

Bridging the Parana

01/03/2000

Consider a financing structure for a project that at first glance does not register on a non-recourse, stand-alone project finance basis. Consider a difficult physical environment, a nearly 60km wide river delta crossing, over mostly unnavigable wetlands terrain subject to flash flooding. Design a main bridge structure that is able to handle river-borne traffic over a windy navigable portion of the river.

Conceive of a greenfield project that can be measured for success only when it is finally completed, and then commences revenue operations, in a somewhat hostile capital arena. And finally try to marshal through the conventionally opposing forces of government, representing the public interest, with private initiative, promising efficiency and economies.

This is precisely what is being accomplished along the banks of the Paraná River in Argentina. Construction began in September 1998 on one of the most challenging public-private-partnership projects in Latin America ? the Rosario-Victoria Bridge Connection. The project is under negotiation leading up to an expected financial close.

Over the past half century, Argentina's transportation infrastructure has deteriorated as a result of a series of fiscal crises and financial mismanagement. With insufficient funding to expand, maintain or rehabilitate its rather considerable asset base, the Argentine government has encouraged a shift toward privatization, pioneered by former president Carlos Menem, with the pace of privatizations picking up in the 1990s.

Through its Ministry of Economics and Public Works, the Government extended market reform by awarding private concession contracts for the rehabilitation and development of nearly 10,000km of Argentina's roads. Bidding was open to international developers in order to attract foreign capital.

The Conexión Física Rosario-Victoria is a 59km bridge, viaduct and embankment link, currently about 25% built. The proposed financing structure for the 25-year concession consists of a sizable government contribution in the form of grants, private equity capital from the concessionaire, and an ?A'-loan ?B'-loan arrangement through the Inter-American Development Bank (IADB).

Upon completion, the connection of the cities of Rosario and Victoria will traverse one of the largest wetlands in the western hemisphere, located between the Argentine provinces of Entre Ríos and Santa Fe. This is no mean feat, achieving environmental clearance in a country that is renewing its commitment to preservation and management of its environs.

There are two existing crossings of the Paraná in this region, with the new connection located approximately midway between the two. The new crossing will offer local and regional residents, private and commercial vehicles, a timesaving alternative to the existing routes. At this time, regional traffic desiring to cross the Paraná must take a circuitous trip either 160km north of Rosario to the SubFluvial Tunnel, or 175km south to the Zárate-Brazo Largo Bridge.

Planners for the new crossing also anticipated that it would help revive economic development in the region, particularly with the growth of inland goods movements, the emergence of the port at Rosario, and the opening up of markets soon to be more readily accessible on the Victoria side.

Secondary benefits are to be expected from improvements to the provincial highway system in the surrounding area, as

well as from international transport movements between Argentina, Brazil, Chile, and Uruguay.

One of Argentina's most populous cities, Rosario is an industrial hub with a high rate of production. Planners believe that a fluid road network will augment international trade and allow Rosario to expand its up-river port capacity and activities. Victoria is a sleepy mostly agricultural-based hamlet on the other side of the river, hampered from achieving economic growth by way of a lack of a viable connection with the growing area surrounding Rosario.

There are numerous environmental and social stipulations in the proposed transaction, which will doubtless be a feature of the deal story once closure is achieved.

One major component of the IADB's agenda is poverty reduction and the improvement of general living standards. Consequently, during the Bank's internal loan approval process, the project must meet a set of guidelines that protect the environment and safeguard the interests of society.

The IDB's initial reconnaissance work details any potential environmental impacts arising out of a project's construction and operation, and proposes mitigation measures that need to be adopted by the concessionaire. Applicable local laws, regulations and practices must also be followed.

A critical role has been played by the IADB's Private Sector Department in providing the leadership necessary to stimulate financing for such an extensive project. The IADB's presence in the proposed deal has been critical in structuring the impending security package. Banco Santander Central Hispano is a potential participant on the 'B' loan side. Others are being attracted by the care and diligence exhibited by the IADB's loan evaluation process, and by the IDB's AAA rating.

The Government of Argentina is making a substantial contribution to the overall funding package: of a total project investment of approximately \$370 million, government grants will amount to over \$200 million. The balance of the investment will be covered with bank loans and sponsor equity. The concessionaire will service this debt, and then recoup its capital, through toll revenues that will accrue after the completion of the four-year construction period.

The Government's Ministry of Economics and Public Works awarded the concession following an international public tender. After an initial pre-qualification phase, eligible participants were invited to submit proposals, which were then evaluated based on legal, technical, and financial criteria established by the government. A special purpose company, Puentes del Litoral S.A. (PdL) was awarded the concession, and signed a 25-year contract in May 1998.

The international consortium of firms that comprises PdL is led by five construction companies with extensive experience in design, build, operate, and maintain (DBOM) projects worldwide. Consortium members include Italian Impregilo S.p.A., Hochtief of Germany, and Argentine Sideco Americana S.A. and its subsidiary Iecsa S.A., Techint S.A.C.E.I., and Benito Roggio e Hijos S.A. Collectively, PdL's resources are considerable, and their project portfolio illustrates a proven record in developing large-scale, complex infrastructure.

Impregilo, the large Italian conglomerate, has worked throughout Argentina for over three decades in engineering and construction activities. As one of the top members of the German engineering and design industry, Hochtief has been involved with the Öresund Bridge, a new land link connecting Denmark and Sweden. Argentinean Sideco is a provider of infrastructure and public services. Techint is an international builder of large-scale infrastructure, including gas pipelines, urban services, mining and steel, hydraulics, and sanitation. It is active all over the Mercosur region, with pipeline projects currently in Chile and Brazil. Operating under the Roggio Group holding company, Benito Roggio is responsible for various toll road concessions throughout Argentina that cover 2,500km and average 185,000 toll transactions per day.

Additional services have been provided by design firms in Italy such as INCO S.p.A. (Ingegneri Consulenti), a specialized bridge design firm based in Milan, as well as by Leonhardt, Andra and Partners (LAP) based in Stuttgart, Germany. LAP has considerable expertise in major bridge design. Since a major component of the project construction is dredging of the river channel and the construction of the embankments, the consortium turned to the world's experts in dredging, the Dutch.

Boskalis International bv-Ballast Nedam Baggeren bv U.T.E. (BKI/BND), a Dutch firm specialized in dredging, is supplying much expertise for this project. BKI/BND has activated two large dredgers shipped in from the Netherlands, one to perform the hydraulic embankment placement and the other to dredge the river channel itself.

Thus, the Rosario-Victoria Connection involves an exciting international venture involving German, Dutch, Italian, and Argentine contractors. In a novel way, the private sector is managing significant contracts and material supply logistics, with major cross-border, cross-cultural lines of communication.

Bordered by steep banks on either shore, the Paraná River valley is a vast marshland of snaking watercourses and small islands. Much of this area is unnavigable, with the exception of the main river channel adjacent to Rosario. As a result, the Conexión Física Rosario-Victoria must be built as a continuous road system of embankments, viaducts, and a cable-stayed bridge. Upon completion, the total length of the link will be 59.3 km. The connection will accommodate three lanes of traffic, widening to four lanes for the length of the cable-stayed main bridge and its two approach viaducts.

The major structural works are concentrated on the westernmost 12km of the project ? the Rosario side. The design entails an ascending west viaduct that originates at the north end of Rosario city's beltway and approaches the cable-stayed crossing; this component will eventually include the toll plaza. The main bridge will span the navigable stretch of the river, requiring an unobstructed width of 300m and a vertical clearance of 50m. The tower height will reach 120m above the water, and the profile will crest at mid span. An east viaduct will descend from the main bridge to the first of the island bridges, crossing the minor waterways of Riacho de la Invernada and Riacho Paranacito.

Typical of a design-build project, construction on the Rosario-Victoria connection commenced before designs for the main structure were entirely finalized. On-site field engineers review and modify design drawings done overseas in order to accommodate production requirements. This system has expedited the development process by streamlining repetitive construction tasks and standardizing details.

Construction is proceeding from both sides of the delta, with PdL offices established at either end. On the eastern side of the project, the concessionaire has completed the superstructure spans for the first of the island bridges, and is now adjusting its production methods to reduce construction time for the other eleven bridges. Similarly, many of the island bridge piers have been installed, thus all of the necessary design adjustments have been made allowing the contractors to roll-out the placement process for the remaining piers.

The Rosario-Victoria link rises above the flood plain that extends some 50km. The swampy character of this land is prone to seasonal inundation during periods of heavy rain and therefore the make up of creeks and sandbars is constantly changing. The connection is comprised of a series of roadways supported by earth embankments and low level island bridges over the Rio San Lorenzo, Arroyo Barrancoso, Arroyo de la Camisera, Riacho Paranacito and the Riacho Carbon Grande.

The embankment portions of the connection are a very critical element of overall construction. Soil placement and settlement is a significant element of the construction process. The embankment material between the east approach viaduct and the Victoria terminus is obtained from burrow pits directly adjacent to the project alignment. Diesel powered dredges have been activated to excavate this material, and then convey it with hydraulic pipelines to the embankment site. These dredges have cleared a 25 meter-wide access channel from Victoria moving west for over 30 kms. In addition to providing access to the burrow pits, this channel also allows for work barges, dredges, and other construction craft to pass to the island bridges where dredging is required to place piles and other substructure components for the viaducts.

There are twelve island bridges that link the portions of the roadway embankment. Floating concrete batch plants have been deployed extensively for the construction of their substructures. Because the placement of the piles and pile caps has advanced much more rapidly than embankment placement, the only access to this component of construction is by water. Therefore, the floating batch plants save a considerable amount of travel time that would otherwise be spent transferring material from the Victoria facility to the island bridge sites.

The main bridge that crosses the navigable Paraná River is flanked on either side by approach viaducts for which

construction is well underway. The west viaduct, extending from the west abutment for 1,131 meters, is comprised of 32 spans with a span length of 35-meters. The east approach viaduct is approximately 2,377 meters in length, stretching from the east abutment to the main bridge. It is made up of 40 spans with a span length of 60 meters. It is at the beginning of each approach viaduct that the connection widens from 3 lanes to 4 lanes to cross the main span bridge.

The superstructure for the main span unit is a cast-in-place concrete girder supported by cable-stays. Cable-stayed girder bridges of similar construction have been erected at many locations around the world over the past decade, and the technology selected for the main bridge is a state-of-the-art cable-stayed system. It will allow for individual repair or replacement of cables, in lieu of a system where a problem with one cable throws off the entire structure.

There are many logistical issues being solved in the construction of such a major bridge structure in the middle of a wide waterway, which is subject to abrupt winds. The concessionaire is dealing with the basic elements of bridge stability. Shifting river currents must be accommodated in design plans and contingency calculations. Wind tunnel tests verify the tall structure's integrity during unexpected wind gusts of severe magnitude. The piers must be designed to minimize the effects of a potential ship impact.

With any greenfield project, there will be risks from tolling a new facility with no operating history on opening day. Proposed opening day tolls are somewhat high relative to the other tolled crossings of the river, but planners are expecting regional traffic to be attracted nonetheless because of the significant time savings involved as compared to the other alternative routes. There are no restrictions on vehicles of any size or length, and planners clearly hope to attract the heavier goods-carrying vehicles for revenue purposes.

There are few projects like the Rosario-Victoria Connection being developed around the world - particularly those the novel partnership between the state and the private sector in the total financing package. In the midst of construction well before its total financing deal has closed, the Rosario-Victoria is testimonial to intestinal fortitude. Stay tuned.

Thank you for printing this article from IJGlobal.

As the leading online publication serving the infrastructure investment market, IJGlobal is read daily by decision-makers within investment banks, international law firms, advisory firms, institutional investors and governments.

If you have been given this article by a subscriber, you can contact us through www.ijglobal.com/sign-in, or call our London office on +44 (0)20 7779 8870 to discuss our subscription options.