

A structure for government requirements in public-private partnerships

A.M. Abdel-Aziz and A.D. Russell

Abstract: A spectrum of requirements for the procurement of public infrastructure under various public-private partnership arrangements has been communicated by governments to the private sector participants. This paper suggests a structure for these requirements and demonstrates how they have been realized in public-private partnership projects. Government requirements are categorized and described under a structure of three dimensions: rights, obligations, and liabilities. Each dimension is further defined and explained through a number of attributes. The structure provides insights as to the basis for the different modes under public-private partnerships such as build-operate-transfer, build-own-operate-transfer, and build-transfer-operate. The structure is used to examine government requirements in a number of public-private partnership transportation projects. The results show that, for each dimension and its related attributes, comprehensive and clear articulation of government requirements is generally needed. This will reduce the amount of supplemental materials issued for the request for proposals, help consortiums in responding with proposals that can fit the requirements and reduce the amount of time spent in negotiations and (or) the need for contract amendments to reflect marketplace realities missed earlier.

Key words: public-private partnerships, concessions, development agreements, franchise agreements, transportation projects.

Résumé : Plusieurs exigences pour l'obtention d'infrastructures publiques par le biais d'arrangements variés de partenariats entre le public et le privé ont été communiquées par les gouvernements aux participants du secteur privé. Cet article suggère une structure pour ces exigences et démontre comment elles ont été réalisées dans des projets de partenariats entre le public et le privé. Les exigences gouvernementales sont catégorisées selon une structure en trois dimensions: droits, obligations et responsabilités. Chaque dimension est définie et expliquée plus en détails par le biais d'un nombre d'attributs. La structure fournit des éclaircissements au sujet des fondations des différents modes de partenariats entre le public et le privé, tels que construction-opération-transfert (« build-operate-transfer »), construction-appropriation-opération-transfert (« build-own-operate-transfer ») et construction-transfert-opération (« build-transfer-operate »). La structure est employée afin d'examiner les exigences gouvernementales pour quelques projets de partenariats entre le public et le privé en transport. Les résultats montrent que, pour chaque dimension et ses attributs associés, une description complète et claire des exigences gouvernementales est généralement nécessaire. Cela réduira la quantité de matériel supplémentaire suivant la requête de propositions, aider les consortiums à répondre avec des propositions qui peuvent remplir les exigences, et réduire le temps passé en négociations et/ou le besoin d'amendements au contrat afin de refléter les réalités du marché qui ont été omises auparavant.

Mots clés : partenariats entre le public et le privé, concessions, ententes de développement, ententes de franchise, projets en transport.

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1. Introduction

As public-private partnerships (PPP) have become a viable alternative to the traditional project delivery approach (U.K. Secretary of State for Transport 1989, 1993;

Augenblick and Custer 1990; Price Waterhouse 1993; World Bank 1994), a spectrum of procurement modes has evolved allowing expanded roles for the private sector in infrastructure development. While the build-operate-transfer (BOT) mode is the one most frequently referred to, its variants such as build-own-operate-transfer (BOOT), design-build-finance-operate (DBFO), and build-transfer-operate (BTO) are used almost as frequently. Governments usually follow a multi-step process for project procurement under any of these modes; an important step in this process is the formulation of government requirements for the project. This paper focuses on these requirements, as they provide the basis for structuring PPP project documents and agreements.

Government requirements cover all of the contractual, technical, and financial aspects of a project. An example of a government requirement is project ownership; government may provide for specific forms such as public ownership, private ownership, or both where transfer of ownership may

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occur during the term of development. The domain of ownership can be the whole project or may be defined for parts of the project, e.g., real property (land), facility (improvements), movable and immovable properties, intellectual property rights, and airspace rights. Whether to allow specific forms of domain may have consequences for both government and developers, for example, on tax treatments, on the availability of rights or licenses to use a technology after the project is transferred to government, or on the ability to obtain private financing for the project. These consequences need to be addressed, otherwise they may produce conflicts. Lawson (1994) explained that conflict might arise between government's statutory power and the developer's interests in areas such as changes to design, safety standards, delay in land acquisitions, and provision of approaches/feeders for road concessions. Where government requirements are not made clear for such issues, private sector developers will try to secure the PPP environment through negotiating binding covenants on the government before drafting development agreements (Lawson 1994). Therefore, the use of PPP calls for government to address the range of terms or conditions necessary to stipulate each requirement and the consequences of each.

The objective of this paper is to identify government requirements for the various phases of a project and demonstrate how they have been addressed in PPP projects. To help identify and demonstrate these requirements, a structure is formulated to model all requirements in a PPP project. This structure helps (i) identify the possible range of terms and conditions for each government requirement, (ii) government in formulating project documents and agreements for PPP projects, (iii) identify the basic structure underlying the different PPP modes, (iv) government in reaching a balance in their requirements in PPP, and (v) developers gain a better understanding of government requirements and how they should structure themselves (range of expertise/experience required) in order to comply with these requirements. In Sect. 2, the suggested requirement structure is presented. Then, Sect. 3 uses the structure to investigate government requirements in a number of PPP projects in the U.K., Canada, and the U.S. as well as in some U.S. acts. Recommendations and conclusions are the subjects of Sects. 4 and 5.

2. Requirement structure

Based upon a detailed study of public domain information pertaining to several PPP projects and acts, we conclude that a useful structure for describing the key features of a PPP project has three major dimensions: rights, obligations, and liabilities. These dimensions along with explanatory attributes are shown in Fig. 1. The rights dimension describes the various rights given by government to a private entity in return for carrying out a specified set of obligations. The rights of possession of a facility and access to revenues constitute the primary attributes of the rights dimension. The obligations dimension represents the promises that the developer and the government agree to be bound to under the agreement. Obligations can be described by four attributes: development obligations (e.g., planning, design, construction, and improvements); operating obligations (e.g., operation and maintenance); environment obligations including

related biophysical (e.g., air, marine, and terrestrial life) and socioeconomic (e.g., labor issues, regional benefits, and affected businesses) requirements; and financing obligations. The liabilities dimension covers the most controversial issues in PPP negotiations and includes three attributes: general liability (e.g., tort or third party liability and facility damage), risk liabilities, and tax liabilities.

For the traditional mode of project development, all requirements and associated attributes belong to, or are the responsibility of, government, as is ownership of a facility. Under PPP, a subset of attributes of a requirement can be temporarily or permanently assigned to another party. Therefore, various allocations of the attributes of the requirement structure can be assembled, which in turn leads to the spectrum of procurement modes commonly associated with PPP (e.g., BOT, BTO).

3. Projects and attributes description

The following subsections explain the projects and acts used for investigating government requirements and demonstrate all the dimensions and attributes of the requirement structure. For each attribute a general summary of the requirements is given, followed by a detailed description of attribute "values" assigned for the projects studied.

3.1. Projects and acts considered

The investigation on government requirements involved two BOT projects, two BOOT projects, one BTO, and a number of U.S. acts.

3.1.1. *The Channel Tunnel, U.K./France (BOT)*

The Fixed Link is a twin bored tunnel rail link with associated service tunnel under the English Channel between England and France. The approximately 50 km link was developed at a cost of U.S. \$16 billion. The invitation to promoters (equivalent to a request for proposals) was issued in 1985 (U.K. DOT 1985) with no prior call for expressions of interest. Agreement with the successful developer was reached in 1986 (HMSO 1986a), and the project was legislated in the U.K. by the Channel Tunnel Act (U.K. DOT 1987).

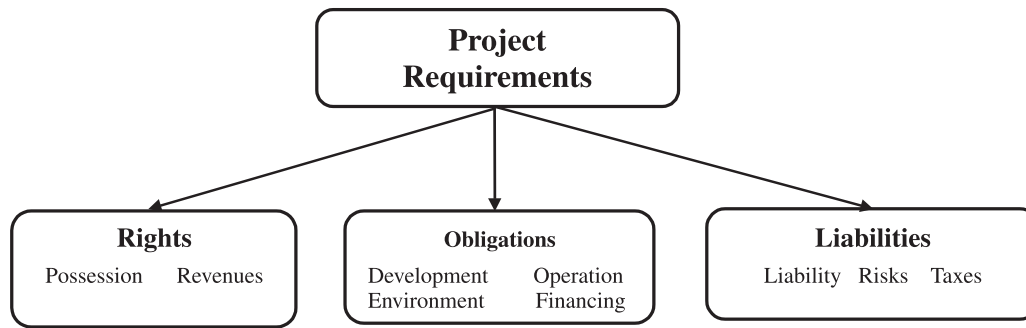
3.1.2. *Second Severn Bridge, U.K. (BOOT, DBFO)*

The Second Severn Bridge is a 920-m cable-stayed bridge and has two 2000-m approach viaducts over the Severn Estuary between England and Wales with a total cost of £300 million. Through a notice and invitation for prospective tenderers (U.K. DOT 1988) and tender invitation (U.K. DOT 1989), the project was arranged as a DBFO one (design-build-finance-operate); however, it is known also as a BOOT project. Along with the provision of a new crossing, the government required the promoter to take over the responsibility for the existing crossing over the Severn Estuary, including its debt.

3.1.3. *Highway 104 Western Alignment, Nova Scotia, Canada (BOT)*

The Western Alignment is a 45-km four-lane highway that forms part of Highway 104 (Trans-Canada Highway) in Nova Scotia. The total capital cost of the project is Cdn

Fig. 1. Requirement structure.



\$113 million. The request for proposals, issued in 1995, was followed by six addenda (Nova Scotia DOTC 1995). The legislation required for the project forms the Western Alignment Act (W-A Act) (Province of Nova Scotia 1995). This act provided for the creation of the Western Alignment Corporation as a single-purpose corporate vehicle, not a public authority or crown corporation. This corporation was created to assist the developer (Atlantic Highways Corp., a subsidiary of Canadian Highways International Corp.) in contracting with the Province for the realization of the project, rather than the developer creating a project company.

3.1.4. Northumberland Strait Crossing Project, New Brunswick/P.E.I., Canada (BOOT)

The Northumberland Bridge crosses the Northumberland Strait between New Brunswick and Prince Edward Island, Canada. The estimated cost of the 13.5-km bridge was about Cdn \$840 million, although the actual cost was in excess of this. After receiving unsolicited proposals for the project, the government issued a call for expressions of interest in 1987 (Public Works Canada 1987) followed by a call for proposals and six addenda in 1988 (Public Works Canada 1988). The project was legislated by the Northumberland Strait Crossing Act (Government of Canada 1993), and financial closing with the developer, Strait Crossing Development Inc., was made in 1993 after a number of environmental assessments and challenges in the courts. Some 39 separate agreements and 400 documents were executed, including a development agreement, a construction contract, a project security agreement, a project trust agreement, an operation agreement, and a regional agreement (FHWA 1996).

3.1.5. State Route 91 median improvement, California, U.S.A. (BTO)

The State Route 91 (SR 91) median improvement is one of four demonstration projects in California authorized by Assembly Bill 680 (Assembly Bill 1989). These projects were proposed by the private sector after issuance of guidelines for conceptual project proposals by the California Department of Transportation (Caltrans) (California DOT 1990). The SR 91 development franchise agreement (1993), signed in 1991, was granted to the developer, California Private Transportation Corporation (CPTC), with final approval of the agreement being contingent on meeting environmental requirements. The agreement was amended and restated in 1993 (California DOT 1993). The project consists of four new express lanes, electronically tolled, 10 miles long (16 km) within the center median of State Route 91. Con-

struction started in 1993 and the project opened in December 1995. Estimated cost of the project was U.S. \$126 million.

3.1.6. U.S. acts

Following California's initiatives as set out in Assembly Bill 680, several states enacted similar legislation for PPP projects. In Washington State, Substitute House Bill 1006 (SHB 1006) initiated BOOT/BTO procurements. It was later amended by SHB 1317 to provide for very comprehensive public involvement in the approval process. In Minnesota, Toll Road Enabling Legislation 1993 (TREL) (State of Minnesota 1993) was enacted to provide for BOOT/BTO projects through the TRANSMART request for proposals (Minnesota DOT 1995). Highway project TH 212, proposed following TRANSMART, was the first agreement signed by the government (Minnesota DOT 1996). However, during a 30-day voting period required by the Act for community approval, one of four cities on the proposed highway voted against it. In Virginia, the Public-Private Transportation Act (PPTA) (Virginia DOT 1995) was enacted to provide further refinements for the implementation of PPP projects following the earlier Virginia Highway Corporation Act of 1988 (Virginia DOT 1988) and the Qualifying Transportation Act of 1994 (Virginia DOT 1994). General consideration is given to these acts in this paper.

3.2. Rights dimension: possession attribute

The investigation of government requirements for this attribute shows an emphasis on the types of properties and requirements for the possession and transfer of property. Several types of properties have been mentioned in the selected projects and acts. These include

- land or real property needed for the project;
- improvements or the facility the developer agreed to construct on the land (e.g., highway, bridge, structure, movable and immovable properties, plant, equipment);
- airspace premises (e.g., over and under the right-of-way); and
- intangible properties needed for the development, operation, and ownership (e.g., intellectual property rights, patent rights, project documents, reports, drawings, plans, and specifications).

Generally, not all of these properties have been explicitly identified and defined in the request for proposals (RFPs) or agreements. Except for the U.S., governments seem to dislike explicitly stating that the developer will be the owner of the project. All-encompassing statements that treat the trans-

fer of all properties at the expiration of the agreement, such as with the Second Severn Bridge (BOOT), are typically featured in agreements. When lease agreements are made for land or right-of-way, the reversion of the improvement (facility) may be treated explicitly such as with the Northumberland Strait Crossing Project (NSCP) (work is deemed to be a fixture to the land) or implied to occur with the reversion of the land at the end of the lease such as with the Channel Tunnel. The two BOOT projects, Severn Bridge and the NSCP, leased the land to the developer at an insignificant rent. For the Channel Tunnel and Western Alignment BOT projects, the first provided land at cost and the second was free.

Intangible properties such as intellectual property rights were the subject of transfer for the Channel Tunnel. However, for the Western Alignment, the request for proposals stated that it was to be under government possession at all times.

Table 1 provides a summary of the relevant characteristics of the possession attribute. Projects were generally required to be transferred or revert at no charge to the government at the end of the agreement. While this transfer requirement might be common in public-private partnership projects, exceptions can usually be found. For example, the Texas High Speed Rail project, a \$5.6 billion project awarded in 1991 and cancelled in 1994 as a result of financial troubles of the consortium that spent \$40 million on the project, had a requirement that at termination the government had the option to purchase the facility at its fair market value (State of Texas 1991).

3.2.1. Channel Tunnel

The Channel tender invitation stated that the chosen promoters would benefit from a concession to construct and operate the Link for a period of time, and the rights of the promoters would expire when the concession was terminated. The governments required the Link to be kept in the public domain (HMSO 1986a). The term Fixed Link was an all-encompassing term, defined to include a twin bored tunnel rail link with associated service tunnel, together with the terminal areas and dedicated facilities for control of, access to, and egress from the tunnels. The term also included plant, machinery, movable and immovable equipment, and railway shuttle rolling stock. Lands for the project were provided by the government through compulsory acquisition and (or) agreement and were leased to the developer.

Upon termination of the agreement, the Fixed Link was to be handed over to the two governments. Immovable property would revert to both governments and land leases would end. In respect of intellectual property rights, the government required the developer to grant a non-exclusive royalty free license to use or sub-license any intellectual property which would be vested in the government for purposes of construction and operation of the Fixed Link after expiration of the agreement.

3.2.2. Second Severn Bridge

The tender invitation (U.K. DOT 1989) stated that both crossings would be highways for which the Secretary of State is the highway authority. The Severn Bridges Act (S-B Act) (U.K. DOT 1992) granted the British Secretary of State

the right to construct the new bridge and to delegate all relevant functions and power to levy tolls to a private promoter according to a concession agreement. The S-B Act authorized the acquisition of lands and to grant a lease or other interest in or right over any land according to a concession agreement. Such lease was to be provided at a peppercorn (insignificant) rent as mentioned by the tender invitation.

The tender invitation provided for the transfer by the promoter of both crossings to the government at the end of the concession period. The S-B Act provided for the transfer of all property, rights, and liabilities of the concessionaire with no explicit definition of property.

3.2.3. Highway 104 Western Alignment

The project as developed is part of the public highway system and the ownership of the project facility at all times is vested in the Province of Nova Scotia. All the needed lands were acquired and paid for by the government and made available to the project. The request for proposals provided for the project facility to include the road and all improvements, buildings, erections and structures, and all chattels, machinery, equipment, materials, tools, forming part thereof or used in the construction or operation. The first addendum provided for construction equipment not to be part of the facility during project operation. Along with public ownership of the facility, the request for proposals provided for the exclusive use and possession by the government of all project materials and information and their related patents, copyrights, and other industrial and intellectual property rights, including trade secrets. With such prior possession of the project by government, no transfer clause was included in the RFP.

3.2.4. Northumberland Strait Crossing Project

The federal government had as a main objective that the project be financed, designed, constructed, operated, and maintained by the developer under a long-term subsidy agreement. The 1988 NSCP proposal call explained that the development agreement would include a ground lease and a schedule of requirements, terms, and conditions. In this call, the project facility was described to include collectively the lands, the work complete in all respects, with all operation and maintenance systems in place, and any other improvements or structures located on the lands. The work means all improvements and all appurtenances, which the developer agreed to construct on the lands.

For project possession, the proposal call stated "the work shall be fixtures to the lands and shall become the absolute property of the landlord (Minister of Public Works) without compensation upon the expiration or termination of this lease." In the first addendum, the government explained further its intention by stating that the contract with the developer would be to build, to own, and to operate the facility for 35 years, after which it would be transferred at a nominal amount to the government. The second and third addenda explained that the nominal amount was meant to effect that the facility would revert to the government after the 35-year ownership period, and that alternative private sector ownership could be considered and be the subject of negotiation after selection. "Own" was defined by the third addendum to mean "to own the leasehold interest in the facility." In the

Table 1. Rights dimension: possession attribute characteristics for selected projects and acts.

| Project or act | PPP mode | Possession characteristics | Acquisition by | Property transfer at termination | Property reversion at termination |
|--------------------------------|-----------|--|--|--|--|
| Channel Tunnel | BOT | Land and facility in public domain, land leased to developer at cost | Government, at cost to developer | Intellectual property rights, movable property | Immovable property, land leases to end |
| Second Severn Bridge | BOOT | Land leases, no explicit clause of private ownership; known as DBFO contract | Government, at developer cost to developer | All properties, rights, liabilities | na |
| Highway 104 Western Alignment | BOT | Public possession at all times of facility, all improvements, patents, intellectual property | Government, at no cost to developer | na | Project to revert at expiration |
| Northumberland Strait Crossing | BOOT | Ground lease, work is fixture to land; own means to own lease-hold interest in facility | Government, at developer cost to developer | na | Work becomes absolute property of government at termination of lease |
| SR 91 and AB 680 California | BTO | Construction lease term, transfer of property at completion to government, operation lease term; airspace option lease | Developer; eminent domain is available, all at developer's cost | na | Surrender of real property and facility |
| PPTA Virginia 93 | BOOT | Developer to acquire, construct, improve, maintain, and (or) operate a facility | Developer/government; cost by developer | Project to be dedicated to public authority | na |
| TREL Minnesota 95 | BTO/ BOOT | Agreement to provide for any mode or procurement (BTO or BOOT) or operation | Developer/government; government sell, lease, or donate right-of-way | Facility titles transfer to government after expiration under BOOT | Facility titles under BTO transferred before operation and reverts at end of lease |

Note: na, not applicable.

sixth addendum, the government stated that for purposes of financing and taxation, the project was a private sector venture.

3.2.5. State Route 91

Assembly Bill 680 authorized Caltrans to enter into agreements for the construction by and lease to private entities of transportation projects. The Bill mentioned and differentiated between three types of lease: lease of rights-of-way, lease of airspace over or under facility state highways, and lease of the facility (private transportation project). Lease terms would be up to 35 years during which private entities would charge fees for the use of the facilities. Facilities would be state-owned at all times and revert to the state after expiration of the lease term at no charge. Caltrans made available its power of eminent domain to be used in right-of-way acquisitions if requested by CPTC. Acquisitions would be made at all times at CPTC's cost.

Several grants and rights were identified in the SR agreement. A 1.5-mile Absolute Protection Zone was defined to protect CPTC's franchise rights and economic viability. Under this provision, Caltrans would not finance, grant, or convey any franchise to any party other than CPTC for the development or operation of a public transportation project within the protection zone, unless the proposed facility did not represent economic competition to the project. CPTC was given the right of first offer and first refusal with respect to the development and operation of any commercial airspace improvement, over, under, on, or within the State Transportation Facility, State Route 91 right-of-way, in Orange County, California. Such airspace rights could run up to 99 years. CPTC was granted an option for the development of three phased extensions to the current facility to be exercised during the term of the agreement.

3.3. Rights dimension: revenue attribute

The revenue attribute is the second right assigned by governments to developers. The investigation emphasized the requirements in connection with toll and revenue arrangements along with other rights given to developers of the selected projects and acts set out in Table 2. Typically, BTO and BOOT modes as implemented in the U.S. projects and acts provide for freedom in toll setting and application of congestion pricing (except for the Virginia act, Table 2) while setting caps on the rates of return. Governments, in general, tend to control the term of agreement through statements directed at early termination if debt or revenues are satisfied (Western Alignment, Severn Bridge) and with an indirect statement if rates of return are met (SR 91 and U.S. acts). Generally, government seems to have two objectives: (i) control the amount of revenue generated by the project and (ii) control the amount of revenue the developer is entitled to earn. Both work to achieve the equity principle used in evaluating finance methods for public projects (Blackburn and Dowall 1991; Robinson and Leithe 1990).

3.3.1. Channel Tunnel

Governments through the Channel Invitation and Concession Agreement offered political guarantees not to intervene in the conduct and operation of the Link and not to terminate

the promoters' right to construct or operate a Link provided that the concession terms are adhered to.

The developer was given commercial freedom in setting tunnel tariffs. Both the invitation and the agreement stated "the Concessionaires will be free to determine their tariffs and commercial policy and the type of service to be offered." Earlier in the Channel Invitation (U.K. DOT 1985), the government explained that the duration of the concession would consider the type of project selected and would be sufficient to allow repayment of debt and permit a reasonable return on equity. The concession period was initially set by the agreement as 55 years. Because of delays and cost increases concession was extended 10 years by the governments involved (Huot 1995).

3.3.2. Second Severn Bridge

The S-B Act provided the authority to levy tolls for both bridges, to be exercised by the concessionaire. The government in the tender invitation required promoters to state the initial tolls required by each class of traffic proposed. Further, the invitation required a statement as to the basis for any subsequent adjustment of tolls due to inflation, the index of inflation to be used and its weighting in the adjustment formula, components of cost to which it would be applied, minimum toll increases, and the time period between adjustments. The tender invitation allowed for differential tolls by day or date provided road safety was not impacted.

The government allowed for additional proposals for adjusting the toll level (and (or) concession period) in order to take account of actual traffic flows diverging from the bid assumptions. For this case, detailed information was required regarding the mechanism for adjusting toll levels and (or) the concession period, the traffic demand assumptions, and the upper limit for the concession period. In the U.K., specifications for maximum tolls to be levied on new roads have been described in the New Roads Act (U.K. DOT 1991). This act provides for specifying maximum tolls if the road consists of a major crossing for which there is no reasonably convenient alternative. Toll periods in this act may end on a specific date, or be determined by the achievement of specific financial objectives, or passage of specified number of vehicles, or the earlier or later of specified dates. The S-B Act provided the concessionaire with the power to levy tolls for a maximum of 30 years. It provided, however, for early termination of this right if the revenue requirement had been met, i.e., the toll income received is equal to or greater than the amount the concessionaire is entitled to receive by the concession agreement.

3.3.3. Highway 104 Western Alignment

The request for proposals provided for initial tolls and any proposed mechanism for increasing the initial tolls during the concession period to be established during negotiation of the Omnibus Agreement. However, the RFP stated that tolls would be sufficient to (i) pay the debt incurred to build the facility, (ii) establish an operating and maintenance reserve, and (iii) provide for required repair and rehabilitation work. The government included with the RFP a study of the current and future traffic volume and revenue forecasts for a range of toll road options. Beck, president of Canadian Highways, explained that tolls were initially set at Cdn \$3 per car, Cdn \$2 per axle for trucks, and Cdn \$4 for recre-

Table 2. Rights dimension: revenue attribute characteristics for selected projects and acts.

| Project or act | PPP mode | Revenue characteristics | Toll characteristics |
|--------------------------------|----------|--|--|
| Channel Tunnel | BOT | Term: 55 years extended to 65; "no second facility" guarantee; "no interference in operation" guarantee | Service levels and tariffs at promoters' discretion |
| Second Severn Bridge | BOOT | Term: 30 years; may be terminated early if entitled revenues are met, and may be extended to account for traffic levels | Initial setting by developer adjusted to inflation; toll may be adjusted to account for actual traffic flow |
| Highway 104 Western Alignment | BOT | Term: to continue until debt retired; return to developer to come from construction, operation and maintenance, return on debt | Tolls set to \$3 per car, \$2 per axle for truck, \$4 for recreational vehicles; toll adjusted for inflation and debt coverage ratio |
| Northumberland Strait Crossing | BOOT | Term: 35 years; revenue floor established; no cap on revenues; revenue distribution mechanism established; subsidy Cdn \$42 million per year indexed to inflation | Pre-established tolls adjusted to 75% of consumer price index and adjusted to reflect changes in taxes and insurance premiums |
| SR 91 and AB 680 California | BTO | Term: 35 years; reasonable return on investment with base return of 17% adjusted to T bonds; incentive return, an additional 6% maximum; excess revenues to State Fund | Freedom in establishing and changing tolls; congestion pricing |
| PPTA Virginia 93 | BOOT | A reasonable maximum rate of return; excess revenues to State Fund or developer to reduce debt | User fees to be established by the parties at negotiation; tolls to achieve a reasonable rate of return |
| TREL Minnesota 95 | BTO/BOOT | A reasonable rate of return to be established; residual revenues to developer | Variable tolls are allowed based on time of day (congestion pricing) |

ational vehicles (Beck 1997). Further, he explained that if debt service coverage was not met, tolls were to be adjusted automatically; and that tolls would be adjusted for inflation.

Government required that the Omnibus Agreement term be limited to the length of time toll revenues were needed to repay all the money borrowed or made available to pay for construction as well as to pay for any reserve requirements as mentioned previously. The government reinforced through the first addendum that the selected developer must earn its return from the construction contract, operating contract, and a return on any debt, which the respondent chooses to hold. In the addendum to the RFP, the government stated further that "DOTC will give no assurance or guarantee that a fair market rate of compensation will be achieved by the Selected Respondent within the Concession Period to be fixed in the Omnibus Agreement."

3.3.4. Northumberland Strait Crossing Project

The NSC Act allowed the government to make regulations prescribing tolls for the use of the crossing. Toll collection was the responsibility of the developer and tolls were to be adjusted annually by 75% of the consumer price index. As explained in the proposal call and its first and fifth addenda, a toll revenue floor was established to be the greater of either \$8 million in 1988 dollars or the actual toll revenues experienced by the ferry service in the full year preceding the date of substantial completion of the facility. It was also explained that toll rates may be increased by more than the permitted 75% of the consumer price index should toll revenues be lower than the established floor, indexed to 100% of any increase in the consumer price index, or if tax changes or insurance premiums result in cost increases. Shortfalls in toll revenues were to be recouped in the succeeding year. With no explicit cap on toll revenues, the government required a separate account for toll revenues where the distri-

bution of revenues would follow certain priorities. The toll distribution priorities included (i) payment of all operating costs, including insurance premiums on an insurance program specified by the government, (ii) payment of interest and capital for the financing secured against toll revenues, (iii) payments into a facility repair and maintenance fund, and (iv) payment of the balance to the developer.

3.3.5. State Route 91

Caltrans entitled CPTC to establish, levy, and collect tolls, fees, and charges for the use of the facility. Toll adjustments and arrangements were at the discretion of CPTC without prior approval or evaluation of Caltrans. Further, CPTC was authorized by the SR 91 agreement to implement a congestion pricing arrangement to respond to dynamic traffic flows and to maintain the highest levels of service. According to the daily demand patterns, toll rates move from \$0.5, \$1.0, \$1.5, and \$2.0 in four time zones with the rate being \$0.25 for off-peak hours. Rates for Monday to Thursday differ from those for Friday and the weekend (PWF 1995). High-occupancy vehicles with three or more passengers pay no tolls. However, the SR 91 agreement provides for tolling high-occupancy vehicles after 2 years of operation if the debt coverage ratio is not met.

While Caltrans established no cap or control on toll rates, it established a 17% base return rate for use in discounting calculations; this rate is to be adjusted annually, and upward only, according to the average yield on 5-year U.S. Treasury Bonds. CPTC is entitled to a reasonable return on investment, comprised of a base return on investment and an incentive return on investment for any fiscal year. CPTC is entitled to retain the available cash in any fiscal year as a base return on investment whenever the base NPV calculated using base return rate is less than zero. The incentive return on investment is implemented to encourage CPTC to modify

and improve the facility to maximize the number of vehicle occupants travelling during peak demand periods on the combined facility, SR 91. An incentive return rate gives 20 basis points (0.2%) increase on the base return rate for each 1% increase in the annual peak hour vehicle occupant volume; however, incremental increases may not exceed 600 basis points for any fiscal year. If the base NPV is equal to or greater than zero, CPTC will share available cash for the fiscal year with Caltrans only if the total NPV calculated at the incentive return rate is less than zero; otherwise, excess revenues will be directed to a State Highway Fund.

3.4. Obligations dimension: development, operation, and environment attributes

This section deals with government requirements under the first three obligation attributes. For all projects, emphasis was placed on the spectrum of functions that government requires developers to be responsible for (planning, design, construction, environment, operation, and maintenance), and the power governments have in project review, inspection, and approvals.

Generally, the projects studied showed that all project functions are the responsibility of the developer unless government assigned certain functions to be its responsibility such as maintenance, traffic management, and police services. For example, maintenance was encouraged to be provided by or contracted to government for the SR 91 (BTO), Western Alignment (BOT), and the TREL Minnesota act (BOOT/BTO). Bylaws requested by developers (e.g., for traffic management) were generally subject to government approvals and could not compromise safety.

Under traditional procurement arrangements, government has an active involvement in all project functions. For public-private partnership, government seeks to maintain a role in those functions for which it has a responsibility for the public at large. The investigation showed that government would provide for (i) the appointment of a representative or agent and consultants or independent engineers, (ii) the default and substituted entity clauses in case of default by the proponent, and (iii) the monitoring functions during development and operation.

Supervision and approval duties may undergo more scrutiny in public-private partnerships. Supervision provides for checking compliance with standards and specifications and takes place while work progresses. Approval provides for accepting the work after it has been reviewed or checked. Approval may hinder the progress of work if it takes time to be done. Government will generally carry out both processes, and promoters will seek strategies to speed them up, for example, by having an independent engineer perform such functions, as in the NSCP case. (It is noted that government often has difficulty ceding the kind of control over design and construction that it exercises under traditional procurement modes. This can create significant tension between government and the developer, especially when government attempts to exercise control through the guise of maintaining standards.)

Generally, the approval process has been substituted or replaced by one or more processes dealing with inspection/monitoring, quality control and quality assurance, with the possible role of an independent engineer who may pro-

vide (i) concurrence with design and construction as in the Northumberland NSCP project, (ii) quality control services during construction as in the Western Alignment project, and (iii) review of performance during design and construction as in the Channel Tunnel and Severn Bridge (BOOT) projects. The SR 91 project provided for government approval of design and inspection of construction and operation. Generally, however, government provides for final inspection of completed work, before it accepts the work or authorizes operation such as in the Channel Tunnel, Western Alignment, and SR 91 projects. Table 3 summarizes the major characteristics of the obligation dimension.

The projects examined demonstrate that government may direct or authorize changes to the work at its discretion as in the Western Alignment project or based on pre-agreed reasons such as in the Channel Tunnel and Northumberland Crossing projects where reasons included safety, defense, security, the environment, errors and omissions, or nonconformity. Time and cost adjustments as a consequence of changes may be subject to negotiations as with the Severn Bridge project, or added to the capital or operational costs as with the SR 91 project.

3.4.1. Channel Tunnel

The Agreement explained the developer's obligations to develop the Link in terms of design, construction, operation, and maintenance. The Channel Tunnel Act provided for the concessionaires to make bylaws regulating the operation and use of the tunnel system, which were the subject of approval by the two national governments involved.

Promoters were required to carry out an environmental impact assessment in both the U.K. and France. Promoters were required to be aware of the procedures of the International Maritime Organization before starting the development such that no permanent structure (e.g., ventilation shafts, artificial islands) would hamper the freedom and safety of navigation. Other requirements included provisions for facilities and installations for policing the tunnel and for frontier controls (customs, immigration, and animal health checks) that the Concessionaires would pay for but which would be organized and performed by the two governments.

For the supervision of construction and operation, the governments authorized an intergovernmental commission and safety authority for the performance of these functions and required the concessionaire to comply with their directions. However, no strict approval process was mentioned in the agreement. The governments provided for their inspection of the completed work before they would authorize operation. An independent project manager, Maitre d'Oeuvre, was appointed to review the performance during design and construction. The agreement explained that the concessionaire could proceed with the works relating to the "Avant Projet" (project outline drawings and documentation list) unless the governments raised an objection to such Avant Projet. Huot (1995) noted that government imposition of the latest innovations, safety or other regulations, after the start of construction led to severe design changes and increased costs.

3.4.2. Second Severn Bridge

Through the Severn Bridge tender invitation and the S-B Act, government required the promoter to take responsibility

Table 3. Obligation dimension for the selected public-private partnership projects and related acts.

| Project or act | PPP mode | Development and operation attributes characteristics | | Financing characteristics | |
|--------------------------------|----------|---|---|---|--|
| | | Proponent responsibility | Government responsibility and power | Proponent responsibility | Government support |
| Channel Tunnel | BOT | All development, operation, and maintenance functions; bylaws* subject to approval | Supervision and right to change; PM reviews compliance; government to inspect completed work before operation is authorized | Financing all phases, and raised based on rights conferred by agreement | No support; no financial guarantees |
| Second Severn Bridge | BOOT | All development, operation, and maintenance functions; bylaws* subject to approval | Right to change; agent monitors design, construction, and operation and maintenance | Financing all phases, inherit debt on existing crossing | Promoter to operate 2nd facility |
| Highway 104 Western Alignment | BOT | All functions; quality control/quality assurance program; maintenance management plan | Right to change; monitoring and quality assurance; provide regular maintenance services at cost | Financing all phases; no lien to be made on the Western Alignment | \$62 million; heavy truck to use Western Alignment |
| Northumberland Strait Crossing | BOOT | All development and operation and maintenance; environmental compliance; regional industrial benefits | Monitors and right to change; independent engineer concurs in design, and approves construction and progress payments | No mortgage of land and facility; equity 10% or \$73 million; \$10 million prime cost for fisheries | Cdn \$42 million annual subsidy indexed to inflation; floor revenue indexed 100% to consumer price index |
| SR 91 and AB 680 California | BTO | All development and operation and maintenance; bylaws* subject to approval | Approval of design; right to change; monitoring all phases; may provide at cost traffic management, maintenance, and police | Financing all phases and based on rights in tolls, agreement, lease, project | No support at all; reimbursed for any service |
| PPTA Virginia 93 | BOOT | All development, operation, and maintenance functions; bylaws* subject to approval | Review and approve plans and specifications; inspections of construction | May pledge property interest in the project | May make grants or loans |
| TREL Minnesota 95 | BTO/BOOT | All development, operation, and maintenance functions | Provide maintenance and police services at cost; regular inspections | May pledge interest in the facility, agreement, income | May issue bonds for toll facility |

*Bylaws required by proponents.

†Proposed based on TREL legislation (State of Minnesota 1993).

for the design, construction, maintenance, and operation of the second crossing as well as for the maintenance and operation of the existing crossing. Other specific requirements included quality assurance, navigational requirements, and environmental aspects.

The S-B Act gave a power of temporary prohibition or restriction of traffic to be exercisable by the concessionaire. The New Roads Act (U.K. DOT 1991) provided for similar power and for all highway functions to be exercisable by the concessionaire except for the power to make schemes, regulations, orders, or give directions under the Road Traffic Regulations Act of 1984, U.K.

The government explained in the tender invitation for this project that special procedures would replace the normal technical approval arrangements. The invitation explained the appointment of a consulting engineer to work as a government agent to monitor design and construction, audit the promoter's quality assurance system, and possibly the maintenance and operation of the works. Further requirements explained that the promoter was required to employ the services of a designer under a formal contractual relationship such that the contract would ensure the designer was sufficiently independent from the promoter. This was required to enable the designer to comply with government requirements, check the promoter's proposed construction methods, materials, and each element of work. Along with that, the detailed design was required to be checked by an independent checker. The government agent was to receive certificates of satisfactory completion from the designer and the checker.

Design changes were allowed and it was explained that if the government issued a change, then the implications for the promoter's program and financial adjustment would be subject to negotiation. If the promoter issued a change, then it would be subject to the agent's approval with no financial adjustment to the promoter, who would also bear the consequences of any delay.

3.4.3. Highway 104 Western Alignment

The developer's obligations as set in the request for proposals included design, construction, operation and maintenance, repair, and rehabilitation. The government required an environmental management plan for the facility. The government set a 20-month objective for completion and a guaranteed maximum price for design and construction. Also, it required a marketing plan to maximize the use of the facility. Approvals and permits were the developer's responsibility. The government was prepared to provide maintenance, repair, and rehabilitation services. Beck (1997), president of Canadian Highway, the developer, explained that an annual maintenance agreement was signed with the government for regular maintenance services.

The request for proposals explained that the government at any time might direct or authorize changes in the work to be performed. The government reserved the right to undertake its own quality assurance activities. However, it was stressed that quality control and quality assurance for the development, design, and construction were the developer's responsibility. The first addendum explained that members of the developer could perform quality control; however, qual-

ity assurance had to be performed by an independent material testing firm and laboratory.

For the operation and maintenance of the road, the government required the preparation of a road maintenance management plan explaining performance specifications, maintenance functions, and how the developer would perform such functions. The intent of government was to evaluate periodically the performance of the respondent according to this plan.

3.4.4. Northumberland Strait Crossing Project

The developer's obligations included all the development and operation functions, including design, construction, operation, and maintenance. A service life of 100 years was a design requirement. Extensive environmental reviews and assessments of the biophysical and socioeconomic consequences of the crossing were required for the project and the developer was required to comply with all the requirements. A fixed crossing was considered to pose a threat of delaying the clearance of ice from the Strait. It was thought that such an "ice-out" could delay the start of the fishing season and could reduce the local temperature, which in turn could delay the spring planting of crops (FHWA 1996). All designs were assessed against a 2-day delay in ice-out in any year over a period of 100 years. Developers were required to comply with this maximum ice-out delay among other requirements, which were addressed by the developer in its commitment to develop an environmental management plan for the management of all environmental aspects of the project (Straits Crossing Inc. 1993).

Among the other obligations, the developer was required to maximize the economic and industrial benefits to the Atlantic region regarding businesses, employment, purchasing (material, equipment, supplies, and services), and technology amongst others. The regional benefit agreement signed for the project included several covenants on the developer such that 70% of all materials, 96% of labor, at least Cdn \$20 million of engineering work after closing, and 75% of all marine workers had to be procured from the Atlantic Provinces region (FHWA 1996).

Monitoring performance during design, construction, commissioning, operation, and maintenance was one of government's roles for the project. The government at no cost to itself could request changes to the work if the reason of change was due to errors, omissions, or non-compliance on the part of the developer. Time for additional work resulting from changes authorized by the government would be negotiated. An independent engineer was appointed for the review of design, construction, operation, and maintenance procedures. Work approvals were the subject of negotiation. The government wished to retain the right to approve construction work and progress payments. A compromise was reached where the independent engineer would approve construction work and monitor the cost to complete of major work items (Pirie 1996).

3.4.5. State Route 91

Caltrans through the SR 91 agreement required CPTC to design, develop, acquire, construct, install, and operate the project transportation facility. Along with allocating such responsibilities to CPTC, Caltrans offered to assist CPTC in

preparing and presenting documents required to obtain any permits and approvals needed for the project. For the operation of the project, CPTC was responsible for performing the administrative, toll collection, and traffic management activities. The Bill and the SR 91 agreement encouraged CPTC to pursue possible contracts with Caltrans to perform traffic management activities and maintenance, and with the California Highway Patrol for police services.

Environmental studies for the facility were CPTC's responsibility. Final approval of the project and commencement of construction were contingent on meeting requirements of the California Environmental Quality Act (CEQA).

The SR 91 agreement explained that Caltrans had the right to review and approve the design prior to commencement of construction. The approval process was limited to validating that the design was in accordance with the Caltrans design standards cited in the agreement, and provided for Caltrans objections or approvals within 21 days. Construction of the facility was required to be in accordance with standards and specifications described in the agreement.

3.5. Obligations dimension: financing attribute

For all of the projects studied, emphasis was placed on the developer's financing responsibilities, the security used in raising finance, and the form of government support to the project. Generally, for the projects and acts examined, government provided for all financing risks to be carried by the developer. Further, no financial guarantees were provided. However, support was provided in terms of (i) a direct subsidy as in the NSCP project, (ii) operation of existing facilities as in the Severn Bridge, and (iii) establishing a policy in favor of the facility such as in the Western Alignment. For purposes of calculating capital, operating, and maintenance costs, government generally required developers to maintain reserve funds such as a working capital reserve fund, maintenance and capital improvement reserve funds, and a debt service reserve fund.

To enable lenders to provide finance or credit support, government generally allowed the developer to use an umbrella of security instruments that cover the developer's interests in and rights under development, lease, and any project-related agreements; tolls, income, and project revenues; and all developer's shares. However, as explained below for BOT and BOOT projects and as shown in Table 3, government restricts the use of the project land and facility (i.e., improvements) as security. This restriction is imposed as a government requirement even for a project for which the developer has private possession/ownership, i.e., BOOT, such as the Northumberland NSCP project, and the Severn Bridge project.

However, there are cases where such restrictions may be relaxed until the occurrence of a stated condition or phase such as in BTO procurements. The SR 125 franchise agreement (California DOT 1991a) explained that the financing assignment used as debt security might cover the developer's interests in all or any portion of "(i) the franchise documents, (ii) the project [toll highway, real property on which such toll highway will be located, personal property and intangible property], (iii) project revenues and/or (iv) any other

property or rights (including operating rights) of developer." It was explained that such a financing assignment should not be made in a manner that precludes passing of the project title to Caltrans on the title transfer date before the start of operation. A similar assignment was made for the AB680 — Mid State Tollway project (California DOT 1991b); however, it covered only the real property of the project.

The Virginia Public-Private Transportation Act (Virginia DOT 1995) provided the power necessary to the project developer/operator such that it could acquire, construct, improve, or operate the facility. The act stated that the operator may "... secure any financing with a pledge of, security interest in, or lien on, any or all of its property, including all of its property interest in the qualifying transportation facility." Similar provisions for the use of facility as security were included in the cancelled Texas High Speed Rail franchise agreement (State of Texas 1991).

3.5.1. Channel Tunnel

Governments through the terms of the Channel invitation and the concession agreement ruled out all support from public funds or government guarantees and required financing to meet all construction and likely cost overruns and delays. In its White Paper (HMSO 1986b), the U.K. government explained that for the evaluation of proposals, solid financing commitments coupled with the ability to attract financing were the final test for the evaluation, which was best met by Eurotunnel's proposal. Financing was entirely the responsibility of the promoters and was to be raised based on the rights conferred in the agreement to the promoter. The amount of equity capital was left to the determination of the promoters; however, it was expected to be substantial.

The Channel Invitation explained that full information on the promoter's anticipated capital structure, proposed time for calls on the various markets, and expected amounts to be raised on each of these markets were required by government. Further, as evidence of the robustness and viability of proposals, a detailed financial plan and a cash flow forecast along with related assumptions were required from the promoters. Detailed annual financial forecasts up to 10 years after repayment of debt were also required, including assessment of costs, traffic, measures of profitability, and related assumptions. Promoters were required to show the sensitivity of the project's economics to variations in traffic flow, cost overruns, delays in completion, and changes in interest and exchange rates.

3.5.2. Second Severn Bridge

The tender invitation required the promoter to finance both the existing and new crossings and inherit an estimated debt of £122 million for the existing bridge. The government required that "proposals involve no material risk on financial grounds regarding the completion of the second crossing to time and specification, the acquisition of the concession and existing crossing, and the operation and maintenance of both crossings."

3.5.3. Highway 104 Western Alignment

The government required the project to be entirely self-financing apart from Cdn \$29 million under the SHIP

Agreement (Canada–Nova Scotia Strategic Highways Improvement Program), which was raised to Cdn \$55 million by the second addendum. The corporation was to borrow money without recourse to the government. The government explained, “it will not guarantee any debt incurred by the selected respondent or corporation.” The government established a policy whereby all heavy trucks, except for local traffic, would use the Western Alignment.

The Western Alignment Act explained that the corporation could borrow money based on its own credits, and could secure its borrowings against any or all of its assets and undertakings and the revenue arising from the collection of tolls. Beck (1997) explained that Cdn \$62 million toll revenue bonds were used to finance the project.

A detailed project cash flow model and pro-forma financial statements were required reflecting forecasts and estimates for each year of the concession period. For evaluation purposes, government required the preparation of two sets of financial statements with accompanying cash flow models for two sets of toll revenue forecasts provided with the RFP. Assumptions for both sets included a 2.35% inflation rate, a 20-month completion period, a 35-year concession period, a Cdn \$650 000 annual maintenance cost, and an 8.25% yield on 30-year Canada Bonds.

3.5.4. Northumberland Strait Crossing Project

The government explained in the proposal call and the NSC Act that its annual subsidy to the existing ferry service would be Cdn \$42 million (1992 dollars). This subsidy was provided to reduce the government’s cost to maintain its obligation for continuous communication with P.E.I. The annual subsidy was to continue for 35 years commencing with the operation of crossing and indexed 100% to the consumer price index.

The government in the sixth addendum insisted that investors should be aware that the project was a private sector venture and the subsidy should be considered as income to support toll revenues. The goal of the federal government was to have its participation “off book.” However, the auditor general of Canada subsequently ruled that the NSCP project financing had to be considered a debt obligation “on balance sheet” of the federal government. This subsidy, as determined by the government, was used by the developer to raise about Cdn \$660 million. Pirie explained that based on the subsidy, real-rate bonds paying a yield of 4.5% plus the annual inflation rate were issued and were taken up mainly by pension funds (Pirie 1996). Later the developer negotiated a reinvestment strategy of the bond proceeds to maximize the use of the loan considering the project’s anticipated drawdown schedule.

Equity for the project, as explained by the fifth addendum, was required to be the lesser of 10% of total project cost (including direct and indirect costs, interest during construction, contingencies, start-up costs, and working capital) or Cdn \$75 million. Instead of requiring the deposit of equity up-front in a trust account, the government allowed the developer to pay in equity pro-rata (supported by a letter of credit) with debt proceeds during the course of the project. The developer was also required to designate a “prime cost sum” of Cdn \$30 million (reduced to Cdn \$10 million) for

disbursement at the government’s discretion for fisheries compensation.

The government emphasized in the request for proposals and the first addendum that neither the crossing nor the lands could be mortgaged or pledged as collateral by the developer in any way and were incapable of seizure by the developer’s creditors. By the third addendum the government explained that it would permit some form of mortgage or pledge to the extent necessary to permit the placement of the required mezzanine financing (subordinated loan). However, by the fifth addendum the government emphasized its earlier restriction and added that “lenders will have available an assignment of cash flow security through the trust accounts and certain insurance proceeds.”

3.5.5. State Route 91

Financing was the responsibility of California Private Transportation Corporation (CPTC). Caltrans explained in the proposal guidelines (California DOT 1990) that the development had to be performed and completed at no cost to the State. All services provided by Caltrans were to be reimbursed by the developers. This included reimbursement for optional services requested by the developer (e.g., traffic projection, maintenance, police services) and reimbursement for non-optional services performed to protect the State’s interest (e.g., costs associated with proposal selection, review right-of-way acquisition, design and construction oversight and technical activities). CPTC was required to maintain a number of reserve funds for working capital, major maintenance, capital improvements, and debt service.

Financing and debt security instruments referred to in the SR 91 agreement as leasehold mortgages were made based on CPTC’s interest in the agreement, the lease, the project facility, and the tolls and profits of CPTC. Rights of leasehold mortgagees were subject to the provisions of the SR 91 agreement. Equity paid by the CPTC was \$19 million. Taxable finance raised by CPTC included \$35 million 17-year institutional debt, \$65 million 14.5-year variable rate term loans, and a \$7 million subordinated loan from the Orange County Transportation Authority (PWF 1995).

3.6. Liabilities dimension: general liability attribute

The general liability attribute is the first attribute in the liability dimension. Table 4 summarizes the general characteristics of the general liability, risk, and tax attributes of this dimension for the projects examined. Governments generally require developers to maintain liability insurance policies sufficient to (i) insure coverage of tort liability (claims arising on account of personal injury or death or damage to real or personal property) to third parties, users, and employees; (ii) protect against physical loss or damage to the facility in order to ensure continued use of the facility; and (iii) provide protection against business interruption (loss of income or earnings due to an insured peril such as delay in start-up and (or) completion). Other policies may be required for other reasons, particularly if government provides support or will carry risk if the project is not completed, such as in the Northumberland Strait crossing project. Exceptions, however, can be made to relieve a developer from part of the liability coverage requirement as in the SR 91 project. It

Table 4. Liabilities dimension for the selected projects and acts.

| Project or act | PPP mode | Liability attribute | Risk attribute | Tax attribute |
|--------------------------------|----------|---|---|--|
| Channel Tunnel | BOT | By developer for all phases; insurance: third parties, facility damage, start-up delay and business interruption | All by developer; time extension for FM*; government compensation for defense interruption | All taxes by developer |
| Second Severn Bridge | BOOT | By developer for all phases; insurance: third parties and facility damage | All by developer; performance bond; time extension for FM; government retains war repairs | Capital allowance for corporation tax; value added taxes on construction |
| Highway 104 Western Alignment | BOT | By developer for all phases; insurance: third parties, facility damage, and business interruption | All by developer; performance and ML [†] bonds; time extension for FM | All taxes by developer; the non-public corporation is exempted |
| Northumberland Strait Crossing | BOOT | By developer for all phases. insurance: third parties, facility damage, and business interruption | All by developer; performance, ML bonds, and others; time extension for FM*; government retained certain FM repairs | All taxes by developer; provinces to give municipal and provincial property tax exemption |
| SR 91 and AB 680 California | BTO | By developer before acceptance date, and shared thereafter; insurance to third parties and facility damage | All by developer; performance and ML bonds; time extension for FM; government retained certain FM repairs | All taxes by developer; developer may depreciate the improvements; franchise fees to be reduced by taxes |
| PPTA Virginia 93 | BOOT | By developer for all phases; insurance: third parties and facility damage | All by developer; delivery of performance and ML bonds | na |
| TREL Minnesota 95 | BTO/BOOT | na; in TH 212* (BTO) the developer was to carry all liabilities and government to carry liabilities from developer's compliance with design and construction standards defined in the agreement | All by developer; in TH 212, included performance and ML bonds acceptable to lender or completion guarantees; time extension for FM | na; in the TH 212, developer pays all types of taxes |

Note: na, not applicable.

*FM, force majeure.

[†]ML, material and labor bond.

[‡]Proposed based on TREL legislation.

should be noted that in general, it is not possible to insure against all liabilities.

3.6.1. Channel Tunnel

The two governments in the invitation and the agreement required the promoters to be liable for damage caused to users of the Link and third parties. Two insurance programs were required, one during construction and one at start of operation which had to be renewable on a one-, two-, or three-year basis. The risks to be insured included (i) physical damage to the Fixed Link, (ii) tort liability to third parties, and (iii) delay in start-up and interruption of operations resulting from facility physical loss or damage. Such requirements proved to be invaluable when in November 1996 a fire erupted in the freight shuttle train and caused serious damage to the concrete lining. As a consequence, the tunnel was closed for 16 days with revenue losses per day of the order of £1 million. The damage cost was approximately £230 million and insurance coverage repaid about 98% of the cost (Bennette 1997).

3.6.2. Second Severn Bridge

During construction, the government required full contractor's all risk, third party, and employer's liability coverage. During operation, the invitation required insuring both crossings against all loss or damage. No explicit coverage was mentioned for liabilities of third parties during operation. However, the tender invitation required the promoter to indemnify the government against liabilities to third parties arising out of development and operation of the two crossings.

3.6.3. Highway 104 Western Alignment

The request for proposals required the corporation to indemnify and hold harmless the government against any and all claims, damages, losses, liabilities, costs, and expenses arising out of the performance or non-performance by the corporation in relation to the design, construction, maintenance, and operation of the facility. The request for proposals required the respondent to maintain throughout the concession period a liability insurance coverage acceptable to the government. The fourth addendum described the insurance and bonding requirements during construction and operation to include coverage for all risks of property damage to the facility and coverage to protect against all claims of liability arising out of property damage, bodily injury including death and personal injury.

3.6.4. Northumberland Strait Crossing Project

To protect itself from being required to pay the subsidy payments and operate the ferry service or complete or repair the work (i.e., double payments), the government took certain precautions. A very expensive insurance coverage before and after completion was required in the sixth addendum (i) to preserve the work (property) against all risks of physical damage, (ii) to pay damages arising from claims from third parties for injury, death, or loss of property, and (iii) to reimburse the government the cost of the subsidy or of providing ferry service if the completion date was not met. Pirie (1996) explained that Strait Crossing Development Inc. managed during negotiations to change the insurance limits so that they were based on the maximum

foreseeable loss rather than the full replacement cost/value required by the government.

3.6.5. State Route 91

Caltrans through the AB 680 and the SR 91 agreement provided for CPTC, the developer, to be protected and indemnified by the Tort Claim Act. Reasons and explanations for this protection included (i) Caltrans authority and obligation to supervise and provide specifications and operational requirements for the design, construction, and maintenance of the project, (ii) Caltrans to hold title to the real property and facility, and (iii) the designation of the facility to be deemed part of the state highway system. This enabled savings to CPTC which otherwise would have been reflected in the toll rates.

Before the transfer of title to Caltrans, the agreement provided for CPTC to bear the risk of injury, loss, or damage to the facility. Third-party claims, except those that arise out of CPTC fault, were carried by Caltrans. These included claims that arise out of fault of Caltrans, any non-negligent actions taken or omitted by CPTC in compliance with any Caltrans permits or regulations, or design and construction that conforms to the standards in the agreement. The same also applied after the acceptance date. However, Caltrans also assumed the tort claims arising out of any act or omission in connection with traffic management and maintenance activities for which it was responsible. CPTC was required to maintain throughout construction and operation, bodily injury and property damage liability coverage of at least \$50 million general aggregate per year.

3.7. Liabilities dimension: risk attribute

Governments in general seek procurement by public-private partnership in order to transfer more risks to the private sector than can be done using conventional procurement arrangements (U.K. Secretary of State for Transport 1993). In general, three categories of requirements can be distinguished from the requests for proposals and agreements for the projects studied: (i) risks related to the developer's obligations in the project; (ii) risks related to the developer's rights, particularly those related to revenues; and (iii) force majeure risks. An overview of how the risk attribute was handled for the selected projects is outlined in Table 4.

For the first category of risks, governments generally allocate all development and operation risks to the developer in clear wording in the requests for proposals and agreements. Emphasis was placed on explaining that government monitoring, inspection, and quality assurance processes did not relieve the developer from his responsibility for the work. This is different from government-directed changes to the work for which time and cost consequences may be negotiated as explained earlier. Further, as part of the allocation of risk, governments usually require completion guarantees, performance bonds, and labor and material payment bonds with amounts that vary according to each project's circumstances. This approach strengthens the allocation of development and operation risks to project developers.

The second category under the risk attribute deals with financing, economic, and revenue risks. The general requirement is for developers to carry all such risks with no guarantees. Governments may provide (i) adjustments for fa-

cility rate and (or) term of agreement to account for some risks such as inflation, and actual traffic growth rates as in the Severn Bridge, and (ii) policies to protect the developer's revenues from competing facilities through a "no second facility" guarantee as in the Channel Tunnel, or "absolute protection zone" for the SR 91 project.

The third risk category deals with force majeure risks. The definition of force majeure varied among the projects studied. It is helpful to categorize force majeure risks in general to include (i) war actions, including war, invasion, act of foreign enemy, and nuclear events; (ii) civil actions, including riots, insurrection, acts of terrorism, sabotage, and strikes; (iii) government actions, including expropriation, changes in law, interference by civil or military authorities; and (iv) natural catastrophes, including floods, earthquakes, unforeseeable geological conditions, chemical contamination, and epidemics.

When force majeure risks are realized, governments in general provide developers with a time extension for the performance of their obligations. Cost consequences, however, vary among projects and may more usefully be considered along with the insurance coverage for facility physical damage and loss generally required from developers. Governments in general provide no financial compensation for force majeure risks except for war actions, as defined above, for which the government provides compensation or retains the risk and carries the cost of repairs, such as in the Severn Bridge (BOOT), Channel Tunnel (BOT), and Northumberland Crossing (war and extreme catastrophes) (BOOT). In SR 91 (BTO), for all force majeure risks government will restore land and reinforcements to restore the weight-bearing capacity of the real property.

3.7.1. Channel Tunnel

Both the Channel invitation and concession agreement emphasized that the Link would be constructed and operated at the promoter's own risk without recourse to the governments. For force majeure risks or exceptional circumstances, the agreement explained that the time allowed for the performance of obligation would be extended accordingly. However, no compensation would be made to the concessionaires due to interruption of construction or operation based on such risks. However, if interruption occurred based on national defense, the concessionaires would be compensated. If these conditions/risks lead to the termination of the concession, "no compensation will be made to the concessionaires but the Principals may pay to the Concessionaires such amount which takes account of the net financial benefits, if any, to the Principals resulting therefrom." As mentioned earlier, insurance coverage was required for physical loss or damage to the facility arising from civil actions and natural catastrophes.

For financial and revenue risk, along with the requirement for no-recourse to government funds, governments gave concessionaires the freedom to determine their tariffs and commercial policy. Further, the government undertook not to facilitate the construction of another fixed link whose operation would commence before the end of 2020.

3.7.2. Second Severn Bridge

Through the tender invitation, the government required all design and construction risks to be allocated to the devel-

oper. The government transferred all geotechnical risks arising from physical conditions and artificial obstructions to the developer. A substantial on-default performance bond and (or) parent company guarantee was required from the developer.

Basically, the developer was responsible for the care of works including cost of repairs from any causes except for force majeure risks for which compensation and time extension would be allowed. These force majeure risks did not include natural catastrophes. Insurance for physical loss or damage of the crossing was required as mentioned earlier.

Revenue risks related to changes from initial traffic volume and traffic growth forecasts were transferred to the developer. The government provided traffic records on the existing crossing and projections for future levels of traffic. However, it assumed no liability from the use of such projections (U.K. DOT 1988, 1989). Given the provisions dealing with toll adjustment and the variable concession period that account for the actual traffic flows, the cost of such risks to the developer was reduced.

3.7.3. Highway 104 Western Alignment

The government stated in the request for proposals that the developer must assume all project risks and for that it was entitled to earn a fair market rate of return commensurate with the risks assumed. Performance and labor and material bonds in the amount of 50% of the maximum price were required for the construction phase. A performance bond was also required for the operation phase in an amount of 50% of the annualized contract for operation and maintenance.

For force majeure risks, the request for proposals explained that an extension of time for completion of the road would only be allowed for the affected activities on the critical path of the project. No time extension for force majeure would be made unless it was filed within seven days of its first occurrence. An "all risk" property insurance policy was required from the developer.

For financing and revenue risks, the government stated that it would not guarantee any debt incurred by the respondent nor the corporation, forecasted traffic levels, and any factors that might impact revenues or costs. However, it covenanted the use of the highway by all heavy trucks, except for local traffic.

3.7.4. Northumberland Strait Crossing Project

The government explained in the request for proposals that the developer must bear all project risks during both the construction and operation periods with the exception of legal challenges and regulatory impediments risk (delays and cost increases directly attributable to government actions). The government explained that its inspection and independent check of the work did not relieve the developer of his responsibility for the work.

The government through the NSCP proposal call and its addenda required the developer to provide a security package that assured the completion of the facility, assured the specified level of operating performance, assured the specified condition at the time of turnover, and assured the interim funding of the ferry service. Pirie (1994, 1996) explained that the security package against completion risk and cost overrun included along with parent company guar-

antees, a cover of Cdn \$200 million performance bond and a Cdn \$20 million labor and material bond along with a Cdn \$73 million letter of credit for cost overrun risk. Further, the developer agreed to pay the operating cost of the ferry in case of completion delay.

Through the terms of the NSCP proposal call and the first addendum, the government relieved the developer from its responsibilities for the normal operation of the facility and completion of the facility in four force majeure cases: (i) acts of the Queen's enemies, (ii) government retroactive legislation, (iii) earthquakes in excess of design criteria, and (iv) a catastrophic event. A catastrophic event was defined as an event that damages the facility and renders it inoperable. Under such circumstances and where the government was bound by its constitutional obligation for "continuous communication," the government required the developer to provide as part of the security package reimbursement of an amount equivalent to the total subsidy paid during the period of time the government assumed responsibility and operated the crossing service.

Pirie (1996) explained that during negotiations with the government, force majeure risks were replaced by what was defined as project risk event and project delay event. Project risk events were retained by the government. Project risk events covered acts of war, acts of government, extreme weather conditions, earthquakes beyond certain standards, and a nuclear event. Project delay events described events beyond the developer's reasonable control such as contaminated material, third party strike or walkout. Their realization could, subject to negotiations, provide the developer with time extension and toll adjustments. Geotechnical risks and labor strikes and lockouts were among the risks the developer was required to carry.

3.7.5. State Route 91

In addition to liability requirements for facility damage and tort, Caltrans required CPTC in the SR 91 agreement to furnish payment and performance bonds or completion guarantees. For events of force majeure, CPTC's time to perform its obligations would be extended by an equal amount. Where the force majeure event damaged or destroyed all or any part of the real property, Caltrans would be obligated to restore the land, grading and reinforcements necessary to restore the weight-bearing capacity of the real property immediately prior to such event. However, the agreement explained that failing to restore the land should not be considered default if Caltrans had also declined to restore the land on the state transportation facility (SR 91 is a median improvement to State Route 91 that includes an adjacent SR 91 free highway).

Strong protections were provided by the SR 91 agreement for CPTC against Caltrans' default, event of loss, and change in law. In the agreement Caltrans stated that it would not grant, nor convey to any other party other than CPTC, and would not finance with public funds, the development of a transportation facility that might present economic competition to the project within the absolute protection zone. Failure of the application or performance of representations, warrants, and obligations would constitute a default by Caltrans, while failure to comply with covenants or requisition of title or requisition of use would constitute an event of

loss. Both entitled CPTC to remedies, compensation, and (or) termination of the agreement and the lease.

The agreement explained that under a "change in law" that adversely impairs CPTC's exercise of its property, franchise, and other contract rights, CPTC could elect to close the project and seek payment by Caltrans of all unrecovered costs at the date of calculation (capital and operating costs, interest on debt, distribution to equity investors minus total revenues at that date). Caltrans stated in the agreement that it would protect and defend CPTC against any challenges to the validity or enforceability of the acts and challenges to the enforceability of the agreement.

3.8. Liabilities dimension: tax attribute

The treatment of taxes is the third attribute under the liabilities dimension. Generally, for public-private partnership projects, governments require developers to be familiar with all tax rulings (e.g., corporate, income, and property taxes) that might apply to their proposed business structure. Further, governments make no representations or warrants to the tax consequences or accuracy of the developers' proposed business structure. Summarized in Table 4 are the tax attributes of the projects examined.

Governments, according to the circumstances for each project, may provide for certain vehicles to support project development. These vehicles may include exemptions for certain types of taxes such as the exemption of property tax in the Northumberland Strait crossing project (BOOT), capital allowance such as in the Severn Bridge (BOOT), or creation of a corporate body with special characteristics such as in the Western Alignment (BOT).

3.8.1. Channel Tunnel

The Channel invitation (U.K. DOT 1985) explained that the principle of territoriality of taxation would be applied where each country will apply its normal laws to the construction, maintenance, and operation of that part of the project falling within its jurisdiction. The requirement for the levying of taxes was set also in the Concession Agreement (HMSO 1986a) requiring that "all duties and taxes levied or to be levied, including taxes on immovable property, will be liabilities of the Concessionaires and will be applied according to the provisions of national law."

3.8.2. Second Severn Bridge

The promoter as mentioned in the tender invitation was to be treated as "trading" for corporation tax purposes and would be able to claim capital allowance for construction expenditure. The invitation explained that value added taxes were payable on construction and exempted for project tolls. The invitation mentioned that local authority rates would be excluded.

3.8.3. Highway 104 Western Alignment

The request for proposals (RFP) explained that the government made no representation or warrants concerning the tax or legislative consequences of any structure used by the respondent. Further, it explained that the respondents must satisfy themselves about the consequences of the provisions of Canadian and Provincial tax laws. The government did not entertain special tax concessions.

The Western Alignment Corporation, not a public authority or crown corporation, was created by the W-A Act to assist the RFP respondent in the realization of the project (development and finance). The W-A Act, enacted in July 1995, stated that neither the corporation nor its property was liable to taxation, including income tax under any enactment. The government required the RFP respondents to satisfy themselves as to the tax status of the corporation. In the first addendum to the RFP, the government emphasized that “each respondent is responsible for obtaining its own advice as to all tax matters” and added “if necessary the corporation will be declared an agent of the Crown in relation to its toll collection activities.”

3.8.4. Northumberland Strait Crossing Project

The government explained that the development was designed as a private sector venture and the developer’s corporate structure was required to comply fully with both the letter and the spirit of the Income Tax Act of Canada in order to be accepted. The developer was required to satisfy itself and make appropriate allowances in regard to all taxes of every nature and kind that may be imposed on the facility, improvements, equipment, or any property brought on lands. The government explained that special tax concessions would not be entertained. A potential increase in sales tax liability was considered a business risk, which must be assumed by the developer. The provinces of New Brunswick and Prince Edward Island were considering exempting the crossing facility from municipal and provincial property taxes.

3.8.5. State Route 91

The SR 91 agreement explained that all taxes imposed on the real property and the project were the sole responsibility of CPTC as part of its capital and operating costs despite the fact that the real property and the project were to be considered property of Caltrans at all times. The agreement, however, provided for franchise fees (base, variable, and excess) to be reduced by the amount of taxes after title transfer to Caltrans. CPTC was concerned about depreciating the project, after title transfer to Caltrans, and was advised it could depreciate the improvements.

4. Recommendations

The above investigation explains how government requirements have been realized for each of the nine attributes of the requirement structure in the projects and acts examined. Each attribute had a range of terms or conditions attached to it and the investigation emphasized important aspects of each attribute. The following recommendations relate to the attributes of the three dimensions that need to be treated in public–private partnership documents. Emphasized is the need for clear articulation of government requirements in such documents and public–private partnership agreements in order to reduce the amount of supplemental materials issued to request for proposals, help consortiums in responding with proposals that can fit the requirements, and reduce the amount of time spent in negotiations and (or) the need for contract amendments to reflect marketplace realities missed earlier.

4.1. Rights dimension

A clear statement of possession requirements in general and with each property type is needed. Items that should be addressed include the following:

- (a) types of project properties (land, improvements, air-space, intangible property);
- (b) type of possession permitted for each type (e.g., public, private, lease);
- (c) properties, if any, that can be taken as a security instrument;
- (d) clear title statement during the different phases and terms of agreement;
- (e) who will carry the responsibility for the acquisition of land and right-of-way and its related costs (e.g., government, developer, or both); and
- (f) properties that are the subject matter of reversion, transfer, or dedication at the expiration of the agreement or at default.

While many of the revenue terms are kept for the negotiation phase, explicit statements regarding project revenues are needed for the following:

- (a) term of agreement: type (e.g., fixed, variable);
- (b) term of agreement: measure (e.g., NPV, IRR before and after tax, specified amount of revenues, specified number of vehicles);
- (c) types of revenues permitted to the developer (tolls, charges);
- (d) treatment of collateral revenues (e.g., revenues from air-space improvements);
- (e) toll types allowed (e.g., direct, shadow, congestion, or at developer’s discretion);
- (f) toll setting authority (e.g., developer, government, or both);
- (g) toll adjustment mechanism (e.g., formula for inflation, traffic demand, debt ratios);
- (h) toll caps (e.g., maximum toll rates allowed);
- (i) base returns allowed: measure and value (e.g., NPV, IRR, specified revenues);
- (j) incentive returns allowed and related performance measure (e.g., achieving specified use of the facility, vehicle occupants, number of cars); and
- (k) excess revenues, their measures and their distribution (e.g., shared, or allocated).

4.2. Obligations dimension

The obligation dimension represents the purpose of the public–private partnership venture and the core of the requirement structure. Explicit requirements have to be set for two issues. The first is the developer’s extent of obligations and responsibilities. The second relates to the extent and terms of the government’s power in performing inspection/supervision, approval, and the right to request changes. Public–private partnership acts, request for proposals, and agreements have to consider details for the obligation requirements, some of which include the following:

- (a) description of project functions for which the developer is responsible (e.g., planning, permits, acquisitions, design, construction, operation, maintenance, environmental assessments and compliance);

- (b) project functions the government prefers, or is required, to perform (e.g., traffic management, maintenance, police services);
- (c) statement of the applicable standards and specifications;
- (d) extent of government monitoring, inspection, and approval processes, and right to make changes;
- (e) statement of quality control and quality assurance systems and the responsibility for performing such activities (e.g., developer, independent consultant, government); and
- (f) processes for addressing time and cost effects resulting from changes made by government (e.g., allocated to capital/operating costs, to be negotiated).

While general statements are provided by government regarding project financing, it is important that call for expressions of interest and request for proposals treat the following:

- (a) financial risks, if any, that may be absorbed by the government, (e.g., interest rate);
- (b) type of financial support or guarantees that might be provided; and
- (c) type of security instruments permitted (e.g., project revenues and rights).

4.3. Liabilities dimension

Explicit statements are needed by government to explain its requirements regarding project general liabilities, risks and taxes. They should cover the following:

- (a) types of liability coverage (e.g., facility damage, tort and business interruption);
- (b) responsible party for each liability during project development and operation;
- (c) amounts of each insurance coverage required during construction and operation;
- (d) types and amounts of project bonds needed for construction and operation;
- (e) extent and conditions, if any, of government liability (e.g., due to developers compliance with government specifications and standards);
- (f) statement regarding the allocation of risks in relation to the developer's obligations;
- (g) explicit definition of force majeure risks;
- (h) time and cost consequences of force majeure risks; and
- (i) statements about tax policies, exemptions, or allowances for the project.

5. Conclusions

Rights, obligations, and liabilities are three dimensions of a structure used to explain government requirements in public-private partnerships. These dimensions in turn consist of nine attributes: possession and revenues for the rights dimension; development, environment, operation, and financing for the obligations dimension; and general liabilities, risks, and taxes for the liabilities dimension. The structure was used to demonstrate the requirements government has regarding the rights, obligations, and liabilities of private developers in a number of public-private partnership (PPP) projects and acts. Generally, the structure can be used as a starting point for government to organize its requirement for

PPP and formulating project documents such as call for expressions of interest, request for proposals, and agreements.

The requirement structure and its nine attributes was useful in explaining how governments implemented BOT, BOOT, DBFO, and BTO modes for the procurement for a number of PPP projects. Alternatively, the structure can be used to identify the basic arrangements under the several PPP modes and in formulating other modes. Government can decide on the contents (e.g., conditions or requirements) and the allocation for each of the attributes, which in turn will provide for a number of arrangements or modes for implementation. The structure, as such, can be used to show that under the traditional public procurement all nine attributes are the responsibility of the government, while under build-own-operate or full privatization, all attributes are the responsibility of the private developer. Between these two extremes come all other PPP procurement modes.

Further, the structure can be used by government in negotiation such that it can manipulate the nine attributes to achieve a balance between the rights, obligations, and liabilities of the private developer. More importantly, governments can use the structure to develop an analysis framework, preferably a quantitative one, to assist in making decisions about the nine attributes and on which allocation of the attributes will attain the best value for the public at large or which will best suit the social and political environment. For example, what would be the benefits (e.g., reduction in facility rates as a requirement in the revenue attribute) if ownership of the facility (possession attribute) would be in the hands of the private sector instead of the government during the term of the agreement? Comprehensive economic models (Abdel-Aziz and Russell 1999) can further be formulated to assess how each of the attributes is best handled.

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