



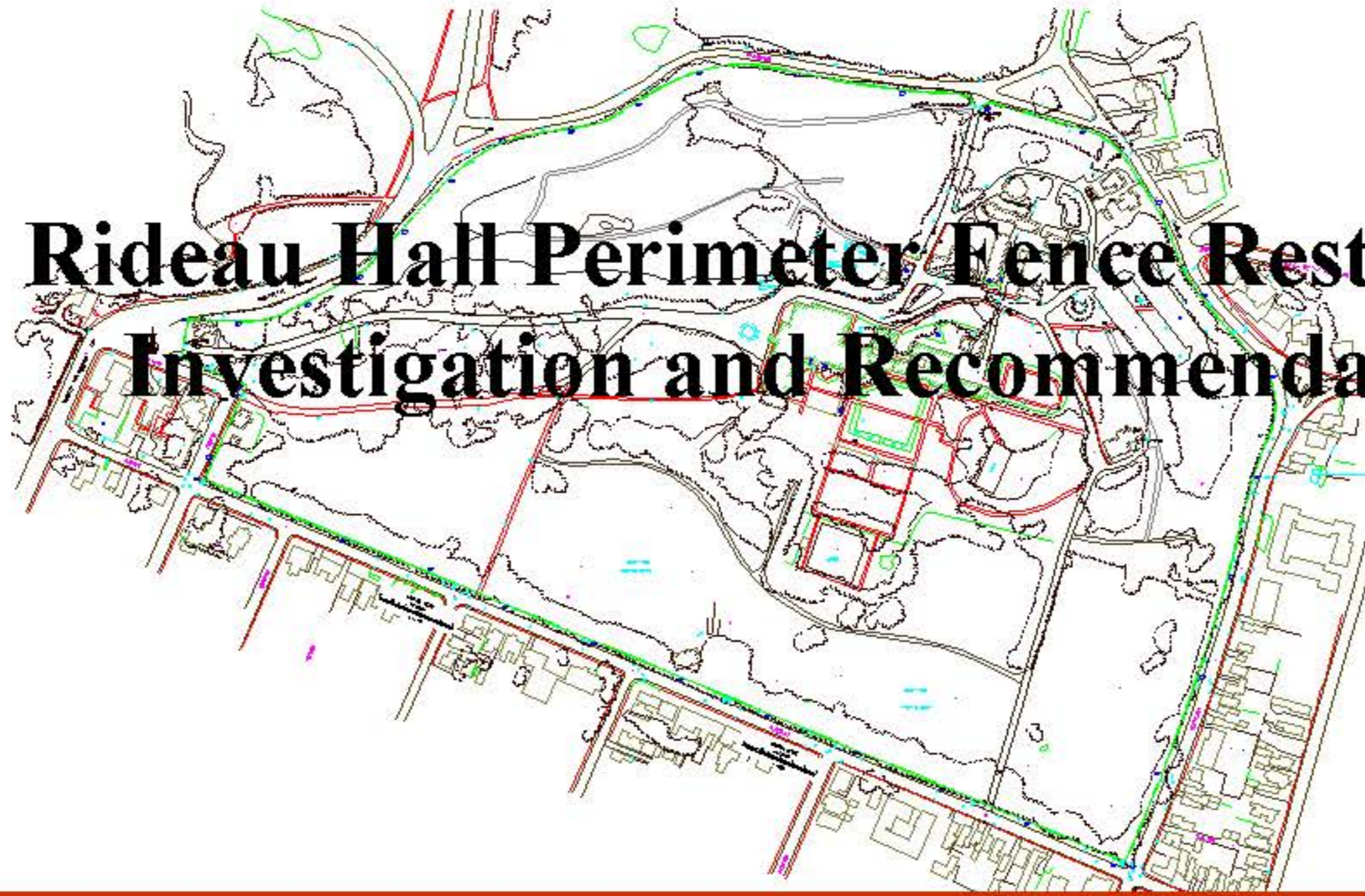
**RIDEAU HALL
Perimeter Fence
Restoration
1996**

**Presentation by F. LeBlanc, Chief Architect
National Capital Commission**



National Capital
Commission

Commission
de la capitale nationale



Rideau Hall Perimeter Fence Restoration Investigation and Recommendations

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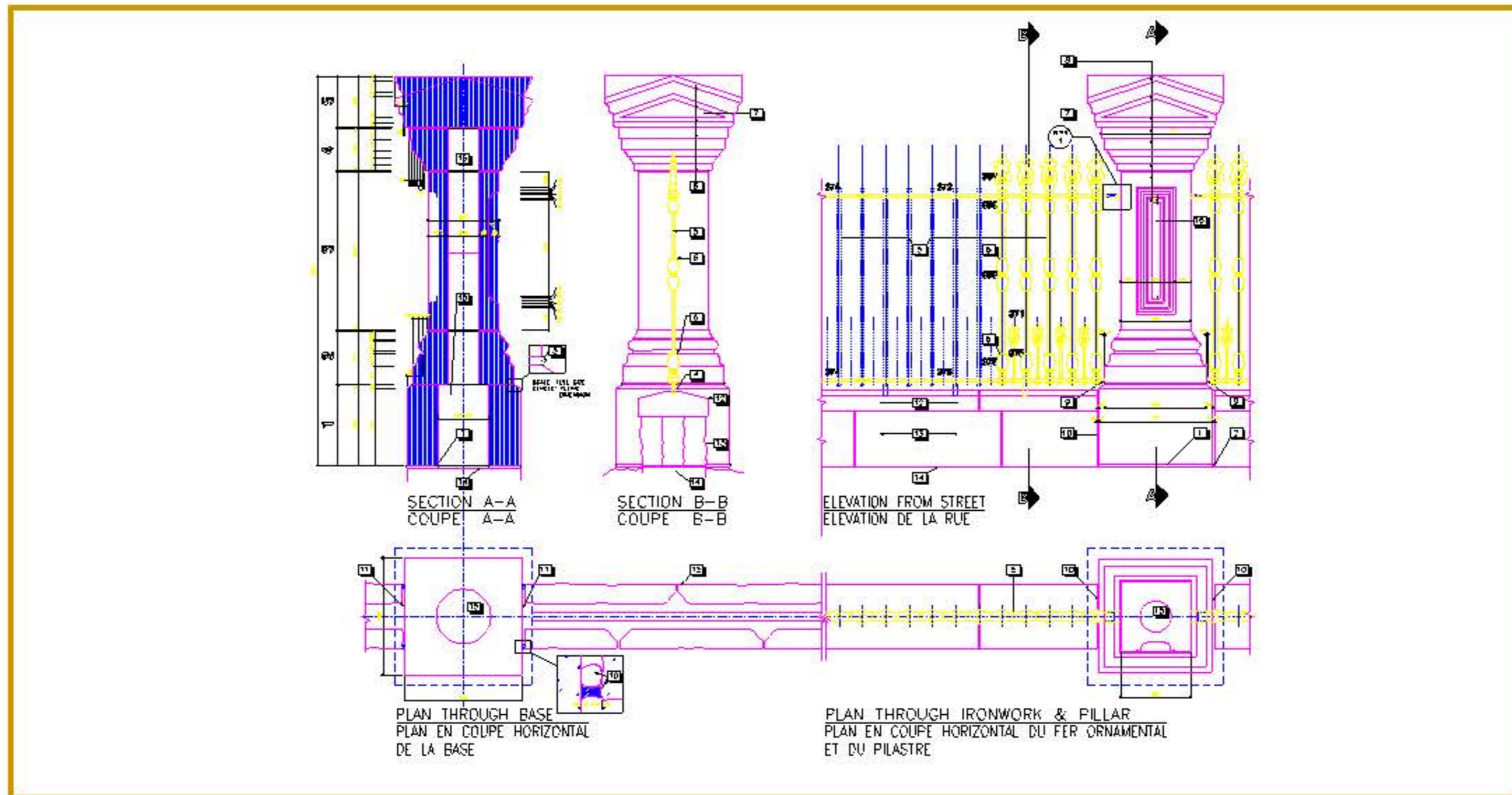
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Rideau Hall Site

Foreword



Fence Construction Details



Rideau Hall Site: The perimeter fence is 2347 meters(7,700feet) long



Rideau Hall Site (at right) including part of downtown Ottawa
The perimeter fence is superimposed over Parliament Hill.

Executive Summary

○ Foundation



Foundation excavation at 1933 Section

○ Metalwork



Typical deteriorated metal work, 1933 Section

○ Low Masonry Walls



Typical failure at low wall

Executive Summary (con't.)

☉ **Masonry Pillars**



Typical fractures at masonry pillar (1933 Section).

☉ **Landscape**



Typical overgrown vegetation

☉ **Maintenance**



Typical fractured metal casting. Neglect of these deficiencies will lead to deterioration of adjacent elements

Interventions

	Scope of Work	Estimated Cost
Intervention #1	Restore 1868 and 1913 sections. Demolish all other sections	\$495,000
Intervention #2	Restore 1868 and 1913 sections. Demolish all other sections. New metal fence on existing foundation. <u>Public tender, two-year contract.</u>	\$2,095,000
Intervention #3	Restore entire fence. Repair foundations as required. Demolish 1936 metal section and replace with new. Clean and paint all metals. Repairs pillars and low walls where required. Replace pillars where required. Repair gates, and repave at gateways as required. Do required landscape works. Implement vegetation management and maintenance plans. <u>NCC Project Team, five year construction</u>	\$3,743,000
Intervention #4	Restore entire fence. Repair foundations as required. Demolish 1936 metal section and replace with new. Clean and paint all metals. Repairs pillars and low walls where required. Replace pillars where required. Repair gates, and repave at gateways as required. Do required landscape works. Implement vegetation management and maintenance plans. <u>Public tender, three-year contract</u>	\$3,790,000
Intervention #5	Restore entire fence. Repair foundations as required. Demolish 1936 metal section and replace with new. Clean and paint all metals. Repairs pillars and low walls where required. Replace pillars where required. Repair gates, and repave at gateways as required. Do required landscape works. Implement vegetation management and maintenance plans. <u>Public tender, eleven-year contract</u>	\$4,595,000
Intervention #6	Restore entire fence. Repair foundations as required. Demolish 1936 metal section and replace with new. Clean and paint all metals. Repairs pillars and low walls where required. Replace pillars where required. Repair gates, and repave at gateways as required. Do required landscape works. Implement vegetation management and maintenance plans. <u>Public tender, \$275,000 per year for 20yrs</u>	\$5,500,000
Intervention #7	Restore entire fence. Repair foundations as required. Demolish complete low wall assembly and rebuild. dismantle all metals and clean with high-pressure water wash. Demolish 1936 metal section and replace with new. Repairs pillars where required. Replace pillars where required. Repair gates, and repave at gateways as required. Do required landscape works. Implement vegetation management and maintenance plans. <u>Public tender, three-year for contract</u>	\$6,466,000

Section of Fence	Reference #	Scope of Work	Cost per Section	# of Sections	Amount
All	A	Preparatory Work: hoardings, protection of work, numbering of pieces, etc.	\$835.49	346	\$289,078
1934,1935 (not out-of-plumb)	B	Rake & repoint low walls, clean metals w/hand tools & paint in situ, disassemble/repair pillars and reassemble	\$4,200.32	127	\$550,242
1868,1913, 1932 partial (i.e. 1980's restoration)	C	Rake & repoint low walls, clean metals w/high pressure water, paint in situ, rake and repoint pillars in situ.	\$2,834.37	53	\$150,222
1932 partial (i.e. unrestored), 1933	D	Rake & repoint low walls, clean metals w/hand tool and paint in situ, demolish pillars and replace with new.	\$10,734.27	96	\$1,030,490
1935 out-of-plumb)	E	Disassemble low wall to top of foundation and rebuild, clean metals w/hand tools & paint in situ, disassemble/repair pillar and reassemble.	\$7,771.77	15	\$116,577
1936	F	Rake & repoint low walls, demolish metals and replace with new, disassemble/repair pillars and reassemble.	\$14,763.10	49	\$723,392
Miscellaneous	G	Gate, Vegetation Plan, Maintenance Plan, etc.	---	---	\$269,508
		Subtotal			\$3,129,508
	H	Overhead, Profit, Insurances	---	---	\$332,134
		Total Sept. 1995 \$			\$3,456,256
	I	Inflation (Eleven Year Period)	---	---	\$1,138,544
		Total Estimated Cost of Construction over eleven-year period			\$4,594,800

INTRODUCTION



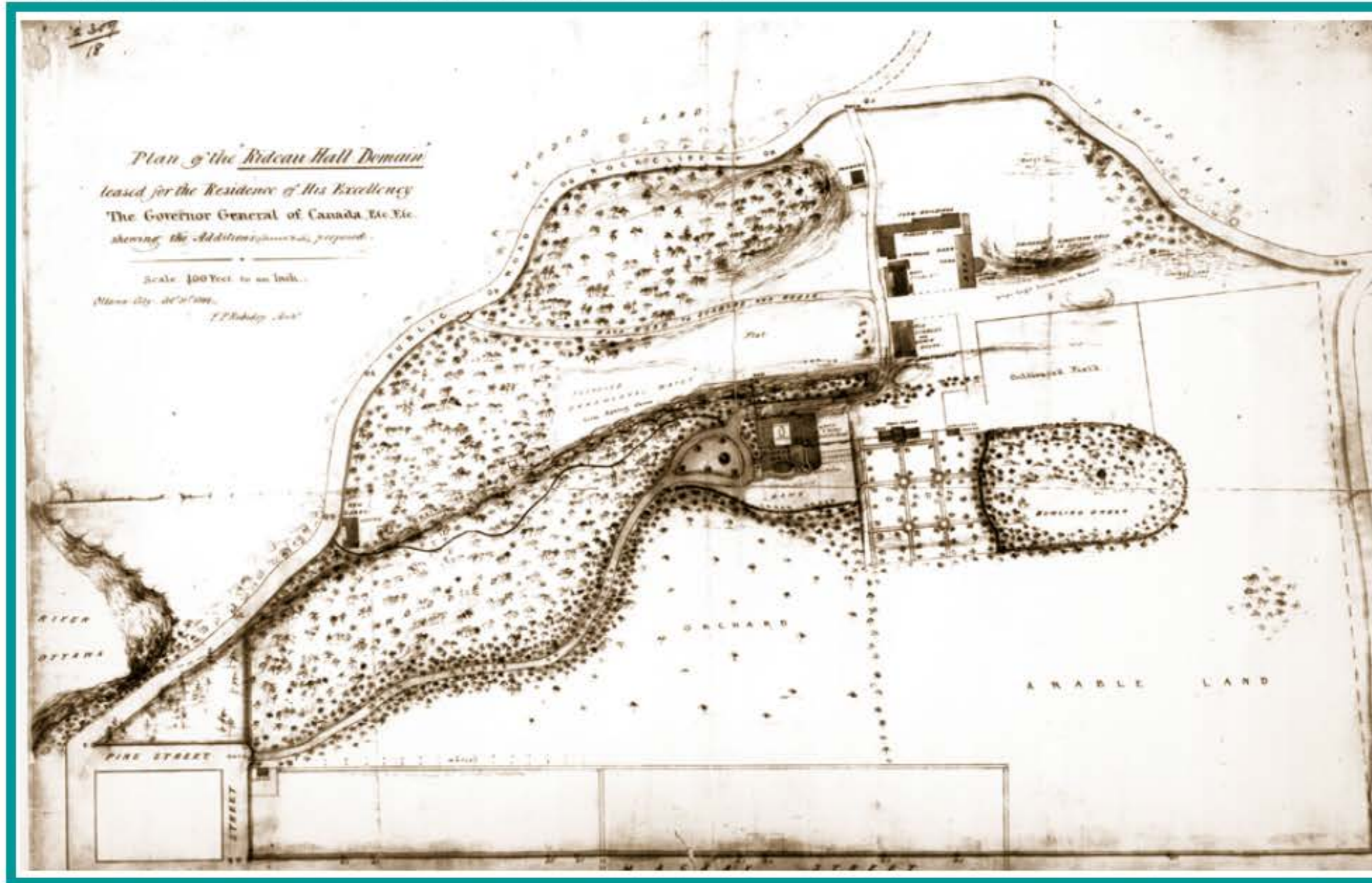
Main Gates at Sussex Drive, after 1883. These first seven sections of the fence were to serve as inspiration for all subsequent work. (National Archives of Canada, #NAC/PA-34056)

Rideau Hall, 1864



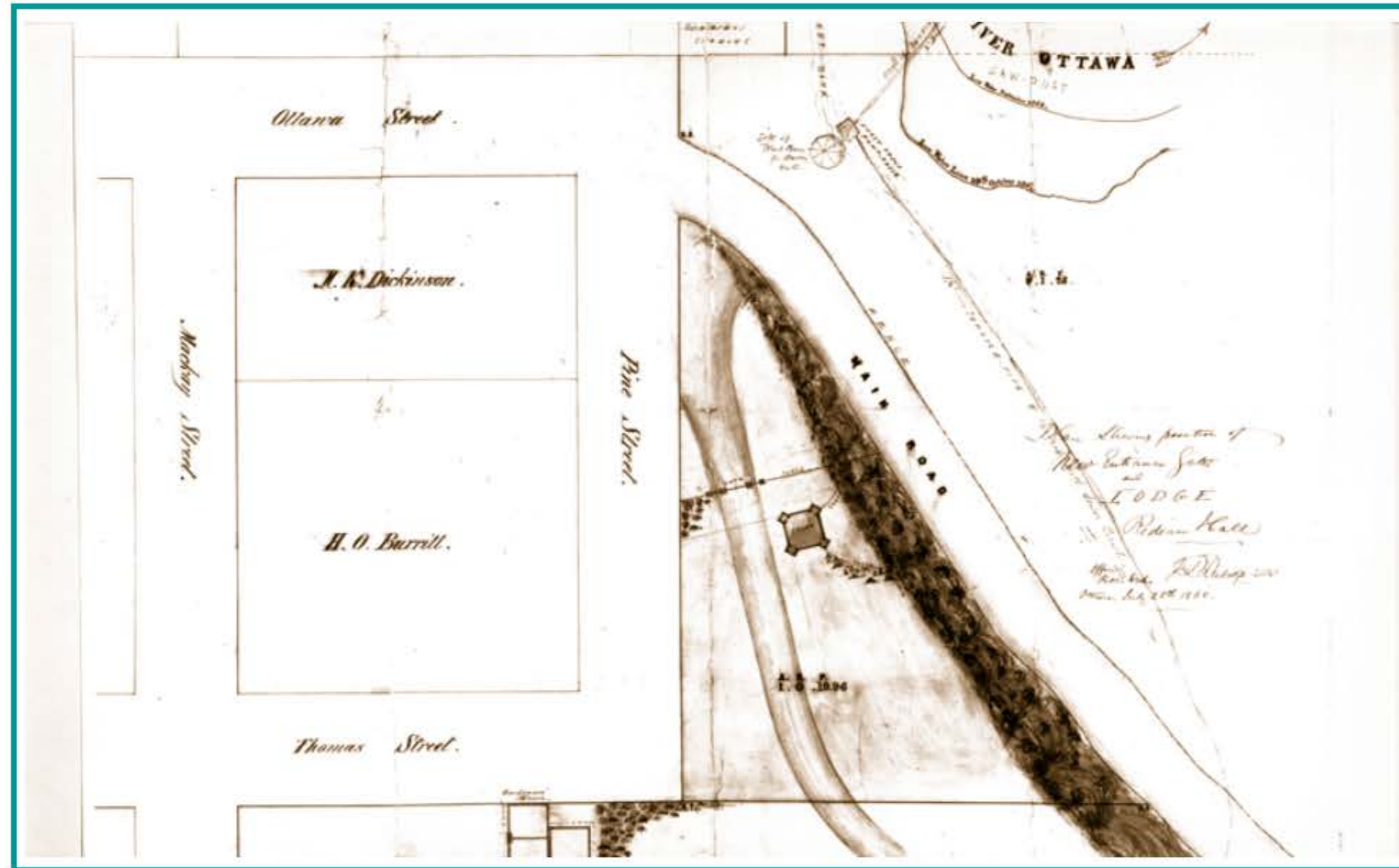
Rideau Hall, 1864. Note entrance to site at Thomas Street. (National Archives of Canada, # NMC79960)

Plan of the Rideau Hall Demain



Rideau Hall Site Plan, October 1864, by F.P. Rubidge. Note proposed gate at corner of Pine (now Rideau Gate) and Thomas Streets. Also note stone wall extending from "lodge". (National Archives of Canada, # NMC43166)

Rideau Hall partial site plan: July, 1868

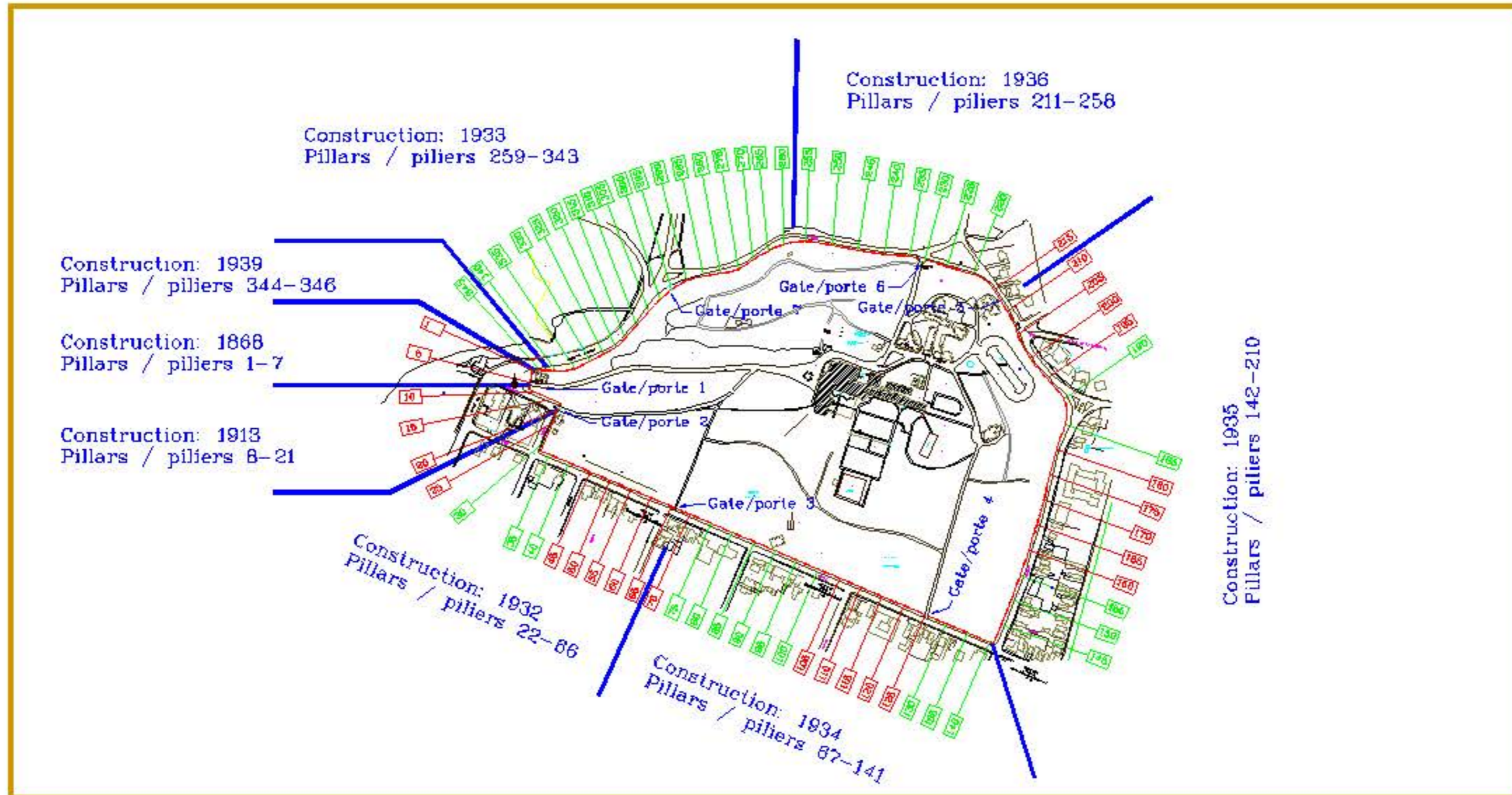


Rideau Hall Site Plan, July, 1868, by F.P. Rubidge. showing Gate Lodge and 1867 (pillar #1-7) fence construction. In 1868, the government acquired Rideau Hall's eighty-seven acres, including fourteen extra acres acquired since 1864, for \$82,000. (National archives of Canada, #nmc 43170)

RIDEAU HALL

PERIMETER FENCE

CONSTRUCTION PHASES



Rideau Hall Site Plan and Phases of Construction

Restoration Philosophy

- ◌ Policy on Federal Heritage Building
- ◌ Built Heritage Policy
- ◌ International Charters
 - The World Heritage Convention
 - Venice Charter (ICOMOS)
 - International Charter for the Conservation and Restoration of Monument and Sites

Heritage Designation

- ◉ The Federal Heritage Buildings Review Office (FHBRO)



Main Gates at Sussex Drive, constructed in 1868. This portion of the fence is designated as a Classified heritage property

Soil and Foundation

Soils and Foundation: Performance Evaluation Summary

Symptoms	Causes of Symptoms	Recommended Solutions
<ul style="list-style-type: none"> • <i>foundation concrete is exposed</i> 	<ul style="list-style-type: none"> • <i>finish grade of the soil has eroded over time</i> 	<ul style="list-style-type: none"> • <i>regrading</i>
<ul style="list-style-type: none"> • <i>spalling concrete</i> 	<ul style="list-style-type: none"> • <i>low wall assembly above entrains moisture</i> 	<ul style="list-style-type: none"> • <i>redesign low wall assembly above</i>
<ul style="list-style-type: none"> • <i>pillar bases above are cracked</i> 	<ul style="list-style-type: none"> • <i>alkali aggregate reaction in foundation concrete has resulted in movement above</i> 	<ul style="list-style-type: none"> • <i>cut expansion joints in foundation</i>
<ul style="list-style-type: none"> • <i>gates are misaligned</i> 	<ul style="list-style-type: none"> • <i>alkali aggregate reaction in foundation concrete has resulted in movement above</i> 	<ul style="list-style-type: none"> • <i>cut expansion joints in foundation</i>
<ul style="list-style-type: none"> • <i>severe outward tilting at the curved 1935 sections</i> 	<ul style="list-style-type: none"> • <i>alkali aggregate reaction in foundation concrete has resulted in tilting</i> 	<ul style="list-style-type: none"> • <i>cut expansion joints, disassembly / reassembly of tilting sections above with new mortar leveling base</i>



Typical spalled concrete at top of foundation



Typical cracked pillar base, partly caused by movement in foundation below

Low Masonry Wall

Low Masonry Walls: Performance Evaluation Summary

Symptoms	Causes of Symptoms	Recommended Solutions
<ul style="list-style-type: none"> limestone facings bulge outwards 	<ul style="list-style-type: none"> wall remains continually saturated with moisture 	<ul style="list-style-type: none"> rake, repoint and reset facing stones
<ul style="list-style-type: none"> delamination of limestone facing 	<ul style="list-style-type: none"> incorrect bedding plane 	<ul style="list-style-type: none"> replace as required
<ul style="list-style-type: none"> upstand wall in friable condition 	<ul style="list-style-type: none"> moisture saturation, freeze-thaw deterioration, and poorly air-entrained concrete 	<ul style="list-style-type: none"> dismantle and redesign/ reassemble where required. Regrading where required
<ul style="list-style-type: none"> severe outward tilting at the curved 1935 sections 	<ul style="list-style-type: none"> alkali aggregate reaction in foundation concrete has resulted in tilting 	<ul style="list-style-type: none"> cut expansion joints, disassembly / reassembly of tilting sections above with new mortar leveling base
<ul style="list-style-type: none"> pillar bases adjacent to low wall are cracked 	<ul style="list-style-type: none"> alkali aggregate reaction in upstand wall 	<ul style="list-style-type: none"> expansion joints, dismantle and redesign/ reassemble where required

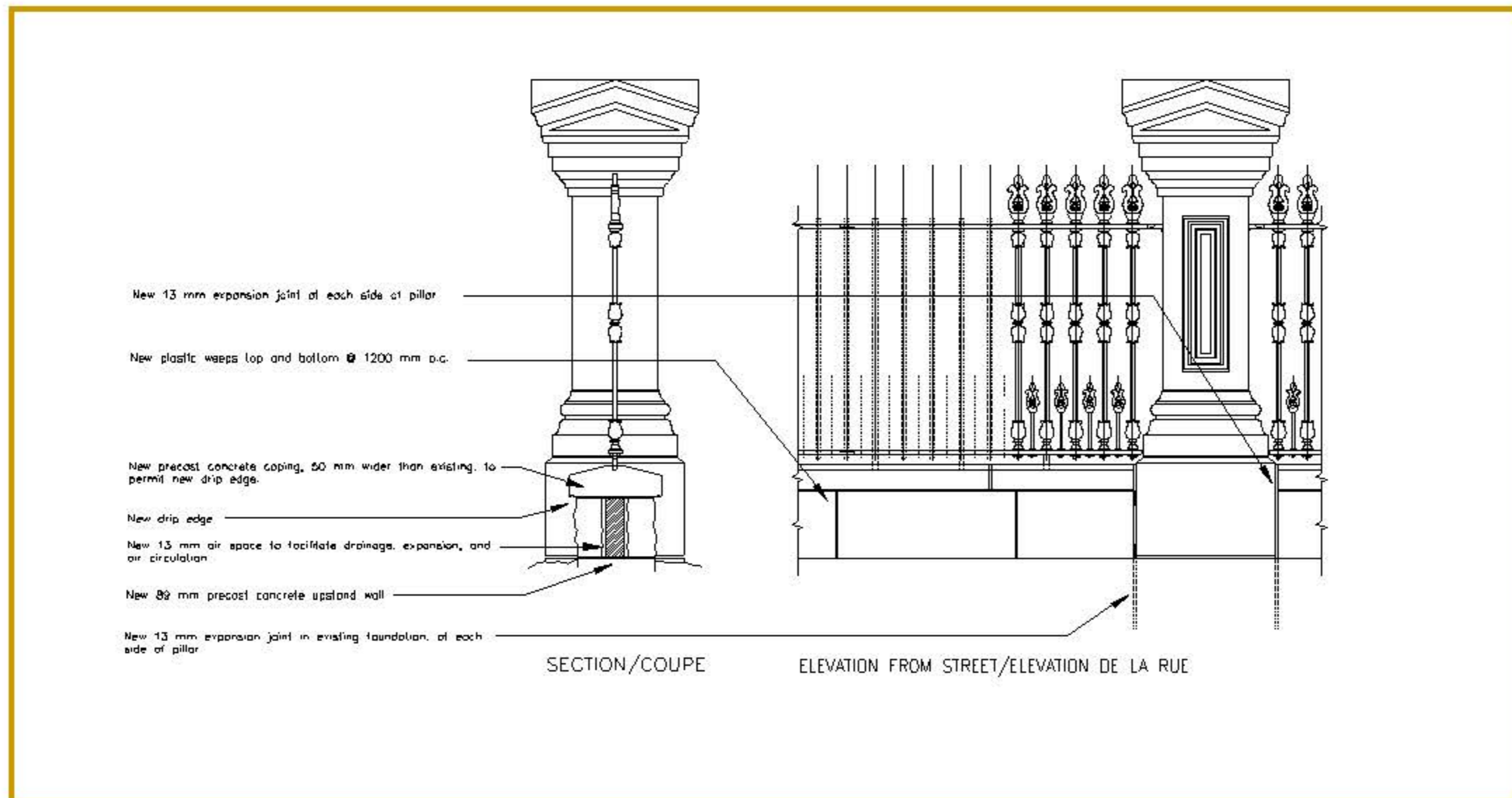


Typical failure at low masonry wall, Muckay Street.



Fence assembly out-of plumb at section 1935

Recommended New Construction @ Low Wall



Proposed redesign of Low Wall Assembly (where required)

Masonry Pillars

Masonry Pillars : Performance Evaluation Summary

Symptoms	Causes of Symptoms	Recommended Solutions
<ul style="list-style-type: none"> pillar bases adjacent to low walls are cracked 	<ul style="list-style-type: none"> alkali aggregate reaction in upstand wall 	<ul style="list-style-type: none"> expansion joints, dismantle and repair / reassemble
<ul style="list-style-type: none"> cracking above base blocks, notably 1932 & 1933 sections 	<ul style="list-style-type: none"> freeze-thaw cycling, salt crystallization damage, alkali aggregate reaction, extennal mechanical forces 	<ul style="list-style-type: none"> disassemble, repair and / or replace
<ul style="list-style-type: none"> staining at mortar joints 	<ul style="list-style-type: none"> egress of moisture 	<ul style="list-style-type: none"> selective cleaning
<ul style="list-style-type: none"> failed mortar joints 	<ul style="list-style-type: none"> egress of moisture, lack of maintenance 	<ul style="list-style-type: none"> rake and repoint
<ul style="list-style-type: none"> severe outward tilting at the curved 1935 sections 	<ul style="list-style-type: none"> alkali aggreate reaction in foundation concrete has resulted in tilting 	<ul style="list-style-type: none"> cut expansion joints, disassembly/reassembly of tilting sections above with new mortar leveling base



Typical Vertical Fracture at base of Pillar 144, caused by AAR-induced expansion in low wall adjacent, and in the foundation below



Typical fractures at masonry pillar (1933 Section).

Metals

Metals: Performance Evaluation Summary

Symptoms	Causes of Symptoms	Recommended Solutions
<ul style="list-style-type: none">• <i>flaking paint</i>	<ul style="list-style-type: none">• <i>improper surface preparation of host metals</i>	<ul style="list-style-type: none">• <i>prepare surfaces and repaint</i>
<ul style="list-style-type: none">• <i>mild corrosion at 1868 & 1913 section</i>	<ul style="list-style-type: none">• <i>absence of protective galvanized zinc coating</i>	<ul style="list-style-type: none">• <i>high-pressure water clean and repaint</i>
<ul style="list-style-type: none">• <i>extensive corrosion at 1936 section</i>	<ul style="list-style-type: none">• <i>absence of protective galvanized zinc coating</i>	<ul style="list-style-type: none">• <i>disassemble and replace</i>
<ul style="list-style-type: none">• <i>severe outward tilting at the curved 1935 sections</i>	<ul style="list-style-type: none">• <i>alkali aggregate reaction in foundation concrete has resulted in tilting</i>	<ul style="list-style-type: none">• <i>disassembly / reassembly of tilting sections</i>



Typical corrosion at non-galvanized 1936 section



Laboratory analysis of metal samples

Miscellaneous Additional Items

Miscellaneous : Performance Evaluation Summary

Symptoms	Causes of Symptoms	Recommended Solutions
<ul style="list-style-type: none"> <i>sagging gates</i> 	<ul style="list-style-type: none"> <i>inadequate support for weight of cast-iron assembly</i> 	<ul style="list-style-type: none"> <i>install gate wheels</i>
<ul style="list-style-type: none"> <i>fractured pillars at gates</i> 	<ul style="list-style-type: none"> <i>inadequate hinge assembly design</i> 	<ul style="list-style-type: none"> <i>disassemble, redesign and replace</i>
<ul style="list-style-type: none"> <i>unsightly electrical conduits</i> 	<ul style="list-style-type: none"> <i>absence of protective galvanized zinc coating</i> 	<ul style="list-style-type: none"> <i>disassemble and replace</i>
<ul style="list-style-type: none"> <i>low saturated wall assembly</i> 	<ul style="list-style-type: none"> <i>finish grade of soil higher than low wall</i> 	<ul style="list-style-type: none"> <i>regrade all required areas</i>
<ul style="list-style-type: none"> <i>overgrown vegetation, organic staining of masonry elements.</i> 	<ul style="list-style-type: none"> <i>lack of systematic maintenance</i> 	<ul style="list-style-type: none"> <i>instigate vegetation management</i>



Surface-mounted electrical conduit at Prince Anne Gate :



Overgrown vegetation at 1939 Section

Maintenance Plan

Maintenance: Performance Evaluation Summary

Symptoms	Causes of Symptoms	Recommended Solutions
<ul style="list-style-type: none"><i>flaking paint, mortar joint failures, cracked pillars, corroded metals, staining, etc.</i>	<ul style="list-style-type: none"><i>inadequate maintenance guidelines and implementation</i>	<ul style="list-style-type: none"><i>implementation of maintenance plan</i>



Routine maintenance is required for paint touch-ups, and cleaning of masonry



Typical Vertical Fracture at Base of Masonry Pillar



Laboratory analysis of metal samples