

Bronze Award North America

Energy and water efficient border control station, Van Buren, ME, United States

Project data

Main author

Name

Profession

Project group	Building and civil engineering works
Client	US General Services Administration
Project background	Public commission
Estimated start of construction	November 2011



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Further author(s)

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Comment of the Holcim Awards jury North America

The jury commended the project for the adroit synthesis of design and technology, successfully applying state-of-the-art features of sustainability in a government project with its regulatory implications. The design is dignified, simple and elegant. Instead of a "noisy" appearance it is well integrated into the context and creates the maximum spatial quality out of the rather simple program of the border station.

Project description by author

Relevance to target issues by author

Innovation and transferability – Progress

United States Land Ports of Entry, border crossings, are part of expanded American anti-terrorism efforts. The designs are required to support inspection services, maintain officer safety and welcome visitors to the US. The ports must convey the dignity, enterprise and stability of the US govern-ment in a durable, 100-year structure complying with the US Energy Independence Act.

The new United States Land Port of Entry – Van Buren, Maine port and site meets rigorous operational and security demands. Officers are provided a panoramic view of the secure area from their primary workspace, including vehicles entering the site as well as those exiting the secured perimeter. Regional staffing availability demands operational security with minimal on-site staff. Enhanced visual surveillance allows as few as two officers to operate the port. Comfort and safety in the heavy snow and icy conditions required a canopy configuration to provide shelter as officers move about the site. The "Z" form supports port operations and creates a coherent, sleek configuration, protecting officers from wind, sleet and snow.

The port design fuses an abstraction of the cultural and landscape context with concepts essential to port opera-tions: surveillance and camouflage. The St John River Valley is profoundly influenced by its roots in the Acadian culture, a heritage visible in the original settlement of long narrow plots oriented toward the river. Forests still cover much of the area and provide another layer to the design genesis. As the repetition of trees in a forest provides camouflage, the building uses a patterned repetition of joints, columns and mullions to provide the officers with concealment and direct visual site surveillance. To provide maximum visual surveillance, the main work areas are largely clad in glass. A silk-screened pattern on the glass provides both camouflage and glare protection.

Sustainability was pursued with a broad range of strategies, focused on water and energy efficiency and production. With remote sites and unusually large energy demands, and ports of entry necessarily may attend to site water management and strategic energy independence. We en-tertained a net zero energy goal, while unfunded, this study led to a design that can accommodate eventual net zero or energy producing status. The current design reduces purchased energy by 48% from the national standard by em-ploying innovative, integrated, energy saving designs such as a ground source heating and cooling, a solar wall to tem-per outside ventilation air, as well as many standard energy saving strategies. Given its proximity to the river, water quality management is particularly important. Site water quality is managed using landforms and swales to filter runoff and provide visitors with an experience based on traditional regional agrarian landforms.

Located on a remote site, proven, easily maintained systems were critical to the ports' success. Passive strategies included natural ventilation, daylight harvesting and water conserving fixtures and low VOC materials. A ground-coupled heat pump reduces off-site energy resource demands. Evacuated tube solar heats hot water. The back ventilated cavity of the exterior wall tempers intake air. Zoned lighting and occupancy sensors maximize efficiency. A bio-diesel boiler provides peak demand heat. LED lamps provide the majority of the site lighting. Site water is collected by a system of swales, landforms, and planted check dams to promote on-site infiltration while filtering runoff. Site patterns are developed from regional cultural and landscape patterns as referenced in the building envelope. Yet, the strategies are applicable to all new US Canadian ports. The project is committed to sharing actual whole-project energy and water usage data for at least 5 vears.

Ethical standards and social equity – People

Border crossings connect US and Canadian border towns socially and economically. Workshops engaged the community in the design process. The new port is sensitively inserted. enhancing and expediting the crossing experience, an impor-tant part of the communities' family and work lives. Strict occupational health and safety and gender and minority hiring equity quotas improve staff experience. Design and construction costs are reported quarterly, scrutinized for irness, accuracy, and waste.

Environmental quality and resource efficiency – Planet

Projected purchased energy usage is 48% of national standard. Fixtures achieve 30% water savings. No irrigation is required. Ground-coupled heat pump, peaking bio-diesel boilers, LED lights, lighting control systems reduce fossil fuel consumption. Building automation system allows remote browser and set point maintenance. Project type and remote location require durable robust materials and low equipment maintenance profiles. The port's secure area reduced to 3.8ha (9.4ac) of the 9.5ha (21ac) site.

Economic performance and compatibility – Prosperity

The new port's commercial capability will increase trade and travel through town, adding economic growth to a depressed region. As security is a primary government func-tion, the port is resilient to economic fluctuation. The port is designed to easily incorporate technological security im-provements and avoid obsolescence. The port was designed well within budget, strategically directing resources toward pragmatic functional and sustainable goals, while providing a powerful design experience.

Contextual and aesthetic impact - Proficiency

Sleek architectural forms are tautly wrapped and detailed with patterns derived from the region's natural and cultural context. Abstracting Acadian land divisions and regional agrarian landforms, the site design consists of a series of mounds that simultaneously create a bio-swale system for filtering water and a cohesive experience of the site. Similar to the building's patterning, the site's rhythmic elements blur the distinction between secured and unsecured areas. Architecture and landscape combine to create a new cultural and ecological amenity from a former rail loading facility. The design conveys a welcoming experience, responsive to the local context while conveying federal dignity and stability.













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