult to scope or for tenderers to price, time pressures, and the state's desire for breakthroughs and innovation.

In the alliance approach, the transportation agency uses an early contractor involvement model that focuses on assembling and integrating the best possible leadership, management, and project execution teams based on qualifications and experience. Following a best-for-project approach, each team could include participants from the selected consortium and/or the transportation agency, depending on the specific expertise area needed.

An early contractor involvement approach means the alliance team is involved during the project scoping and design phases. Because no bidding occurs at the end of the design phase (since the consortium was selected earlier), the alliance approach requires transparent communications between the parties, particularly on compensation and cost structures. Strategies to achieve this goal include establishing a fee structure for all direct project costs that uses open-book accounting and is viewable by all parties,

a separate corporate overhead and profit calculation, and clear gainshare-painshare arrangements. Gainshare provisions include establishing how to share any net monetary savings at the end of the project.

In general, the alliance team is responsible for coordinating effectively with utilities early and finding optimum relocation strategies. Only one team interacts with utilities during the design and construction phases. The alliance team also presents a unified front for dealing and negotiating with property owners.

- **Training and professional development.** Australian states use a variety of approaches to promote training and professional development opportunities. For example, several universities offer formal educational programs for property valuers. A typical full-time, 3-year program offers a degree with a major in property. Coursework usually covers areas such as accounting, construction, property valuation, contract law, statistics, business finance, marketing, GIS, property economics, property law, planning and environmental law, and property and asset management.

In New South Wales, the NSW Streets Opening Conference sponsored the development of a pilot training course for transportation and utility personnel involved in locating utility facilities in the field. The training course provides the foundation for a formal accreditation process for utility location services.

Through VicRoads International, VicRoads has an active presence abroad. An integral component of the VRI program is to provide staff members with the opportunity to travel and work abroad, which in the long term benefits VicRoads because it promotes personal growth and professional development. VicRoads also promotes VRI as a recruitment strategy.

- **Road reserve.** The concepts of road reserve and road right-of-way (as applied in the United States) share many similarities. However, the treatment of the road reserve in Australian legislation historically has been stronger and more centralized than the treatment of the right-of-way in the United States. Australian states have also benefited from the

application of more centralized land use practices as well as high-level planning and land title registration offices that work with ministries of transportation and other state agencies to provide orderly, coordinated land use planning.

- **Corridor preservation.** Australian states have a number of tools that facilitate the preservation of corridors for future transportation use. Examples include the requirement to register transportation plans with the state land title registration office, the ability of these offices to add notes or caveats to title certificates on the future use of a corridor, the ability to control building setbacks on corridors designated for future road expansion, and the ability of the transportation agency to acquire parcels during the planning phase.
- **Appraiser-legal representation fees and right-of-way negotiation process.** Australian states routinely reimburse property owners for reasonable expenses (including attorney fees) related to the appraisal and negotiation process. Further, in Australian practice, property owners are encouraged to become informed and seek professional help to assist them in that process. In addition, Australian states routinely share appraisal reports with property owners (or their representatives). Additional innovative right-of-way acquisition practices include reconciliation of professional opinions, the use of lease agreements with property owners to facilitate early right of entry to the property, in-kind compensation, exchange of surplus property for required property, and reliance on appraisals by independent bodies.

Combined, these features result in a more cooperative, less adversarial relationship with property owners, which can result in more effective property acquisition practices and earlier access to property needed for project completion.

- **Use of technology to support the right-of-way acquisition and property management processes.** It is customary for Australian states to use GIS-based applications to manage the right-of-way acquisition process, including corridor preservation, and property management activities. The use of GIS technology is supported by the use of public acquisition overlays during the planning process to illustrate the extent of the road reserve, the requirement to

register transportation plans with the state land title registration office, and the integration of parcel databases into georeferenced data repositories that facilitate data exchange among stakeholders.

Through the alliance contracting approach, Australian states are beginning to experiment with the use of visualization techniques to assist in the right-of-way acquisition process (e.g., by using 3-D visualization techniques and posting video clips on the Internet to explain the project to a wide audience).

- **Dial Before You Dig.** “Dial Before You Dig” is a referral system for information on underground utility installations. It is a voluntary national organization with members from all states and territories. It is similar to utility one-call centers in the United States, with two major differences. First, membership includes not just utility owners and operators, but also transportation agencies and railroads (under the premise that these agencies can also provide information about the assets they own to parties that request it). Second, Dial Before You Dig encourages the use of the services earlier in the project development process than is customary in the United States.
- **Reimbursement of utility relocations.** Australian states normally reimburse utility interests for the relocation of utility facilities (but not for betterments). Historically, most utility owners and operators have been government entities. As a result, it does not really matter who pays for the relocation since funding for it comes from the same source. For simplicity, the policy is that the agency responsible for the transportation project that causes the need for the utility relocation is also responsible for relocation costs. In recent years, the Australian utility industry has undergone deregulation, with a large percentage of utility interests now in private hands. However, the policy for reimbursing utility relocations continues.
- **Multilevel MOU approach with utilities.** In Australia, several states are exploring a variety of MOUs and agreements with utilities to facilitate the cooperation and coordination process. In a typical situation, a high-level MOU sets forth general principles and the intent of both parties to work cooperatively. Typically, this MOU is signed by the parties at the executive director level. To ensure the MOU is a living

document, it may include attachments and other agreements that discuss specific issues, such as standards, specifications, and general procedures for resolving conflicts. Typically, technical personnel from both organizations prepare these documents. There may also be contract-level agreement details and specific provisions that the higher-level MOU does not address.

The multilevel MOU concept is also used in the United States. However, the study team’s impression is that Australian MOUs are more elaborate and stringent than those in the United States. Utility accommodation policies or rules at the State level govern the accommodation of utilities on the State right-of-way in the United States, but a similar concept does not appear to exist in Australia (which could explain in part the need for more comprehensive MOUs). Nonetheless, the study team noticed several advantages in the Australian MOU concept worth considering for implementation in the United States.

MOUs with telecommunication providers in Australia appear particularly critical, considering that telecommunications in that country are governed by federal legislation (rather than state legislation, as is the case for other utilities) that, in general, is weak on the power given to the agencies responsible for the road reserves to regulate the accommodation of telecommunication facilities.

Related to the implementation of the MOUs is the NSW Streets Opening Conference, which started in Sydney in 1909 as a focal point for discussing common transportation and utility issues. The association’s objectives include establishing roadside allocations and recommended practices for providing utility services; fostering coordination; encouraging the use of agreed-on codes and practices for excavation, backfilling, and roadway reconstruction; and minimizing the impact of excavations. Members include utility owners, local government and road authorities, light rail operators, other government agencies, consultants, and other groups interested in utility issues.

Canada

Lessons learned from the meetings with Alberta Transportation and MTO include the following:

- **Appraisal sharing.** As in the Australian states, Alberta Transportation and MTO share appraisal reports in full disclosure to achieve transparency with property owners. Both agencies also reimburse property owners for reasonable costs, including appraisal, engineering reports, and planning reports.
- **Corridor preservation and setback control.** Alberta and Ontario have legislation that enables the provincial transportation agency to regulate the type of development (including utilities) that takes place within a certain distance from the road centerline or the property line. In Alberta, the extent of the land under regulation varies by road type. For example, according to a regulation now under development, the extent of land under regulation will be 150 m (492 ft) from the right-of-way line for minor provincial highways and 300 m (984 ft) from the right-of-way line for multilane provincial highways. In Ontario, regulation tools at MTO's disposal cover encroachments and utility installations, buildings and land use, signs, and highway access. The minimum setback for new buildings or other structures varies by road type and proposed development. For example, on controlled-access highways, the control area within which all development is subject to permit requirements from the ministry is 45 m (148 ft) from the right-of-way. This permit area extends up to 395 m (1,296 ft) at interchanges.
- **Transportation and utility corridors.** In Alberta, the Government Organization Act enabled the establishment of restricted development areas to coordinate and regulate the development and use of certain areas. The Calgary RDA and the Edmonton RDA are of particular interest because of the designation of TUCs within those RDAs. The TUCs were established on the principle that long-term planning for the accommodation of a number of transportation and utility facilities within a TUC can maximize its use. The TUCs protect ring road and utility alignments from advancing urban development. Advantages to the use of TUCs include land conservation, limited environmental disruption, administrative efficiency, safety, land use certainty, assured alignments for future users, and open space use.
- **Reversal of trend to outsource most work.** Alberta Transportation outsources most work, including right-of-way acquisition and utility coordination.

However, the agency is revisiting its 100 percent commitment to outsourcing. MTO outsources much of its work except right-of-way acquisition, but has begun to do more work internally. This trend highlights the need to develop in-house expertise to address needs such as succession planning, the ability to provide needed services, and the management of services that continue to be outsourced.

CHAPTER 6 | Implementation Strategies

The study team identified some 20 potential implementation ideas that merit consideration in the United States. Table 3 lists those ideas, including which ideas the study team considers top priorities for implementation.

A summary description of each implementation idea follows. A separate document (*Scan Technology Implementation Plan*) provides a more detailed description of the top priority implementation ideas.

Table 3. Potential right-of-way and utility implementation ideas.

Subject Area and Related Implementation Ideas	Top Priority
Legal Framework for Right-of-Way and Utility Processes	
Promote incentive-based reimbursement for utility relocations.	5
Establish standard protocol and lease template for utility attachments to roadway structures.	
Pursue strategies to facilitate corridor preservation.	6
Establish template for roles and responsibilities of multiple parties that use infrastructure corridors.	
Transportation Project Delivery Methods	
Create template for project-specific roles and responsibilities based on project type and configuration.	
Integrate right-of-way acquisition and utility coordination in an alliance contract approach.	1
Establish operation and maintenance fee for developer-initiated transportation infrastructure.	
Establish sliding scale for State contribution to developer-initiated transportation infrastructure.	
Project Development Process	
Develop framework for risk-based business case analysis for project decisionmaking.	
Develop framework for multimodal transportation infrastructure planning that integrates utilities.	
Right-of-Way Acquisition	
Enhance cooperative relationship with property owners to facilitate timely property acquisition.	2
Develop GIS-based right-of-way project and asset management systems.	8
Promote visualization techniques to communicate anticipated project impacts to property owners.	3
Utility Coordination and Utility Conflict Management	
Promote the use of multiple-level MOU structure among transportation and utility interests.	7
Create template for project-specific roles and responsibilities based on project type and configuration.	
Promote the use of best practices in utility coordination during the construction phase.	9
Develop methodology for preliminary utility relocation cost estimates.	
Real Property Management	
Develop GIS-based right-of-way project and asset management systems.	8
Promote active management of the right-of-way asset to maximize value and return on investment.	
Project Team Strategies, Training, and Professional Development	
Develop framework to establish proficiency of right-of-way and utility professionals in core disciplines.	4

Legal Framework for Right-of-Way and Utility Processes

Promote Incentive-Based Reimbursement for Utility Relocations

This implementation idea involves providing incentive-based compensation to utility companies for the relocation of utility facilities required by transportation infrastructure improvement projects. The incentive compensation (in the form of a reimbursement) may be provided for eligible items of work, such as preliminary engineering, physical relocation, and materials to the utility, by preestablished utility relocation milestones set through coordination between the transportation infrastructure owner and the utility company. Failure of the utility company to meet milestones would cause the utility to forfeit all or a preestablished percentage of the incentive compensation, in effect causing the utility company to relocate its facilities at its own expense.

In general, the incentive compensation applies in situations in which the utility company does not have a reimbursable real property interest and is occupying highway right-of-way by permit.

Strategies in connection with this implementation idea include the following:

- Prepare a synthesis report on States with legislation allowing incentive-based compensation of utility companies for the relocation of utility facilities, the benefits derived from incentive-based compensation in terms of time savings and reduction in project delays and construction contractor claims, and the cost of incentive-based compensation to the transportation infrastructure owner. The synthesis report should include samples of legislation from States that have used incentive-based compensation successfully.
- Develop model legislation to enable compensation of utility relocations using legislation from States that allow compensation of utility relocations. The model legislation would provide the foundation for implementing State legislative changes to allow for compensation of utility relocations.
- Conduct pilot projects in States that allow compensation of utility companies for the relocation of utility facilities, but have not used incentive-based compensation. As part of the pilot, the transportation agency would disseminate information on lessons learned.

Establish Standard Protocol and Lease Template for Utility Attachments to Roadway Structures

This implementation idea involves collaborative work between transportation agencies and utility companies to establish a standard protocol and a lease template for the attachment of utility infrastructure to roadway structures. The protocol and lease template would cover relevant terms and conditions, such as engineering evaluations, access for maintenance, indemnity for damage, attachment costs, and responsibility for relocation costs.

The origin of the idea was a provision in the Code of Practice for Management of Infrastructure in Road Reserves in Victoria, Australia. As required in the Road Management Act 2004, this code of practice provides guidance to road authorities, utilities, and public transportation providers on planning and managing their infrastructure in road reserves. Two objectives of the code of practice are minimizing total costs to the community and providing guidance to road authorities on coordinating the installation of nonroad infrastructure on roads. In the case of utility attachments to bridges and other road structures, the code recommends that the interested parties enter into a commercial agreement that addresses technical considerations, attachment costs, damages, and relocation costs.

Pursue Strategies to Facilitate Corridor Preservation

An ongoing challenge State and local transportation agencies face is keeping up with population shifts and the resulting shifts in demand for different transportation routes. Given the extensive amount of time typically required to plan and deliver transportation projects, agencies have a special mandate to anticipate future demand and plan proactively. An increasingly valuable tool for dealing with this challenge is corridor preservation—an environmentally sound and cost-effective approach for avoiding and minimizing the impacts of transportation projects that involve widening existing alignments or developing new alignments.

Strategies in connection with this implementation idea include the following:

- Establish a protocol that enables the official register of transportation plans with land title registration offices. This protocol would enable those offices to add notes or caveats to title certificates on the future use of a corridor.
- Introduce mechanisms for transportation agencies

to acquire parcels or provide compensation during the planning phases of a transportation project. Examples include cases in which it would be strategic to preserve a corridor for future transportation use or in hardship situations (e.g., if a property owner cannot sell a property because of a caveat on the property title certificate on the future use of a corridor).

- Establish mechanisms that facilitate effective information exchanges among all stakeholders involved in the corridor preservation effort, including transportation agencies, planning agencies, property owners, appraisal districts, local and county governments, and the public. One such mechanism involves the use of GIS-based proposed acquisition overlays (published on easily accessible Web sites) that show proposed corridors in relation to landmarks and existing parcels and enable stakeholders to provide comments.
- Establish protocols that enable transportation agencies to control building setbacks on corridors designated for future road expansion. One mechanism to achieve this objective is to enable transportation agencies to provide input on the building permitting process.

Establish Template for Roles and Responsibilities of Multiple Parties That Use Infrastructure Corridors

The Road Management Act 2004 in Victoria established a coordinated management framework for transportation networks. The act formalized the concept of a coordinating road authority, codes of practice for infrastructure management, and an infrastructure reference panel that provides advice to the state on utility coordination and other users of the road reserve, the codes of practice, and regulations. The panel is composed of 15 representatives of various utilities and services, VicRoads, public transportation, and local governments.

The purpose of this implementation idea is to establish a template that would enable State DOTs to initiate an entity similar to Victoria's infrastructure reference panel that could be used in the planning, design construction, and management phases of joint transportation-utility infrastructure corridors. The role of the panel would be to provide State transportation infrastructure and right-of-way owners with advice on utility coordination issues, such as utility accommodation policies, regulations, and

hierarchy of utility location within the corridors. The template would define the roles and responsibilities of the transportation and utility infrastructure owners in the infrastructure corridor.

Strategies in connection with this implementation idea include the following:

- Prepare a report that describes the Victoria infrastructure reference panel functions, protocols, and levels of authority; identifies any DOT in the United States that convenes a group similar to the infrastructure panels; and documents similarities and differences.
- Identify two or three pilot State DOTs willing to establish and convene a stateside equivalent of the Victoria infrastructure reference panel, with the goal of establishing a similar panel within 6 to 9 months after designation and committing to convene the panel for 1 to 3 years.
- Share lessons learned and successes achieved from the infrastructure reference panel pilots via American Association of State Highway and Transportation Officials (AASHTO) and Federal Highway Administration (FHWA) mechanisms.
- Formalize utilities as a mode of transportation.

Transportation Project Delivery Methods Create Template for Project-Specific Roles and Responsibilities Based on Project Type and Configuration

This implementation idea involves developing a matrix to identify roles and responsibilities by all stakeholders based on project type and configuration. In addition to the general coordinated management framework for transportation networks (see above), the Road Management Act 2004 in Victoria established a mechanism that facilitates the development of a project-level framework in situations that involve several local jurisdictions and agencies, and it is important to outline the roles, rights, and responsibilities of each stakeholder. VicRoads has used this mechanism to facilitate the development of projects such as the EastLink Project and the Melbourne CityLink Project.

The study team did not identify major challenges or costs in connection with this implementation idea in the United States. It would be advisable to conduct a synthesis report

to develop an inventory of current practices in the United States and determine specific recommendations for implementing the template.

Integrate Right-of-Way Acquisition and Utility Coordination in Alliance Contract Approach

The alliance contract approach is gaining popularity in Australia, particularly when there are significant uncertainties about the optimum solution for a project. Uncertainties can include unpredictable risks, a project that is difficult to scope or for bidders to price, time pressures, and the state's desire for breakthroughs and innovation. An increasing body of knowledge documents the benefits of the alliance contract approach, including the report on a recent scanning study on public-private partnerships sponsored by FHWA, AASHTO, and the National Cooperative Highway Research Program (NCHRP). That body of knowledge strongly indicates that implementing an alliance contract approach to support the delivery of transportation projects in the United States would be highly beneficial.

Strategies in connection with this implementation idea include the following:

- Identify the source and role of right-of-way acquisition and utility coordination personnel in alliance teams, following a best-for-project approach. In Australian practice, right-of-way acquisition typically remains the responsibility of the transportation agency. In general, the alliance team has the responsibility to coordinate effectively with utilities early and find optimum relocation strategies. Only one team interacts with utilities during the design and construction phases. The alliance team also presents a unified front for dealing and negotiating with property owners.
- As part of the gainshare-painshare arrangements in an alliance contract, introduce mechanisms for dealing with unplanned utility relocations that encourage collaboration by all alliance team members. For example, if a pipeline is unexpectedly found during construction, the focus should be on finding a solution instead of blaming one of the parties for not identifying the pipeline earlier during the planning and design phases.
- Conduct the following activities in conjunction with other alliance contracting interests (e.g., the public-private partnership scan team):

- Investigate other sectors and initiatives (e.g., oil industry and community redevelopment) in the United States that may already use elements of the alliance contract approach.
- Conduct initial education and outreach efforts (e.g., using a white paper, synthesizing available information about alliance contracting, and including the role and integration of right-of-way acquisition and utility coordination activities in alliance contracts).
- Give presentations and conduct workshops at events such as the Transportation Research Board (TRB) Annual Meeting, the AASHTO Design and Construction Committee Conference, and the Right-of-Way and Utilities Subcommittee Conference.
- Sponsor presentations by Australian delegations at those events.

- Identify two or three States willing to use the alliance contract model and establish suitable pilot projects already included in their Transportation Improvement Programs (TIPs). Depending on the State and its legislative framework, it might be necessary to obtain special legislative approval to use an alliance contract approach.
- For States willing to pilot the alliance contract model, request approval from FHWA under Special Experimental Project No. 14—Alternative Contracting (SEP-14).
- At the end of the pilot project phase, prepare a synthesis report to identify lessons learned and recommendations for implementation nationwide, taking into consideration the differences in State legislative frameworks throughout the country.

Establish Operation and Maintenance Fee for Developer-Initiated Transportation Infrastructure

This implementation idea involves establishing a protocol to enable transportation agencies to charge an upfront fee for developer-based transportation infrastructure. In Ontario, developers are typically responsible for all expenses when they build transportation infrastructure such as interchanges. At the completion of the project, MTO takes ownership of the project. As part of the agreement, MTO charges an upfront fee to cover anticipated operation and maintenance costs throughout the lifetime of the new facility. On occasion, developers have agreements with local municipalities in which the

municipalities agree to assume responsibility for maintaining the facility.

Strategies in connection with this implementation idea include the following:

- Identify States that have implemented this strategy or parts of it (e.g., Maryland, Ohio, and Florida). Ohio has three interchanges where developers built the structures and are responsible for maintaining the facilities.
- Explicitly incorporate the concept of an upfront operational and maintenance fee as an analysis factor during long-range transportation planning.
- As needed, draft model State legislation and guidance documents.

Establish Sliding Scale for State Contribution to Developer-Initiated Transportation Infrastructure

This implementation idea involves tying the State contribution to locally requested projects to the number of years into the future the department is already considering those projects for construction (e.g., 90 percent for 1 year, 80 percent for 2 years, 70 percent for 3 years, and 0 to 60 percent for more than 3 years). Alberta Transportation uses this strategy to accelerate the delivery of projects in response to third-party requests to develop those projects. In general, to consider a cost-sharing plan, the department would need to include the project in its transportation plan.

Strategies in connection with this implementation idea include the following:

- As needed, draft model State legislation and guidance documents.
- Identify two or three States willing to implement this strategy and set up the necessary legislative and planning framework.
- On a trial basis, identify pilot projects and report on the lessons learned after a 3-year period.

Project Development Process

Develop Framework for Risk-Based Business Case Analysis for Project Decisionmaking

This implementation idea involves promoting the concept of a business case-risk management approach not just for

identifying and selecting transportation projects, but also for coordinating right-of-way and utility activities. In Australia, the study team perceived a strong emphasis on entrepreneurship and the application of sound business principles to DOT operations. An example of a business strategy was the emphasis on strategic planning, which relies on the preparation of risk assessments and business cases to provide adequate justification for projects. The risk management approach extends to the assessment of risks and cost contingencies associated with property acquisition and utility relocation.

To maximize value, the risk-based business case approach to decisionmaking would include the use of performance measures, which provide a mechanism to determine the effectiveness of initiatives, programs, and strategies, therefore enabling a direct link between infrastructure facility operations and maintenance and overall planning activities. An example of this approach would be using judicious cost contingencies throughout the utility relocation process, comparing utility relocation cost estimates with final costs, and developing a historical cost database to facilitate the effectiveness of the utility relocation process.

An example of a risk-based business case analysis is the preparation of a risk management plan for new utility installations on existing transportation corridors. The risk management plan would include an analysis of risk areas, proposed mitigation measures to reduce risks to an acceptably low level, assignment of responsibility for operating the risk management plan, training for staff and contractors to ensure the risk management plan is followed, and a monitoring and review plan. The risk areas to cover in the analysis would include elements such as safety, road infrastructure integrity, traffic and transit disruption, delays, and negative impacts on the future development of both road and nonroad infrastructure.

Develop Framework for Multimodal Transportation Infrastructure Planning That Integrates Utilities

This implementation idea involves developing a framework that integrates utilities into a multimodal transportation planning process. In Alberta, the transportation and utility corridors were established on the principle that long-term planning for the accommodation of a number of transportation and utility facilities within a TUC can maximize its use. TUCs protect road and utility alignments from advancing urban development. Advantages of using

TUCs include land conservation, limited environmental disruption, administrative efficiency, safety, land use certainty, assured alignments for future users, and open space use.

Alberta has two TUCs corresponding to loop corridors in Edmonton and Calgary. Many jurisdictions in the United States have concentric loop corridors around urban centers, but those corridors typically do not integrate utilities at the same level as TUCs in Canada. However, at any given point, many U.S. urban or suburban transportation projects are in the planning stage. Integrating utilities, particularly major ones, into the metropolitan transportation planning process would offer a number of advantages, including a more rational use of societal resources and the opportunity for a more effective, less confrontational working relationship between transportation agencies and utility interests.

Strategies in connection with this implementation idea include the following:

- Draft legislation that requires coordination among transportation and utility stakeholders during the metropolitan transportation planning process and establishes a hierarchy of roles and responsibilities for developing and managing the infrastructure right-of-way. The legislation would need to enable transportation agencies to acquire right-of-way for uses other than transportation (or formally recognize utilities as a transportation mode).
- Conduct workshops and educational outreach activities to illustrate the process and benefits of the coordinated framework. As part of the outreach activities, it would be advantageous to prepare typical cross sections to illustrate the use of the right-of-way by all stakeholders.
- Identify two or three pilot projects to develop a model strategic plan.

Right-of-Way Acquisition

Enhance Cooperative Relationship With Property Owners to Facilitate Timely Property Acquisition

The study team observed a number of practices in Australia and Canada that lead to a more cooperative, less adversarial relationship with property owners, which can result in more effective property acquisition practices and earlier access to property needed for

project completion. For example, Australian states routinely share appraisal reports with property owners and reimburse property owners for reasonable expenses related to the appraisal and negotiation process. Property owners are also encouraged to become informed and seek professional help to assist them in that process. Additional innovative right-of-way acquisition practices include reconciliation of professional opinions, the use of lease agreements with property owners to facilitate early right of entry to the property, in-kind compensation, exchange of surplus property for required property, and reliance on appraisals by independent bodies.

Strategies to develop nonadversarial relationships with property owners to enhance and accelerate the acquisition of property needed for transportation projects in the United States include the following:

- Appraisals and expenses
 - Share appraisals if parties cannot agree on price.
 - Reimburse property owners for reasonable expenses related to the appraisal and negotiation process. It may be necessary to convene a focus group with interested stakeholders to determine the meaning and scope of "reasonable" expenses and to address issues such as the perception of providing "gifts" of public funds.
 - Establish a minimum agreement value, which could be useful for small partial purchases, such as corner cutoffs for intersection improvements.
- Early property access
 - Develop lease agreements with property owners.
 - Obtain right of entry for early property access.
 - Establish advance partial payments to facilitate early property access while negotiations for a just compensation-based final purchase price (and corresponding paperwork) are being finalized.
- Other innovative right-of-way acquisition tools
 - Develop criteria on eligibility for land exchanges.
 - For partial purchases, enable the acquisition of a larger portion, or even an entire parcel, when it is in the best interest of the project to do so.
 - Establish a reasonable time frame for property owner to consider offer.
 - Enable compensation in cash or in kind.
 - Enable options on properties.

The following activities would be necessary in connection with the strategies outlined above:

- Conduct a synthesis study to evaluate current practices in the United States.
- Conduct cost-benefit analyses of the proposed processes.
- Develop draft regulations for FHWA to propose through a notice of proposed rulemaking. (This is generally a 1- to 2-year process.)
- Develop educational and training materials for right-of-way agents, as well as public outreach materials for property owners and other stakeholders.

Develop GIS-Based Right-of-Way Project and Asset Management Systems

This implementation idea involves promoting the development of comprehensive Web-based right-of-way project and asset management systems with the ability to track project and parcel status, as well as the ability to produce reports and GIS-based parcel documents and maps.

Several states in Australia use GIS-based systems to manage acquisition of right-of-way and perform property management activities. These systems enable acquisition staff to know the status, history, and relationship of all parcels on a project. The use of GIS technology is further supported by the use of public acquisition overlays during the planning process to illustrate the extent of the road reserve, the requirement to register transportation plans with the state land title registration office, and the integration of parcel databases into georeferenced data repositories that facilitate data exchange among stakeholders. For the property management staff, the benefits include access to mapping interfaces and the ability to produce paper maps that depict different types of parcels, such as excess right-of-way, under lease, in the disposition process, and parcels that could be combined to generate a larger, more attractive parcel for disposition.

Strategies in connection with this implementation idea include the following:

- Implement results of NCHRP Project 08-55 “Integrating Geo-Spatial Technologies into the Right-of-Way Data-Management Process” and NCHRP Project 08-55A “Developing a Logical Model for a Geo-Spatial Right-of-Way Land Management System.”⁽⁶⁰⁾
- Implement the results of the Texas Department of Transportation Research Project 0-5788

“Right-of-Way Real Property Asset Management Architecture.”⁽⁶¹⁾

- Develop a national standard for depicting real property assets that builds on current data modeling and data standardization efforts (including cadastral initiatives) by industry, government, and academic research. In the long term, the national standard would have as one of its primary objectives the development of robust data exchange specifications to ensure that parcel data can be generated and shared among many stakeholders (e.g., transportation agencies, appraisal districts, property owners, and metropolitan planning organizations) without any degradation in positional accuracy and metadata content. Level of access to relevant attribute data would depend on user role and access permission levels.
- Use a project under the Transportation Pooled Fund Program to develop, test, and report on the results of a GIS-based property asset management system using the results of recent research efforts.

Promote Visualization Techniques to Communicate Anticipated Project Impacts to Property Owners

This implementation idea involves using innovative visualization techniques to help transportation agencies communicate anticipated project impacts to property owners. As part of an alliance contract in Australia, the alliance team used 3-D visualization techniques and posted video clips on the Internet to explain the project to a wide audience. Although the development of the 3-D tool was expensive, the DOT concluded that the results obtained (e.g., in terms of better understanding by property owners and the public) were more than enough to offset the initial investment.

The use of visualization techniques is increasing in the United States. As part of the 2006 domestic scan on right-of-way and utilities, the Minnesota DOT reported on the preliminary results of using 3-D video to illustrate after-construction conditions to help property owners develop a better understanding of the project and how the project would appear in relation to adjacent properties.⁽⁵⁸⁾ The department also used the video at public information meetings. The preliminary results reported by the Minnesota DOT were positive.

Strategies in connection with this implementation idea include the following:

- Conduct an analysis to quantify benefits and costs associated with the use of 3-D visualization techniques to support the right-of-way process. This analysis would need to consider cost allocation factors to determine the impact of the visualization tools on right-of-way acquisition costs (considering that the 3-D visualization products could also be used for additional project development process activities).
- Monitor a recent FHWA initiative on design visualization using Surface Transportation Environment and Planning (STEP) funds. Objectives of this initiative include developing a clearinghouse of sources, both Web-based and published, that have used visualization techniques for right-of-way activities; conducting a peer exchange to identify best practices or develop new technologies; facilitating technology transfer; and developing sample scopes of work for visualization contracts.
- Using a cost allocation formula, include the cost of developing visualization products into the project development cost.

Utility Coordination and Utility Conflict Management

Promote the Use of Multiple-Level MOU Structure Among Transportation and Utility Interests

This implementation idea involves promoting a multiple-level MOU approach to optimize the relationship between transportation agencies and property interests. In Australia, several states are exploring a variety of MOUs and agreements with utilities to facilitate the cooperation and coordination process. A multilevel MOU structure typically includes a high-level MOU that sets forth general principles and the intent of both parties to work cooperatively, attachments and other agreements that cover specific topics of interest to both parties, and contract-level details and specific provisions that the higher-level MOU does not address.

The high-level MOU sets forth general principles and the intent of both parties to work cooperatively (e.g., by establishing a framework that covers issues such as cost distribution, information sharing, strategic planning, project management, work sequencing, and dispute

resolution). Normally, this MOU is signed by the parties at the executive director level or by a steering committee.

To ensure the MOU is a living document, it may include attachments and other agreements that discuss specific issues, such as standards, specifications, and general procedures for resolving conflict. Typically, technical personnel from both organizations prepare these documents. For example, in Queensland, Main Roads and Energex are developing new protocols, procedures, and specifications to address issues on electric utility relocations, planned utility installations, backfill requirements, preliminary estimates, and power pole safety. Similarly, an agreement between Main Roads and Telstra describes technical requirements for Telstra document submissions to enable Main Roads to review the documentation and reply to Telstra in a timely fashion.

Coordination and cooperation can involve multiple parties. For example, the NSW Streets Opening Conference, a voluntary association of organizations in New South Wales that focuses on common transportation and utility issues, has sponsored the development of documents such as a model agreement between transportation agencies and utility interests, a guide to codes and practices for street openings, and a specification for excavation, backfill, and restoration. The NSW Streets Opening Conference has also developed a pilot training course to improve the understanding of plans and the identification of facility components in the field.

The multilevel MOU concept is also used in the United States, but the study team's impression is that Australian MOUs are more elaborate and stringent than those in the United States.

Strategies in connection with this implementation idea include the following:

- Obtain more information about the operation of the multiple-level MOU approach from Australian states (e.g., language contained in the MOUs, exact levels of organizational leadership associated with membership on the panels, challenges, and plans).
- Conduct outreach activities to explain the benefits of the multiple-level MOU approach to transportation agencies and utility interests, with an emphasis on the differences between that approach and current utility coordination practices in the United States.

- Identify two or three DOTs willing to experiment with the multiple-level MOU approach and record the lessons learned after an initial trial period.

Promote the Use of Best Practices in Utility Coordination During the Construction Phase

This implementation idea involves promoting the use of best practices in utility coordination during construction. In Australia, RTA recently started requiring contractors to have utility coordinators at the jobsite. According to RTA officials, this tactic has been very effective. In the United States, some States also use utility coordinators, at least to some degree, on major construction projects.

Having utility coordinators assigned to a project in a meaningful capacity during construction (either provided by the transportation agency or required as part of the construction contract) would enable the transportation agency to prepare pending utility agreements, expedite utility relocation work, and alleviate conflicts between highway construction and utility relocation activities. Utility coordinators would also assist with the inspection of utility-related work in the field to verify compliance with applicable highway and utility industry standards and specifications.

Traditionally, utility coordination has been a preconstruction activity. Expanding the utility coordination scope to the construction phase would result in additional costs to the project. However, the expectation is that the resulting benefits to the project would offset those costs.

Strategies in connection with this implementation idea include the following:

- Publish the results of a 2008 survey of States documenting the use of full-time utility coordinators during construction (either provided by the transportation agency or required as part of the construction contract). Information in this study could be used to identify State DOTs and contractors that might be surveyed further to document best practices and benefits. Information is not available on whether the utility coordinators were also involved in utility inspections or whether the projects used additional inspectors. An additional survey might be necessary to gather this information.
- Conduct a study (e.g., through the NCHRP process) to determine the effectiveness of providing utility

coordination and/or utility inspection during the construction of sample highway projects to document best practices and benefits. The study would involve identifying at least five projects throughout the country and either documenting their experiences with utility coordination and/or utility inspection during construction or providing utility coordination and/or utility inspection and evaluating the results. The analysis would include an evaluation of the additional project costs and any benefits resulting from implementing the strategy.

In addition to costs and benefits, the analysis would need to examine potential challenges and strategies for addressing them. For example, it is known that experienced and knowledgeable utility coordinators are difficult to find for preconstruction, and it may be even more difficult to find them for construction, especially if they are required to provide inspection services. Likewise, utility coordinators provided by contractors may adopt the contractors' point of view when issues arise, making it more difficult to establish productive working relationships with utilities.

The AASHTO Subcommittee on Right-of-Way and Utilities could use the lessons learned from the study to update its right-of-way and utility guidelines and initiate the inclusion of a recommendation in updates of pertinent AASHTO guidance and policy manuals.

Develop Methodology for Preliminary Utility Relocation Cost Estimates

This implementation idea involves developing and promoting methodologies for preparing preliminary utility relocation cost estimates. As part of the multiple-level MOU structure in place at Main Roads in Australia, a catalog was prepared that shows typical electrical installation facilities and the amount required to relocate those facilities.

This catalog allows Main Roads to conduct a quick identification of assets (partly because the catalog contains photographs of typical assets found in the field) and produce a preliminary assessment of utility relocation costs, which is appropriate for developing early utility relocation cost estimates in the planning and programming phases. In the preliminary design and design phases, more detailed cost assessments are still necessary (that include variable contingency levels, depending on the design status). The document, which

is revised yearly, is distributed to all regional Main Roads offices.

Strategies in connection with this implementation idea include the following:

- Implement the results of Texas Department of Transportation Research Project 0-4998 “Standardization of Special Provisions and Determination of Unit Costs for Utility Installations.”⁽⁶²⁾ This research resulted in a framework for estimating and analyzing utility relocation costs throughout the project development process, from planning to design and construction.
- Identify States with methodologies for collecting cost information for utility relocation estimation purposes. This effort might also include cost aggregation schemes and benefits derived not only by State DOTs, but also by participating utility companies.
- Develop a best-practice manual for developing utility relocation estimates throughout the project development process and disseminate the results to State DOTs and utility companies.

Real Property Management

Develop GIS-Based Right-of-Way Project and Asset Management Systems

Note: See details under “Right-of-Way Acquisition.”

Promote Active Management of the Right-of-Way Asset to Maximize Value and Return on Investment

This implementation idea involves promoting strategies that encourage a business-oriented asset management approach to maximize the value and return on investment of the right-of-way asset. The origin of the idea was the strong emphasis on entrepreneurship and the application of sound business principles to DOT operations, including right-of-way and utility coordination, that the study team perceived in Australia. In addition to using strategies such as strategic planning and maintaining high levels of performance and customer satisfaction, the state DOTs visited also seek opportunities to maximize the value and revenue from right-of-way assets. Examples of commercial ventures include leasing properties not needed for transportation purposes in the short term, leasing billboards located on the right-of-way, using multiple leases for communication infrastructure locations, and using commercial

agreements for utility attachments to bridges. Not every right-of-way asset management tool needs to result in additional revenue.

Strategies to promote best practices for the optimum use of the right-of-way asset include the following:

- Develop and deploy a comprehensive asset management function to plan, develop, manage, and optimize returns on State DOT real property holdings. The function would need to cover all interests associated with the right-of-way asset, including the land, subsurface mineral rights, water rights, air rights, and wireless communication support structures.
- Draft legislation that enables the use of innovative ideas to optimize the use of the right-of-way asset.
- Develop alternative right-of-way valuation techniques to the traditional “across-the-fence” valuation method, explicitly considering the fact that a continuous right-of-way is more than just an assembly of isolated land parcels. Expanded use of alternative valuation methods is also important to properly assess the value of the right-of-way for accommodating other facilities within the right-of-way.

Project Team Strategies, Training, and Professional Development

Develop Framework to Establish Proficiency of Right-of-Way and Utility Professionals in Core Disciplines

This implementation strategy involves developing programs and promoting strategies for developing right-of-way and utility professionals. Australian states use a variety of approaches to promote training and professional development opportunities. For example, several universities offer formal educational programs for property valuers. A typical 3-year, full-time program offers a degree with a major in property. In New South Wales, the NSW Streets Opening Conference sponsored the development of a pilot training course for transportation and utility personnel, which will provide the foundation for a formal accreditation process for utility location services. Through VicRoads International, VicRoads has an active presence abroad that provides staff members with the opportunity to travel and work abroad. VicRoads also promotes VRI as a recruitment strategy.

In Canada, Alberta Transportation outsources most work, including right-of-way acquisition and utility coordination. However, the agency is revisiting its 100 percent commitment to outsourcing. MTO outsources much of its work, except right-of-way acquisition, but has begun to do more work internally. This trend highlights the need to develop in-house expertise to address needs such as succession planning, the ability to provide needed services, and the management of services that continue to be outsourced.

Strategies in connection with this implementation idea include the following:

- Monitor Strategic Highway Research Program (SHRP) 2 Project R15(A) "Model Curricula and Training Programs for Utility Relocation." The objective of this project is to develop a training program and model curricula to provide transportation agencies, consultants, and utility professionals with tools to assist in the coordination, design, and construction of utility facilities, as well as tools to develop a better understanding of the interaction between transportation and utility facilities. SHRP 2 R15(A) is expected to become active in the short term. If SHRP 2 R15(A) is not activated, it would be advisable to develop a research problem statement for potential NCHRP funding.
- Monitor the Florida Utilities Coordinating Committee's (FUCC) effort developing six utility coordination training modules for State, consultant, and utility personnel, and explore the possibility of adopting FUCC's training modules for nationwide use. Two modules are already being taught. Upon completion, the Florida DOT anticipates using the modules to train and certify all utility coordinators working on agency projects.
- Work with the National Highway Institute (NHI) to either extend the scope of the "Highway/Utility Issues" course (FHWA-NHI-134006) to cover utility coordination issues in more detail or to develop a new course that covers topics beyond that course.
- Examine the need to revamp right-of-way-related NHI courses (e.g., "Advanced Relocation Under the Uniform Act" (FHWA-NHI-141030), "Appraisal for Federal-Aid Highway Programs" (FHWA-NHI-141043), and "Appraisal Review for Federal-Aid Highway Programs" (FHWA-NHI-141044)) to

ensure that they effectively address the training needs of right-of-way professionals.

- Develop training and accreditation programs on selected right-of-way and utility topics through established university-based extension services nationwide. To facilitate the process, it would be advisable to develop a centralized list of courses and provide funding to a selected number of university-based extension services to develop and market the training modules.
- Develop formal degree-seeking curricula on right-of-way topics. Following the Australian model, the first step could be to develop a 2- to 3-year associate's degree program. To facilitate the process, it may be possible to provide seed funding for developing the curricula to a selected number of nationally recognized institutions that offer associate's degrees. (A few institutions in the United States already provide associate's degrees in real estate appraisals. It may be advisable to capitalize on their experience and extend their scope of services to cover transportation right-of-way topics.)

The second step could be to develop 4-year bachelor's degree programs. According to anecdotal information, consultants frequently hire graduates with a degree (e.g., in business) to do right-of-way-related work. While it is possible to provide on-the-job training to those individuals, the industry (and its clients) would benefit enormously if it could hire graduates with a degree in a right-of-way-related topic. Transportation agencies would also benefit because of the possibility to hire right-of-way agents who have 4-year college degrees and are more likely to grow internally to management levels. A 4-year degree in right-of-way would also increase the level and visibility of the right-of-way profession in the transportation industry.

- Develop graduate-level programs (both master's degree and Ph.D.) in utility engineering that also enable upper-level undergraduate students to take utility-related electives. In recent years, subsurface utility engineering (SUE) has evolved into a recognized specialty in the civil engineering profession. However, the name of the specialty is sometimes controversial because transportation professionals

frequently associate SUE with the inventory of utilities and the corresponding quality levels and fail to recognize that SUE also encompasses utility coordination and aboveground utilities.

To enhance the visibility of the specialty, it would be advisable to use a more generic term such as “utility engineering,” much like other recognized civil engineering specialties such as transportation engineering, geotechnical engineering, structural engineering, and hydraulic engineering.

A graduate-degree program in utility engineering would enable students to develop expertise in a variety of topics, such as utility accommodation and utility relocation laws, regulations, and principles; utility coordination topics; construction management; relevant geotechnical topics; industry standards and specifications; project management; right-of-way topics; surveying; computer-aided design; database management; and GIS. To facilitate the process, it may be possible to provide seed funding for developing the curricula to a selected number of nationally recognized universities.

- Develop a staff exchange program with selected counterpart transportation agencies abroad as a mechanism to expose staff members to alternative practices, which in the long term could benefit both the participating agencies and the individuals involved.
- Develop and maintain a strategic relationship with Australian and Canadian transportation agencies. A common theme during the meetings in Australia and Canada was the mutual interest between the U.S. delegation and the host agencies in continuing the exchange of ideas after the scanning study. Several strategies were discussed to achieve this goal, including cross participation in significant state- and national-level organizations and conferences. In the case of Australia, those discussions have evolved into short-term activities and plans that include DTEI’s participation at the 2009 AASHTO right-of-way and utilities conference in Oklahoma City, OK, and the potential participation of AASHTO and/or IRWA representatives at similar conferences in Australia. In the case of Canada, several mechanisms already foster communications between U.S. and Canadian officials (e.g., through

AASHTO and IRWA). These mechanisms could be expanded to cover relevant right-of-way and utility-related issues of mutual interest.

References

1. Area of Australia–States and Territories. Geoscience Australia, Australian Government, Canberra ACT, Australia, October 2008. <http://www.ga.gov.au/education/geoscience-basics/dimensions/area-aus-states-territories.jsp>. Accessed Jan. 3, 2009.
2. Land and freshwater area, by province and territory. Statistics Canada, Ottawa, Ontario, Canada, February 2005. <http://www40.statcan.gc.ca/l01/cst01/phys01-eng.htm>. Accessed Jan. 3, 2009.
3. Australian Demographic Statistics. Australian Bureau of Statistics, Belconnen ACT, Australia, June 2008. <http://www.abs.gov.au/ausstats/abs@.nsf/mf/3101.0>. Accessed Jan. 3, 2009.
4. Quarterly Demographic Estimates. Statistics Canada, Ottawa, Ontario, Canada, December 2008. <http://www.statcan.gc.ca/daily-quotidien/081219/t081219b2-eng.htm>. Accessed Jan. 3, 2009.
5. R. Moeller, J. Pestinger, M. Frierson, W. Kennedy, A. McCormick, C. Colan Muth, J. Myers, P. Scott, and S. Waymack. *European Right-of-Way and Utilities Best Practices*. FHWA-PL-02-013. Federal Highway Administration, Washington, DC, August 2002.
6. National Guidelines for Transport System Management in Australia. Australian Transport Council, Canberra, Australian Capital Territory, Australia, 2006. <http://www.atcouncil.gov.au/documents/NGTSM.aspx>. Accessed Nov. 24, 2008.
7. Alberta Infrastructure and Transportation Developments Adjacent to Highways. Alberta Infrastructure and Transportation, Edmonton, Alberta, Canada, October 2007.
8. Land-use Framework. Government of Alberta, Edmonton, Alberta, Canada. <http://www.landuse.alberta.ca/>. Accessed Nov. 24, 2008.
9. Public-Private Partnerships. Federal Highway Administration, Washington, DC, undated. <http://www.fhwa.dot.gov/PPP/index.htm>. Accessed Jan. 3, 2009.
10. M. Sakal. "Project Alliancing: A Relational Contracting Mechanism for Dynamic Projects." *Lean Construction Journal*, Vol. 2, No. 1, April 2005. http://www.leanconstruction.org/lcj/paper_v2_i1.html. Accessed Jan. 3, 2009.
11. Request for Proposals. Tullamarine–Calder Project. VicRoads, Melbourne, Victoria, Australia, undated.
12. Agreement to Design, Build, Finance and Operate. Northwest Anthony Henday Drive. Alberta Transportation, Edmonton, Alberta, Canada. <http://www.transportation.alberta.ca/1704.htm>. Accessed Nov. 24, 2008.
13. Land Acquisition (Just Terms Compensation) Act 1991. New South Wales Consolidated Acts, Sydney, New South Wales, Australia. http://www.austlii.edu.au/au/legis/nsw/consol_act/latca1991442/. Accessed Nov. 24, 2008.
14. Roads Act 1993. New South Wales Consolidated Acts, Sydney, New South Wales, Australia. http://www.austlii.edu.au/au/legis/nsw/consol_act/ra199373/. Accessed Nov. 19, 2008.
15. Land Titles. Department of Lands, Government of New South Wales, Australia. http://www.lands.nsw.gov.au/land_titles. Accessed Nov. 24, 2008.
16. Land Acquisitions. Second Edition. Roads and Traffic Authority, Sydney, New South Wales, Australia, 1999.
17. Valuation. Department of Lands, Government of New South Wales, Australia. <http://www.lands.nsw.gov.au/valuation>. Accessed Nov. 24, 2008.
18. Best Practice Reporting Review. Joint Committee on the Office of the Valuer General, Parliament of New South Wales, Sydney, New South Wales, Australia, November 2005. [http://www.parliament.nsw.gov.au/prod/parliament/committee.nsf/0/5cfd1f048b295e02ca2570ba0013f2b8/\\$FILE/Best%20Practice%20Report%20Part%20One%20Without%20Apendices.pdf](http://www.parliament.nsw.gov.au/prod/parliament/committee.nsf/0/5cfd1f048b295e02ca2570ba0013f2b8/$FILE/Best%20Practice%20Report%20Part%20One%20Without%20Apendices.pdf). Accessed Jan. 4, 2009.

- 19.** Transport Planning and Coordination Act 1994. Office of the Queensland Parliamentary Counsel, Brisbane, Queensland, 1994. http://www.legislation.qld.gov.au/Acts_Passed/Acts_Passed_NUM_1994.htm. Accessed Nov. 24, 2008.
- 20.** Transport Infrastructure Act 1994. Office of the Queensland Parliamentary Counsel, Brisbane, Queensland, 1994. http://www.legislation.qld.gov.au/Acts_Passed/Acts_Passed_NUM_1994.htm. Accessed Nov. 24, 2008.
- 21.** Integrated Planning Act 1997. Office of the Queensland Parliamentary Counsel, Brisbane, Queensland, 1997. http://www.legislation.qld.gov.au/Acts_Passed/Acts_Passed_NUM_1994.htm. Accessed Nov. 24, 2008.
- 22.** Land Act 1994. Office of the Queensland Parliamentary Counsel, Brisbane, Queensland, 1994. http://www.legislation.qld.gov.au/Acts_Passed/Acts_Passed_NUM_1994.htm. Accessed Nov. 24, 2008.
- 23.** Acquisition of Land Act 1967. Office of the Queensland Parliamentary Counsel, Brisbane, Queensland, 1994. <http://www.legislation.qld.gov.au/Search/isysquery/30cf9847-aadf-4f48-b2ac-ba0d09836500/4/doc/AcqLandA67.pdf#xml=http://www.legislation.qld.gov.au/Search/isysquery/30cf9847-aadf-4f48-b2ac-ba0d09836500/4/hilite/>. Accessed Nov. 24, 2008.
- 24.** *Property Acquisition. A Guide to DTEI's acquisition process under the Land Acquisition Act 1969.* Department for Transport, Energy, and Infrastructure, Adelaide, South Australia, Australia.
- 25.** Highways Act 1926. South Australian Legislation, Adelaide, South Australia, Australia. <http://www.legislation.sa.gov.au/LZ/C/A/HIGHWAYS%20ACT%201926.aspx>. Accessed Nov. 24, 2008.
- 26.** Land Acquisition Act 1969. South Australian Legislation, Adelaide, South Australia, Australia. <http://www.legislation.sa.gov.au/LZ/C/A/LAND%20ACQUISITION%20ACT%201969.aspx>. Accessed Nov. 24, 2008.
- 27.** Metropolitan Adelaide Road Widening Plan Act 1972. South Australian Legislation, Adelaide, South Australia, Australia. <http://www.legislation.sa.gov.au/LZ/C/A/METROPOLITAN%20ADELAIDE%20ROAD%20WIDEN->
- [ING%20PLAN%20ACT%201972.aspx](http://www.legislation.sa.gov.au/LZ/C/A/METROPOLITAN%20ADELAIDE%20ROAD%20WIDEN-ING%20PLAN%20ACT%201972.aspx). Accessed Nov. 24, 2008.
- 28.** Road Management Act 2004. Parliament of Victoria, Melbourne, Victoria, Australia. http://www.dms.dpc.vic.gov.au/Domino/Web_Notes/LDMS/PubLawToday.nsf?OpenDatabase. Accessed Nov. 24, 2008.
- 29.** Road Management Act, regulations and codes. Roads Corporation, Melbourne, Victoria, Australia. <http://www.vicroads.vic.gov.au/Home/RulesStandardsRegulations/RoadManagementActRegulationsCodes/>. Accessed Nov. 24, 2008.
- 30.** Land Acquisition and Compensation Act 1986. Parliament of Victoria, Melbourne, Victoria, Australia. http://www.dms.dpc.vic.gov.au/Domino/Web_Notes/LDMS/PubLawToday.nsf?OpenDatabase. Accessed Nov. 24, 2008.
- 31.** Victoria's Registrar of Titles. Department of Sustainability and Environment, Melbourne, Victoria, Australia. <http://www.dse.vic.gov.au/DSE/nrenptm.nsf/LinkView/6D774E81233A3E42CA2572110081044E787BE628BB684FBCA25729500794750>. Accessed Nov. 24, 2008.
- 32.** Policy and Instructions for the Purchase, Compulsory Acquisition, and Sale of Land. Government Land Monitor, Department of Infrastructure, Melbourne, Australia, August 2000. [http://www.land.vic.gov.au/CA256F310024B628/0/A770487351EBA70BCA25702C00816754/\\$File/Policy+and+Instructions+for+the+Purchase+Compulsory+Acquisition+and+Sale+of+Land.pdf](http://www.land.vic.gov.au/CA256F310024B628/0/A770487351EBA70BCA25702C00816754/$File/Policy+and+Instructions+for+the+Purchase+Compulsory+Acquisition+and+Sale+of+Land.pdf). Accessed Nov. 24, 2008.
- 33.** Government Panel of Valuers. Valuer-General Victoria, Melbourne, Australia, May 2008. <http://www.land.vic.gov.au/Land/lcnlc2.nsf/childdocs/-418EED712A81C5AE-4A256A0A0015CDC1-26C8409B2467569D4A256A0A-001DAC6F-236D1771CBB90BBFCA256E5F0014647E-DF4C0519746C52D14A256A63001E1A4D?open>. Accessed Nov. 24, 2008.
- 34.** Expropriation Act. Queen's Printer, Government of Alberta, Edmonton, Alberta, Canada. http://www.qp.gov.ab.ca/catalogue/catalog_results.cfm?frm_isbn=0779741048&search_by=link. Accessed Nov. 24, 2008.

- 35.** Highways Development and Protection Act. Queen's Printer, Government of Alberta, Edmonton, Alberta, Canada. http://www.qp.gov.ab.ca/documents/Acts/H08P5.cfm?frm_isbn=9780779724581. Accessed Nov. 24, 2008.
- 36.** Highway Development and Protection Regulation. Draft. Edmonton, Alberta, Canada, 2008.
- 37.** Government Organization Act. Queen's Printer, Government of Alberta, Edmonton, Alberta, Canada. http://www.qp.gov.ab.ca/documents/Acts/G10.cfm?frm_isbn=9780779733071. Accessed Nov. 24, 2008.
- 38.** Calgary Restricted Development Area Regulations. Queen's Printer, Government of Alberta, Edmonton, Alberta, Canada. http://www.qp.gov.ab.ca/documents/regs/1976_212.cfm. Accessed Nov. 24, 2008.
- 39.** Edmonton Restricted Development Area Regulations. Queen's Printer, Government of Alberta, Edmonton, Alberta, Canada. http://www.qp.gov.ab.ca/documents/regs/1974_287.cfm. Accessed Nov. 24, 2008.
- 40.** Transportation/Utility Corridor (TUC) Program Policy. Realty Services Branch, Properties Division, Alberta Infrastructure, Edmonton, Alberta, Canada. <http://www.infrastructure.alberta.ca/TUCContent/tucpolicy.pdf>. Accessed Nov. 24, 2008.
- 41.** Transportation/Utility Corridors. Presentation, Government of Alberta, Edmonton, Alberta, Canada, undated.
- 42.** Public Transportation and Highway Improvement Act. Legislative Assembly, Toronto, Ontario, Canada. http://www.e-laws.gov.on.ca/Download?dDocName=elaws_statutes_90p50_e. Accessed Nov. 24, 2008.
- 43.** Expropriations Act. Legislative Assembly, Toronto, Ontario, Canada. http://www.e-laws.gov.on.ca/Download?dDocName=elaws_statutes_90e26_e. Accessed Nov. 24, 2008.
- 44.** Streamlining Land Acquisitions. Implementation Guidelines. Property Office, Ministry of Transportation, St. Catharines, Ontario, Canada, February 2007.
- 45.** Planning Act. Legislative Assembly, Toronto, Ontario, Canada. http://www.e-laws.gov.on.ca/Download?dDocName=elaws_statutes_90p13_e. Accessed Nov. 24, 2008.
- 46.** *Corridor Control and Permit Procedures Manual*. Ministry of Transportation of Ontario, Toronto, Ontario, Canada, 2001. http://www.library.mto.gov.on.ca/webopac/zoomrecord.asp?recordkey=55689fe3-43d9-4e10-bf6c-ebaa2e3c78d3&TemplateGUID=26c8336a-34a4-4079-8514-5cf60c65e6eb&passport=0b49eaf2-2a8f-4ff0-9351-0404c499b607&data_dictionary=7422212a-4e1b-475d-8b16-63406bda3e4f&CommandQuery=+%28Title+%25+%27corridor+control+and+permit+procedures+manual%27+%29&SearchButton=Command&SearchTemplate=&page=1&RootTemplateGUID=f1273652-1c89-4feb-b4ed-aa5525c2792b&rpt_session_guid=&hpp=25&searchmode=basic&ParentTemplateGUID=&CurSortCol=&CurSort=0&LinkGUID=&mode=search&hide=1. Accessed Nov. 24, 2008.
- 47.** Memorandum of Understanding between Sydney Water Corporation and Roads and Traffic Authority of New South Wales, Sydney, New South Wales, Australia. Issue 1.2, May 2007.
- 48.** *Model Agreement for Local Councils and Utility/Service Providers*. NSW Streets Opening Conference, August 1999.
- 49.** *Guide to Codes and Practices for Street Opening*. NSW Streets Opening Conference, 2007.
- 50.** AUS-SPEC. Standards Australia, Sydney, New South Wales, Australia, undated. <http://www.standards.org.au/cat.asp?catid=32&ContentId=61>. Accessed Nov. 24, 2008.
- 51.** M. Nenes and I. Davies. Memorandum of Understanding. Energex and Main Roads. Telstra and Main Roads. Presentation, Department of Main Roads, Brisbane, Queensland, 2008.
- 52.** Telecommunications Act 1997. Commonwealth of Australia Law, Canberra, Australia. <http://www.comlaw.gov.au/comlaw/Legislation/ActCompilation1.nsf/0/9658F043246AC29DCA25748A001FD7C1?OpenDocument>. Accessed Nov. 24, 2008.
- 53.** Project Guidelines. Issue 4. Power Line Environment Committee, Adelaide, South Australia, Australia. <http://www.lga.sa.gov.au/site/page.cfm?c=11287>. Accessed Nov. 24, 2008.

- 54.** Annual Report 2002–2003. Power Line Environment Committee, Adelaide, South Australia, Australia.
- 55.** Road Management Act 2004. Code of Practice. Management of Infrastructure in Road Reserves. *Victoria Government Gazette*, October 2008. <http://www.gazette.vic.gov.au/Gazettes2008/GG2008S269.pdf>. Accessed Nov. 24, 2008.
- 56.** Relocation Procedures (Utilities), Version 3. Ministry of Transportation of Ontario, St. Catharines, Ontario, Canada, June 3, 2008.
- 57.** Hydro One Plant Relocation Guidelines. Hydro One, Toronto, Ontario, Canada, undated.
- 58.** *Domestic Scan Program: Best Practices in Right-of-Way Acquisition and Utility Relocation*. FHWA-HEP-07-022. Federal Highway Administration, Washington, DC, December 2006. <http://www.fhwa.dot.gov/REALESTATE/scans/bprowscan.htm>. Accessed Jan. 7, 2009.
- 59.** 2008 FHWA Incentive Payments Peer Exchange Report. Federal Highway Administration, Portland, Oregon, August 13–14, 2008. <http://www.fhwa.dot.gov/realestate/incpeerexch.htm>. Accessed Jan. 4, 2009.
- 60.** K. Hancock. 8-55 Integrating Geo-spatial Technologies into the Right-of-Way Data Management Process. 8-55A Developing a Logical Model for a Geo-spatial Right-of-Way Information Management System. 2008 AASHTO/FHWA Right-of-Way and Utilities Conference, Grand Rapids, Michigan, May 4–8, 2008. http://cms.transportation.org/sites/rightofway/docs/2008_ch05s05.pdf. Accessed Jan. 7, 2009.
- 61.** C. Quiroga, E. Kraus, N. Koncz, S. Lyle, and Y. Li. *Right-of-Way Real Property Asset Management—Prototype Data Architecture*. Publication FHWA/TX-09/0-5788-1, Texas Department of Transportation, Austin, TX, February 2009.
- 62.** C. Quiroga, D. Ford, T. Taylor, S. Kranc, E. Kraus, and E. Park. *Specification Framework for Telecommunication Utilities and Estimation of Utility Adjustment Costs*. Publication FHWA/TX-08/0-4998-3, Texas Department of Transportation, Austin, TX, December 2007. <http://tti.tamu.edu/documents/0-4998-3.pdf>. Accessed Jan. 7, 2009.

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Biographic Information

John P. Campbell (*AASHTO cochair*) is chair of the American Association of State Highway and Transportation Officials (AASHTO) Subcommittee on Right-of-Way and Utilities and director of the Right-of-Way Division of the Texas Department of Transportation (TxDOT). He oversees the department's efforts in acquiring right-of-way for highway construction, providing relocation assistance and payments, controlling outdoor advertising along highways, and coordinating utility adjustments. He earned his bachelor's degree in civil engineering from Texas A&M University in 1984. Campbell earned his master's degree in business administration from the University of Texas at Dallas in 1992. He is a 1999 graduate of the Governor's Executive Development Program at the Lyndon B. Johnson School of Public Affairs at the University of Texas at Austin. Campbell began his career in TxDOT's Dallas District as the right-of-way utility coordinator in 1989. Moving to Austin in 1993, he supervised the Right-of-Way Division's Utility Section. Two years later, he became the division's Engineering Section director. Campbell became director of the Right-of-Way Division in 1999. Before TxDOT, Campbell worked in the private sector in Dallas as an excavation and utility construction contractor and a contract manager for a design consulting firm. He is a registered professional engineer in Texas and holds the International Right of Way Association (IRWA) senior designation of SR/WA. He is a certified IRWA course facilitator and a member of IRWA Chapter 74 in Austin.

Gerry L. Solomon (*FHWA cochair*) is director of FHWA's Office of Real Estate Services, where he is responsible for developing polices and providing management direction for nationwide programs on right-of-way acquisition, relocation assistance, property management, corridor preservation, and related aspects of the Federal and

Federal-aid highway programs. Solomon has a bachelor's degree from the University of Massachusetts, a law degree from the University of Miami, and a master's in public administration from Suffolk University School of Management. In 25-plus years of legal and policy work in the public and private sectors, he has concentrated on contracts, real estate, and transportation. After time in a private litigation practice, Solomon held various positions in the Massachusetts Office of General Counsel of the Division of Capital Planning and Operation. In this office, he was responsible for issues associated with construction of state capital facilities and disposition of state surplus property. In 1993, he joined the Massachusetts Highway Department as manager of right-of-way for the Central Artery/Third Harbor Tunnel Project. In 1997, he became director of the agency's Right-of-Way Bureau, a position he held until coming to FHWA in 2006. Solomon is licensed to practice law in Massachusetts and is a member of the Transportation Research Board's Committee on Eminent Domain and Land Use.

Gary C. Fawver is the division chief for the Environmental Quality Assurance Division at the Pennsylvania Department of Transportation (PennDOT). Fawver directs the Environmental Quality Assurance Division, where he is responsible for overseeing the development and implementation of PennDOT environmental policy and procedures. Before that, Fawver was chief of PennDOT's Utilities and Right-of-Way Section for 8 years. He has a bachelor's degree in transportation technology from Pennsylvania State University. He is a licensed professional engineer in Pennsylvania and serves on the technical committee for the American Society of Civil Engineers Standard 38-02, Standard Guideline for the Collection and Depiction of Existing Subsurface Utility Data.

G. Raymond Lorello is the statewide utility and railroad program manager for the Ohio Department of

Transportation (ODOT). Lorello's responsibilities include statewide support for the network of 12 district utility coordinators, who are involved in utility relocation in the State's \$2 billion annual highway construction program. Additional responsibilities include the review and approval of utility relocation plans and reimbursement eligibility, coordination of highway construction that impacts the State's railroads, including an aggressive \$200 million Rail-Grade Separation Program, and supervision of a staff of three who share responsibility for this activity. Lorello has been with ODOT for more than 10 years and has nearly 35 years of experience in government and private sector interaction in the areas of economic development, utilities, and airport operations. He studied business administration at the University of Dayton, organization management at the University of Notre Dame, and is a graduate of the George V. Voinovich Institute for Public Strategy at Ohio University. Lorello is a member of several ODOT committees charged with creating processes for improving the efficiency of utility relocation in highway construction projects and railroad coordination.

Daniel (Dan) M. Mathis is the division administrator for FHWA's Washington Division in Olympia, WA. As the top FHWA official in Washington State, Mathis is responsible for providing leadership and strategic direction in the delivery of the \$600 million annual Federal-aid highway program in Washington. This includes ensuring that appropriate right-of-way and utility procedures are used for highway projects. Mathis was a participant in the U.S. scan on right-of-way and utilities (NCHRP 20-68 (01)) in July 2006. He has held various positions with FHWA in California, Illinois, Iowa, and Washington, DC, where he was involved in right-of-way and utility issues as part of highway projects. Mathis earned a bachelor's degree in civil engineering from North Dakota State University. He is a licensed professional engineer in California and a member of the American Society of Civil Engineers.

Dr. Cesar Quiroga (*report facilitator*) is a research engineer at the Texas Transportation Institute (TTI), where he is program manager of the Infrastructure Management Program. His research and professional interests are in the areas of transportation infrastructure management and transportation operations. He has been particularly involved in utility and right-of-way topics, including data inventory, utility permitting, utility relocation costs, and construction specifications. Before joining TTI in 1998, he was a research associate at the

Remote Sensing and Image Processing Laboratory at Louisiana State University. He also worked in the private sector as a consultant. He has a master's degree in civil engineering and a Ph.D. from Louisiana State University and an undergraduate degree in civil engineering from the Colombian School of Engineering. He is a registered professional engineer in Texas and Louisiana and is active in several organizations, including the American Society of Civil Engineers, the Institute of Transportation Engineers, and the Transportation Research Board.

Bimla Rhinehart is the division chief for the Division of Right-of-Way and Land Survey for the California Department of Transportation. She is responsible for managing the statewide program for right-of-way acquisitions, real property services, surveying, and right-of-way engineering in support of the agency's purpose, mission, vision, and goals. Rhinehart has worked in all functional areas of right-of-way, both in the urban and rural districts and in headquarters, and has been instrumental in streamlining project delivery and process improvement efforts. She was the team leader in developing and implementing a process for preproject mitigation. In addition to her right-of-way experience, Rhinehart has held various management positions in project management, legislative and external affairs, and budgets. In these positions, she developed a broad understanding of the various transportation programs and policies in California. Rhinehart graduated from California State University, Chico with a bachelor's degree in finance and accounting. She is a member of Women in Transportation and the International Right of Way Association.

Bernard (Ben) J. Ward is right-of-way division manager and vice president of PBS&J in West Palm Beach, FL. Ward joined PBS&J in 1990. PBS&J provides right-of-way project planning, project development, surveying and mapping, utility relocation design and coordination, land acquisition and relocation assistance production services, information-database technologies, and program management. Ward's responsibilities include management of 45 staff members in Florida, Georgia, and North Carolina; production oversight; and business development throughout the United States. He serves as the national liaison for all firm right-of-way activities. Ward has been active in several right-of-way organizations, including the International Right of Way Association, American Association of State Highway and Transportation Officials, Florida Institute of Consulting Engineers, and Right of Way Consultants Council. Key transportation project roles have

included senior acquisition and relocation agent, project manager, program manager and quality assurance officer. He has served on or supervised projects in Alabama, Arizona, California, Colorado, Florida, Georgia, Louisiana, Mississippi, Nevada, North Carolina, Pennsylvania, South Carolina, Tennessee, Texas, and Virginia. Ward earned his bachelor's degree in business administration and marketing from the University of Iowa in 1982.

Jeffrey A. Zaharewicz is the Value Engineering and Utilities Program manager in FHWA's Office of Infrastructure in Washington, DC. He is responsible for providing technical direction and support for initiatives aimed at improving the relocation and accommodation of utility facilities on highway rights-of-way and advancing innovative utility engineering practices. His responsibilities also include developing, interpreting, and applying Federal legislative requirements and agency policies. Before joining the Office of Infrastructure in 2007, he worked for the Office of Federal Lands Highway for 17 years. He has experience in areas ranging from highway design to architecture-engineering and construction procurement to program management. Zaharewicz holds a bachelor's degree in civil engineering from Pennsylvania State University.

Nicholas M. Zembillas is senior vice president of the Utility Division and principal of TBE Group, Inc. (TBE). Zembillas joined TBE as director of utility engineering in 1992. He provides leadership and management for 35 national branch offices and a joint venture in Canada, which provide subsurface utility engineering (SUE), utility design and engineering, utility negotiation, and surveying and mapping services to private and public utilities, government agencies, and consulting firms. Before joining TBE, Zembillas worked for the Florida Department of Transportation as district utility engineer for District VII for 15 years. Zembillas serves as a technical advisor on SUE technology to numerous Federal and State agencies, and provides training and lectures on SUE internationally. Zembillas is a member of the American Society of Civil Engineers' Standards Committee and is on the board of directors of the National Utility Locating Contractors Association. He is a frequent speaker at national conferences and associations and has written numerous articles for publication in technical journals. His other professional affiliations include the American Society of Highway Engineers, American Public Works Association, American Water Works Association, Florida Engineering Society, Florida Transportation Builders' Association, Florida

Utilities Coordination Committee, International Right of Way Association, National Highway and Utility Committee, National Utility Contractors Association, and Society of American Military Engineers. Zembillas earned a bachelor's degree in civil engineering from Westmar College in 1977.

APPENDIX B | Host Country Contacts

The following individuals served as the main contacts at each of the agencies visited. Table 4 provides a comprehensive list of individuals the scan team met with during the scanning study.

Australia—New South Wales

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Australia—Queensland

Raymond Matta

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Australia—South Australia

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Canada—Alberta

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Canada—Ontario

Robert Hazra

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Table 4. Host country officials met during scanning study.

Country	State/Province	Affiliation	Name	Title
Australia	New South Wales	Blacktown City Council	Schimke, Karl	Civil Engineer
Australia	New South Wales	Dial Before You Dig NSW	Puiu, Dominic	Manager
Australia	New South Wales	Energy Australia	Issa, Nabil	Manager and Chairman
Australia	New South Wales	Institute of Public Works Engineering Australia	Turner, Mark	Executive Manager, NSW Division
Australia	New South Wales	Jemena	Di Lorenzo, Carlo	Delivery and Improvements Coordinator
Australia	New South Wales	RTA	Cahill, Geoff	Infrastructure Development Manager
Australia	New South Wales	RTA	Dangerfield, Andrew	Acquisition Manager
Australia	New South Wales	RTA	Fogarty, Geoff	General Manager, Project Management Services
Australia	New South Wales	RTA	Mills, Bernie	Valuations and Acquisitions Manager
Australia	New South Wales	RTA	Nichols, Martin	Manager, Land Use and Transport Planning

continued

Country	State/Province	Affiliation	Name	Title
Australia	New South Wales	RTA	Woodburn, Richard	Program and Performance Manager
Australia	New South Wales	Sydney Water	Couchman, Graham	Policy Engineer
Australia	New South Wales	Telstra	Malhotra, Kulbir Singh	Senior Access Network Strategist
Australia	New South Wales	Telstra	McKechnie, Dave	Senior Advisor, NSW
Australia	Queensland	Energex	Lee, Colin	Network Systems Development Manager
Australia	Queensland	Justice and Attorney-General	Sammon, Gerard	Principal Lawyer
Australia	Queensland	Main Roads	Churchward, Allan	Executive Director, Project Delivery
Australia	Queensland	Main Roads	MacDonald, Mark	Director, Property Services
Australia	Queensland	Main Roads	Matta, Raymond	Director, Trade and Industry Relations
Australia	Queensland	Main Roads	Nelson, Cameron	Director, Urban Development and Planning
Australia	Queensland	Main Roads	Nenes, Michael	Principal Advisor, Road Reserve Management
Australia	Queensland	Main Roads	Stone, Robin	Director, Environment and Heritage
Australia	Queensland	Main Roads	Tesch, Alan	Director-General
Australia	Queensland	Main Roads	Thompson, Sharon	Manager, Corridor Access
Australia	Queensland	Telstra	Davies, Ivor	Business Development Manager
Australia	South Australia	DTEI	Berry, Jock	Road Portfolio Manager
Australia	South Australia	DTEI	Bertram, Charles	Principal Valuer
Australia	South Australia	DTEI	Elford, Mark	Director, Road Transport Policy and Planning
Australia	South Australia	DTEI	Gelston, Paul	Projects Director
Australia	South Australia	DTEI	Goode, Jeff	Regional Manager, Metropolitan
Australia	South Australia	DTEI	Hartley, Alan	Special Projects Manager
Australia	South Australia	DTEI	Mackintosh, Don	Senior Solicitor
Australia	South Australia	DTEI	Muncey, Richard	Director, Accommodation and Property Services
Australia	South Australia	DTEI	Wright, Alecia	Environmental Manager
Australia	Victoria	VicRoads	Buckeridge, Glen	Property Asset Manager
Australia	Victoria	VicRoads	Bull, Alan	Acquisition Manager
Australia	Victoria	VicRoads	Collins, Alan	Manager, Network Policy
Australia	Victoria	VicRoads	De Santis, Frank	Project Director, Eastern Projects
Australia	Victoria	VicRoads	Gidley, Bruce	Executive Director
Australia	Victoria	VicRoads	Kauhausen, Frank	Environmental Improvements Coordinator
Australia	Victoria	VicRoads	Kozlowski, Eddie	Network Policy Officer
Australia	Victoria	VicRoads	Manning, Jeff	Property Sales Manager
Australia	Victoria	VicRoads	Marcus, Shelley	Director, Legal Services
Australia	Victoria	VicRoads	Mottram, Clive	Manager, Planning Investigations
Australia	Victoria	VicRoads	Murphy, Helen	Director, Environmental Services
Australia	Victoria	VicRoads	Pontefract, Tim	Acquisition Manager
Australia	Victoria	VicRoads International	Cross, Bob	Manager, International Projects
Australia	Victoria	VicRoads International	Goad, Wendy	Project Operations Officer
Australia	Victoria	VicRoads International	Williams, Peter	Director, VicRoads International
Canada	Alberta	Alberta Infrastructure	Bramm, Rick	Senior Land Use Planner, North Region
Canada	Alberta	Alberta Infrastructure	Minenko, Mark	Legislative Planning and FOIP
Canada	Alberta	Alberta Infrastructure	Turpin, Joanie	Property Manager, North Central Region
Canada	Alberta	Alberta Transportation	Hritzuk, Kip	Director, Major Capital Projects Branch
Canada	Alberta	Alberta Transportation	Kwan, Allan	Executive Director, Technical Standards Branch
Canada	Alberta	Alberta Transportation	Mah, Joe	Utilities and Safety Specialist, Highway Operations
Canada	Alberta	Alberta Transportation	Middleton, Ron	Director, Environmental Management Services
Canada	Alberta	Alberta Transportation	Tjostheim, Glen	Roadside Planning Specialist
Canada	Ontario	MTO	Carruthers, Brenda	Senior Policy Analyst
Canada	Ontario	MTO	D'Angelo, Tony	Senior Property Officer
Canada	Ontario	MTO	Hazra, S. Robert	Head, Corridor Management and Property Office
Canada	Ontario	MTO	Hewitt, Tom	Head, Corridor Management Section
Canada	Ontario	MTO	Peeling, Doug	Senior Policy Advisor, Operations Office
Canada	Ontario	MTO	Toenig, Bettina	Senior Property Manager
Canada	Ontario	MTO	Wang, Jin	Senior Transportation Planner
Canada	Ontario	MTO	White, Jason	Section Head, Highway Engineering

APPENDIX C | Amplifying Questions

To assist in the discussion with host country officials, the scan team prepared a series of amplifying questions that provide additional insights about the motivation and objectives of the scan. The amplifying questions cover the following subject areas:

- A. Legal framework for right-of-way and utility processes**
- B. Transportation project delivery methods**
- C. Project development process**
- D. Environmental impacts**
- E. Right-of-way acquisition**
- F. Utility coordination and utility conflict management**
- G. Real property management**
- H. Project team strategies, training, and professional development**

For each subject area, the scan team is particularly interested in learning about innovative practices, techniques, uses of technology, and strategies the host countries have implemented to optimize or otherwise improve right-of-way and utility processes and integrate such processes into the project development phase to positively affect cost, project schedule, and quality. The scan team is also interested in the implementation of strategies and techniques affecting right-of-way and utility issues at different levels of government (national, regional, and local).

A. Legal Framework for Right-of-Way and Utility Processes

- A. 1. Can you provide an overview of applicable laws, regulations, and policies for voluntary and involuntary public acquisition and use of private or public property for highway purposes?
- A. 2. Can you provide an overview of applicable laws, regulations, and policies for ownership, accommodation and occupation, relocation, and reimbursement and compensation of utility facilities on highway rights-of-way?
- A. 3. Please describe the utility industry's rights and authority to acquire property for utility relocation to accommodate highway projects.

- A. 4. Please describe your agency's rights and authorities to acquire property for utility relocation to accommodate highway projects.

B. Transportation (Highway) Project Delivery Methods

- B. 1. What is the experience of your agency, region, or country in incorporating right-of-way acquisition and utility accommodation activities with various project delivery methods (e.g., design-bid-build, design-build, design-build-finance-operate, design-build-operate-maintain, performance contracting, framework contracts, and concessions)? What impact on project cost, schedule, and/or quality have you found in any of these alternative project delivery methods?
- B. 2. What types of project agreements does your agency, region, or country use to document the parties, roles and responsibilities, scope, schedule, and budget of highway projects?
- B. 3. What laws are in place requiring compensation for impacts caused by highway projects to property not acquired, such as noise, business interruption, access denial, and construction inconvenience?

C. Project Development Process

- C.1. What role does your agency play in the oversight of your region or country's transportation (highway) program?
- C.2. Can you provide an overview of your long-range (5- to 20-year) transportation planning process and the level of integration of right-of-way and utility needs and activities within this process (primarily for highways)?
- C.3. If the future planning process includes the identification of corridors for preservation (i.e., the application of strategies to protect future highway corridors from unwanted land development and unnecessary environmental, social, and economic impacts), are utility owners asked to provide input on future expansion of their facilities in the proposed corridor areas?

- C.4. What are the steps of the highway project development process in your agency, region, or country and how does the process vary by project type? How are right-of-way and utility needs addressed in each step?
- C.5. Please describe your region's or country's legal requirements and procedures for public involvement in the various stages of the project development process.

D. Environmental Impacts

- D.1. Please provide an overview of applicable laws, regulations, and requirements covering environmental impacts associated with highway projects.
- D.2. What are the steps of the environmental process in your agency, region, or country and how does the process vary by project type?
- D.3. At what phase in the project development process does your agency consider real property requirements to address environmental mitigation needs?
- D.4. At what phase in the project development process does your agency consider environmental impacts associated with utility relocation activities?
- D.5. Please describe your experience with innovative techniques for addressing environmental mitigation needs, such as land banking, use of public lands, private property ownership with covenants, and conservation easements.

E. Right-of-Way Acquisition

- E.1. Please describe the process for identifying right-of-way requirements and how those requirements and impacts are integrated into all phases of the project development process.
- E.2. Please describe performance measures or metrics used to evaluate the effectiveness of integrating right-of-way activities into all phases of the project development process.
- E.3. Does your agency, region, or country use corridor preservation strategies to protect future highway corridors from unwanted land development and unnecessary environmental, social, and economic impacts? If so, please describe the acquisition, legal requirements and restrictions, procedures, and other preservation techniques used to restrict land development.

- E.4. What types of property interests do you acquire and what strategies, methods, and processes do you use to secure those interests?
- E.5. What methods do you use to determine property values and compensation levels to property owners and tenants?
- E.6. Please describe your experience with acquisition incentive (or risk management) strategies, such as using signing bonuses and land exchanges, raising nominal monetary thresholds for low-cost parcels, allowing negotiators to offer above fair market value offers, letting landowners select the appraiser from an approved list, and offering a "highest supportable value."
- E.7. Please describe the process for negotiation and property interest acquisition.
- E.8. What information management systems does your agency, region, or country use to identify, document, and manage real property data during the project development process?
- E.9. What specifications and quality assurance-quality control methods does your agency use to ensure that project and right-of-way schematics and plans are sufficiently complete to proceed with right-of-way acquisition and minimize changes during project development, design, and construction?
- E.10. What types of performance measures for right-of-way acquisition and tracking does your agency, region, or country use?

F. Utility Coordination and Utility Conflict Management

- F.1. What is the process for integrating utility activities (including determination and evaluation of utility impacts, relocations required, and relocation schedule and cost) in the project development process?
- F.2. Please describe utility coordination and utility conflict management and resolution practices and strategies in your agency, region, or country.
- F.3. Please describe engineering and industry standards as well as policies and regulations that govern the depiction of utilities, accommodation, and relocation of utilities within the highway right-of-way.

- F.4. Is it common to include utility relocation work in the highway construction contract? If utilities are responsible for the cost, do you require them to deposit the funds to cover the expense prior to contract award?
- F.5. Please describe practices during the construction phase (both utility relocation and highway construction), including utility relocation inspection and management of utility conflicts during construction.
- F.6. What data collection standards and specifications, practices, technologies, and information management systems does your agency, region, or country use to accurately identify, document, and manage utility installation and utility conflict data?
- F.7. Please describe any postconstruction procedures, including the production of as-built documentation and follow-up reviews to identify problems with project design, project schedule, and conflict resolution.
- F.8. What performance measures or metrics do you use to determine the effectiveness of the utility process at monitoring utility activities?

G. Real Property Management

- G.1. What is your agency's process for the disposition or disposal (sale, lease, or donation) of property no longer needed for highway purposes (i.e., excess property)?
- G.2. Please describe information management systems used to identify, document, and manage real property data.
- G.3. Do you lease airspace over or along the right-of-way? What laws, regulations, and policies do you have on airspace use?
- G.4. Does your highway agency protect roadway capacity, safety, and aesthetics by controlling access to the roadway system? If so, how and where do you control access to the right-of-way? Do you use police powers or do you acquire access rights?
- G.5. What property management activities does your agency perform after acquisition and before construction of the project?

H. Project Team Strategies for Information Exchange, Training, and Professional Development

- H.1. Do you have a formal communication strategy in place to provide information exchange about the right-of-way and utility activities associated with your highway program?
- H.2. What is your level of interaction with right-of-way and utility stakeholders, including organizations, associations, and other professional venues?
- H.3. What practices and strategies does your agency, region, or country use to assist in the recruitment, retention, education, and professional development needs of right-of-way and utility personnel?

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