

Heritage Advisory Committee  
NOV 20 2012

# HERITAGE IMPACT STATEMENT ON THE PUMP HOUSE AT THE MISSISSAUGUA GOLF AND COUNTRY CLUB 1725 MISSISSAUGA ROAD, MISSISSAUGA, ONTARIO

by Paul Dilse, Heritage Planning Consultant

for the Mississauga Golf and Country Club and the City of Mississauga

October 11, 2012



Fig. 1 West elevation of existing pump house with fenced court (gate open)

## HERITAGE IMPACT STATEMENT ON THE PUMP HOUSE AT THE MISSISSAUGUA GOLF AND COUNTRY CLUB

### Background

The Mississauga Golf and Country Club is applying to demolish and replace its existing pump house (Fig. 1 on the report cover). Through its golf course and property manager, the club can be reached at:

- 1725 Mississauga Road, Mississauga, Ontario L5H 2K4; telephone: (905) 278-4857 extension 272; fax: (905) 278-8086; AZubek@mississaugugolf.com.

In the review of the application, the City of Mississauga requires a heritage impact statement.

On September 11, 2012, Don Smith, assistant golf course and property manager for the Mississauga Golf and Country Club, invited City representatives Paula Wubbenhorst and Elaine Eigl, land use planning consultant Karen Bennett and heritage planning consultant Paul Dilse to visit the site. Karen Bennett took photographs of the interior of the existing and former pump houses, and these appear in the report. A scope of work for the heritage impact statement was discussed; and soon thereafter, articulated.

Paul Dilse returned to the site on October 4. Adam Zubek, golf course and property manager, introduced Paul Dilse to Lea Hill, volunteer archivist. Lea Hill guided research of the club's archives, which consists of leather-bound scrapbooks starting in the early years of the club and continuing chronologically to the present day. Following their research, Paul Dilse photographed and noted the existing and former pump houses, other outbuildings and the clubhouse. Exterior photographs in the report date from October 4.

As well, Paul Dilse read and noted Bettie Bradley's 1981 history of the club, a copy of which is held at the North York Central Library. Additionally, he reviewed the histories he had written for previous reports requested by the City of Mississauga. Passages from his histories are incorporated in the current report's site history.

It should be noted that the present spelling of the club's name is different from the original spelling and from the common spelling. The present spelling comes close to the mid-nineteenth century spelling, but not exactly. Because it is a Native name translated into English, variations on "Mississauga" occur in historical documents and in the report.

### Identified Attributes in the Cultural Landscape Inventory

In 2005, the Landplan Collaborative Ltd. and its associates completed an inventory of cultural landscapes found across the City of Mississauga. Three of those are the Mississauga Golf and Country Club, the Credit River Corridor that runs through the club and the Mississauga Road Scenic Route that borders on the club.

In the inventory, the Mississauga Golf and Country Club is described as follows:

“Prior to the establishment of a golf course on this site, the area served as the Mississauga Band Reserve from 1826 to 1847. The Native Mississauga were eventually relocated to a reserve near Hagersville. The Mississauga Golf and Country Club was founded in 1905 by the Old Highlands Golf Club. The well established and prestigious golf club is located on 240 acres of property, home to a club house that was built in 1912, and hosted the AT&T Canada Senior Open in 2001 and the Canadian Open on six occasions.”

The club’s landscape is noted for its scenic and visual quality, natural environment and horticultural interest. The club’s buildings are noted for their aesthetic or visual quality, consistent pre-Second World War environs and consistent scale. The club is also recognized for its historical or archaeological interest.

Taking excerpts from *The Physiography of Southern Ontario*, the inventory’s authors describe the Credit River Corridor:

“The Credit River is 58 miles long in total and has a drainage area of 328 square miles. From south of Georgetown to Erindale, the river cuts through the boulder till of the Peel Plain and in some areas exposes the underlying Paleozoic bedrock of shales and sandstones. The River flows through a wide alluvial terrace at Meadowvale where its banks are gentle and tree covered. As it approaches the old Shoreline of glacial Lake Iroquois at Erindale it cuts deeper and deeper into the Peel Plain creating steep valley walls in excess of 75 deep. In several locations, such as on the former Bird property north of Burnhamthorpe, intermediate benches were formed as the water levels of the glacial lakes receded. These benches and alluvial terraces provide wonderful natural and recreational settings for trails and other recreational activities. South of the Iroquois shoreline the River cuts through the sands and boulder till of the Iroquois Plain. The last mile of the river is drowned and marshy. The wave action of Lake Ontario continues in its efforts to build a bar across the mouth of the river which is periodically removed by dredging. Despite its size, the River has had significant impact on the settlement of the area. At one time, Erindale had a mill and for a short while a small hydroelectric generating station. At Streetsville, four flour mills operated some of which remain today as modern mills. Two sawmills and a carding mill were built in Meadowvale. The banks

of the river continue to be developed for attractive residential neighborhoods, parks and special uses such as the University of Toronto Erindale campus. The river provides the residents of Mississauga with a variety of recreational and educational opportunities. The Credit River Valley is the most significant natural feature remaining in the City of Mississauga.”

The corridor’s attributes include its scenic and visual quality, natural environment, landscape design, direct association with an important person or event, illustration of an important phase in the City’s social or physical development, historical or archaeological interest, outstanding features and significant ecological interest.

In the inventory, the Mississauga Road Scenic Route is described as follows:

“Mississauga Road is one of the oldest roads in Mississauga. Its alignment varies from being part of the normal road grid in the north to a curvilinear alignment in the south following the top of bank of the Credit River. The scenic quality of the road is notable because it traverses a variety of topography and varying land use from old established residential neighbourhoods to new industrial and commercial areas. From Streetsville south the boulevards and adjacent landscapes are home to some of the oldest and most spectacular trees in the City. It is acknowledged as an important cultural landscape because of its role as a pioneer road and its scenic interest and quality.”

The route’s attributes include its scenic and visual quality, horticultural interest, landscape design, illustration of an historical pattern, illustration of an important phase in the City’s social or physical development, consistently scaled built features and historical or archaeological interest.

The Mississauga Golf and Country Club and any property associated with the Credit River Corridor or Mississauga Road Scenic Route are listed in the City’s register of heritage property as properties Council believes have cultural heritage interest. An application to develop a listed property, in this case the demolition of the existing pump house and its replacement, necessitates an assessment of the proposal’s impact on the identified attributes of the three cultural landscapes.

#### Location of the Existing Pump House

The Mississauga Golf and Country Club is located near the Mississauga Road interchange of the Queen Elizabeth Way (Fig. 2 in Appendix A).

The existing pump house stands far from Mississauga Road on the bank of a watercourse that connects with the main course of the Credit River. The small structure



is inconspicuous at the bottom of the river's steep treed valley wall. Visitors rarely see the pump house, which is accessed by a cart path. The club's main building, the clubhouse, commands the top of the hill and is visible to visitors and club members alike.

### Site History

The Mississauga, an Ojibway-speaking people, began to cede their lands along the north shore of Lake Ontario to the British Crown after the 1790s, keeping a portion of the Credit River, Twelve Mile Creek and Sixteen Mile Creek (one mile either side of stream and inland from the mouth for six miles) in the 1805 treaty. In the 1820 surrender, they lost all but 200 acres.

The loss of important hunting and fishing grounds on which they depended, decimation by European diseases and encroachment by European settlers all took heavy tolls on the Mississauga. In the early 1820s, Methodist Episcopal missionaries, including Peter and John Jones (children of surveyor Augustus Jones and Tuhbenahneequay, daughter of a Mississauga chief) converted many of them to Christianity and a more European way of life with agriculture and trades. In 1826, more than 200 Mississauga moved their settlement of bark huts and tents from the mouth of the Credit River to the small agricultural village reserve lands that had been set aside – the site now owned by the Mississauga Golf and Country Club.

Even here, they were denied security of tenure. In 1847, on invitation from the Six Nations Iroquois of the Grand River, the Mississauga moved to the southeastern corner of the Tuscarora reserve near present-day Hagersville, and named their new lands the New Credit Reserve.

Figure 3, a map drawn in 1843, shows the division of lands in the former Mississauga Indian Reserve. Figure 4, a detail from a map drawn in 1859, marks the site of the "Old Indian Village."

After a half century in private ownership, 208 acres were purchased from the Capreol family in 1905 by shareholders in the Mississauga Golf and Country Club; preserving the historic site as open space. George Cumming and Percy Barrett, professionals at the Toronto and Lambton golf clubs, surveyed and laid out a nine-hole course in 1906. A farmhouse overlooking the banks of the Credit River served as the clubhouse. An old log house, originally used in the Mississauga agricultural village, was rented to an employee.

More property was acquired in 1908; and in 1912 and 1913, a new clubhouse was built on the site of the old farmhouse. The style chosen for the clubhouse, Tudor Revival, evoked vernacular English country manor houses of the Tudor period. Figure 5, a detail from a map drawn in 1917, labels the Mississauga Golf Club as the site's owner.

In 1923, further improvements were undertaken – a new bungalow for the maids, a new garage, an incinerator, machine shop, locker room, shelters on the course, a sewage disposal plant and a new water system.

*The Canadian Golfer* in its March 1923 issue reported that:

"The Mississauga Golf and Country Club early in March let a contract to the National Equipment Company, Limited, of Toronto, for the installation of an entirely new water system at Mississauga. The new system will not only take care of the 18 greens and tees, but will supply water for the showers in the club house and sleeping bungalow, water for the maids' quarters, the secretary's residence, the garage and the stable, and will be powerful to take care of an additional nine-hole course which the club has in mind to build some day in the north-eastern section of its property. Having spent about \$35,000 on the building of new greens during the past two years, Mississauga should, with its fine new water system, which will cost \$10,000, soon rank as one of the very finest golf courses in Canada. Its scenic beauty is without doubt the finest of any Canadian golf club."

Pasted in the same club scrapbook where *The Canadian Golfer* article is found, an article from *The Globe*, entitled "O'er Fairway and Hazard," began:

"With the approach – at last – of real spring weather, thousands of citizens are beginning to think and to plan golf. The ancient Scottish game has taken a marvellous hold on the affections of folk in this city, and The Globe is making arrangements, in so far as is possible, to "cover" the golfing activities of Torontonians during the coming season – not merely the tournaments and club matches, but stories of the clubs, incidents on the courses, happenings to individual players, and records of personal achievement. ... "

*The Globe* article continued its report on golfing:

"The Mississauga Club is planning some improvements to its grounds. Its purpose is to plant roses along its entire frontage of a quarter of a mile and thus make its property one of the beauty spots of the county. Its President, Hugh Johnson, discussed this on Saturday with E. G. Donaldson and Arthur Sprott of the Greens Committee. Improvements are being made to the water system and members of the club, when they play over the permanent greens, will find that the course has been practically rebuilt within the past three years. With the improvements to grounds, the clubhouse and the

course, Mr. Johnson believed that the plant of the Mississauga Club would be among the best in Canada. ... "

In the report of the board of directors for the year ending the 30<sup>th</sup> of November 1923, an expenditure of \$10,936.95 for the new water system was accounted for.

The club continued to improve its grounds in the early and mid-twentieth century. In 1928, Stanley Thompson, the head of the most active golf architectural company in North America, drew plans to lengthen the course. More adjoining land was acquired in 1931 and 1932. In 1937, an old cottage near the sixteenth fairway was removed; and a sprinkler system installed on the lower fairways. In 1940, an inclined elevator (called the inclinor) was built, linking the fifteenth and sixteenth greens. In 1948, a companion elevator was installed below the clubhouse; and the club's first permanent bridge was spanned across the river. In 1958, a curling rink was added to the grounds; the clubhouse was renovated for year-round use; Mississauga Road, which had run through the grounds, was moved farther west; a new parking lot and drive were laid out; a new halfway house was erected; stone terracing was constructed; and major plantings were set out.

In 1974, the president reported on an ambitious plan of upgrades:

"During the past year, an overall plan for upgrading the golf course, the club house, and the entrance grounds has been developed. Greens Director Dick Dewson and Bryan Devereux have prepared a long range plan for the golf course improvement which includes new equipment, a new pumping station and a sprinkler system. Planning Director Bruce Johnston and Bill Sinclair have prepared a long range plan for club house renovations which makes provision for a mixed lounge and patio deck, new and enlarged locker room facilities for the men's and ladies' sections, a designated area for the Juniors, and a new better planned area for the office. A plan has also been prepared for the improvement of the entrance to the club with plantings along the driveway and in the circle in front of the club house. All plans will be ready for review by the membership as soon as a total cost and method of financing has been determined. The implementation of these plans will require a major investment of funds, and must have approval of the membership before being undertaken. It should be pointed out that the planning has been done in order to protect the investment we already have in our facilities, as their depreciation is substantial each year."

The following year, the president reported that new pumping equipment for the watering system would be installed in the winter of 1976. And in the president's report for 1976, it was recorded that:

"Two major course expenditures in 1976 are in reality investments which will benefit the

club for many years. The rebuilding of all pumping equipment plus new water intake from the river should make further outlays unnecessary for the next one or two decades. The installation of automatic sprinkler equipment at all greens, tees, and aprons should serve the club equally well. Converting our fairway watering to the automatic system is expected to follow in the Fall of 1977."

In 1978-79, a significant change to the clubhouse was made with the addition of a new informal dining room overlooking the valley – the Terrace Room.

The pattern of continual improvement of the grounds and facilities has continued into the twenty-first century. In 2010, the pump house erected in 1976 was improved. Course superintendent, R. Brewster, announced in a "Course Update" from 19 November 2009 that:

"Our new pump station has been ordered for 2010 golf season and should be installed in February. Our pumphouse roof has been removed in preparation for removal of existing pumps. A temporary roof has been installed. The outside of the building will look like our Half-Way House and the washroom on Hole #15 when completed next spring."

#### Character and Setting of Existing Pump House

Figure 1 and Figures 6 to 12 illustrate the existing pump house and its setting.

The existing pump house, built in 1976 and remodelled in 2010, mirrors the exterior appearance of the halfway house and a washroom building. All are simple outbuildings with a cladding inspired by the clubhouse's rough-hewn Credit Valley sandstone and mock half-timbering. The concrete-block construction of the pump house is disguised by exterior walls consisting of a stone veneer base and upper panelled walls of wood and External Insulation and Finish System. A concrete-floored court in front of the west elevation is fenced. The structure's gable roof is sheathed in asphalt shingle. Mechanical equipment is housed inside the structure.

The existing pump house, washroom building (Fig. 13) and halfway house (Fig. 14 and 15) integrate well into the scenic landscape and harmonize with the historic clubhouse (Fig. 16 to 18).

#### Character of the Former Pump House

Figures 19 to 26 illustrate the former pump house built in 1923.

The former pump house, now used for parts storage, is built into the valley wall about

33 feet distant from the existing pump house. Two intersecting shallow-pitched gable roofs surmount the structure. Flanking buttresses descend to ground level. The structure constructed of poured concrete is faced with rough-hewn Credit Valley sandstone in the same style as the clubhouse. Trim in the form of window heads and sills, door heads and a dentillated beam extending across the gabled structure is in concrete. Inside, the ceiling under the east gable follows the pitch of the roof. A cast-iron intake pipe enters the structure at the western entrance.

#### Cultural Heritage Value of the Existing Pump House

The 36-year-old existing pump house, extensively remodelled two years ago, is an ancillary building on the grounds of the Mississauga Golf and Country Club. Although it fits in the scenic landscape which is meticulously maintained for the membership, it is not an historic structure. In itself, it does not meet provincial criteria for determining cultural heritage value or interest. Accordingly, it does not merit retention.

#### Impact of Existing Pump House's Demolition and Replacement

Improvements to the existing pump house in 2010 have failed to provide sufficient capacity for the watering system. A new pump house with greater capacity is proposed. Two locations for the new longer pump house have been studied – the site of the existing pump house and a nearby site west of the existing pump house. Credit Valley Conservation prefers the existing pump house site as staff believe it is already a disturbed site and the nearby site is not. The engineers engaged by the Mississauga Golf and Country Club have developed a proposal that corresponds to the wishes of Credit Valley Conservation staff.

Figures 27 to 32 illustrate the proposal for the new pump house. In terms of its external appearance, the new pump house is similar to the existing one and the other outbuildings at the club. The new pump house's reinforced concrete block construction is hidden behind a stone veneer base and upper panelled walls of stained wood and Exterior Insulation and Finish System. A hipped roof clad in asphalt shingle surmounts the one-storey structure. The north and south elevations are long in comparison to the east and west elevations. The north elevation facing the watercourse contains a single intake fan in the wall, two dormer windows and a roof hatch. The south elevation facing the former pump house contains metal roll-up doors and an exhaust fan in the wall as well as a dormer window. The east elevation has a single window. The west elevation, which is angled to permit cart movement around it, contains a window, single-leaf door and metal roll-up door. The new pump house is designed to harmonize with the other contemporary outbuildings in a style inspired by the clubhouse and to contribute to the

scenic quality of the club's grounds and the river corridor.

The new pump house is close to the former pump house, and adequate protection for the former pump house during construction should be provided. Hoarding around the former pump house should be erected. After construction, the former pump house will remain accessible and visible to members. The club intends to continue using the former pump house for storage, to repoint masonry, and to interpret its history with a commemorative plaque.

### Conclusion

The proposed built form of the new pump house reflects the attributes of the Mississauga Golf and Country Club and Credit River Corridor cultural landscapes. The new pump house is far, and cannot be viewed, from Mississauga Road. Its construction does not have any effect on the attributes of the Mississauga Road Scenic Route.



## Appendix A: Illustrations

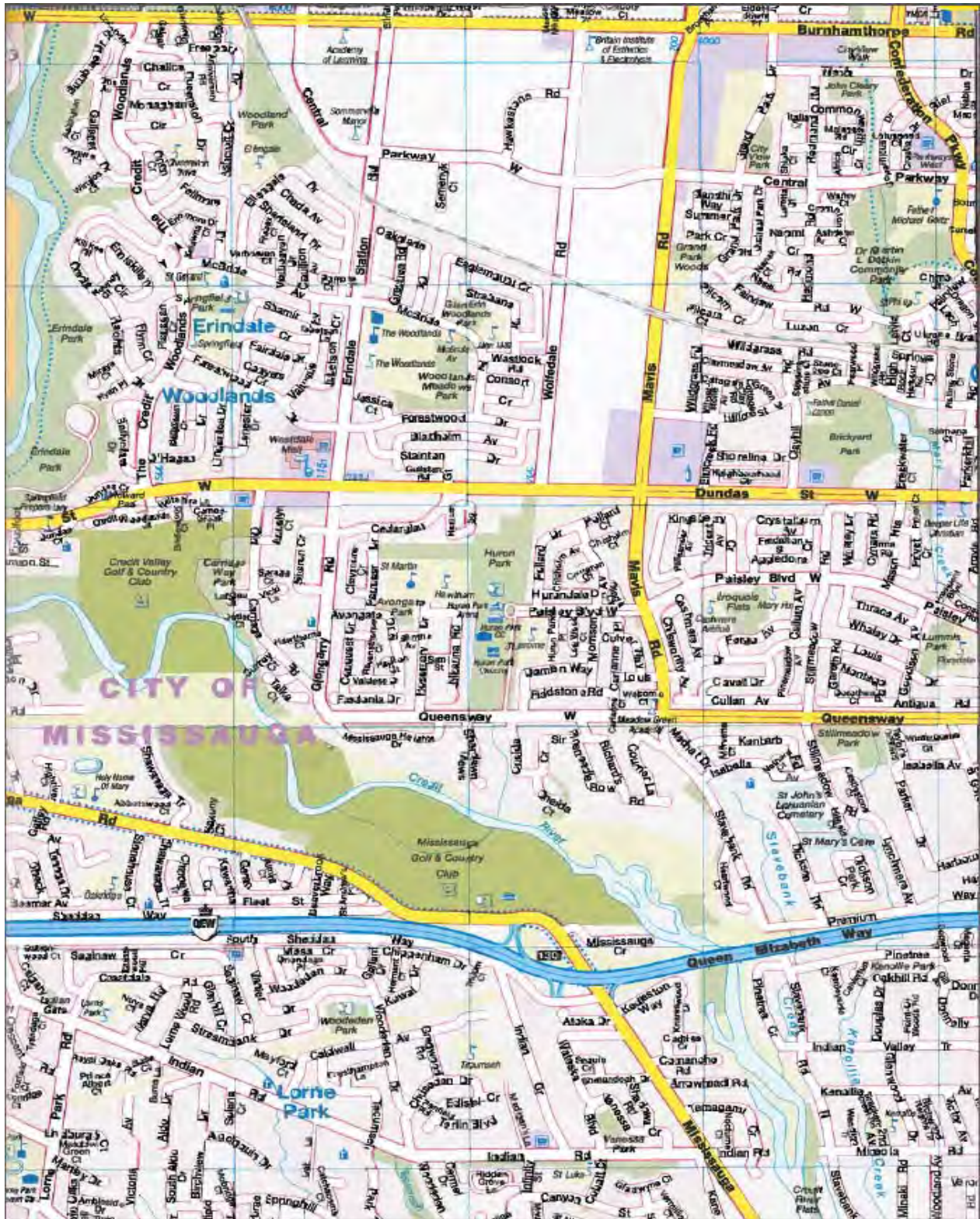


Fig. 2 MapArt, Toronto & Area (Oshawa, Ont.: Peter Heiler Ltd., 2010), pl. 472.



# PART of the TOWNSHIP of TORONTO

showing

## The Mississauga Indian Reserve

Scale 40 Chains to an inch

The whole Reserve is edged pink

The ungranted part is edged yellow and contains about 3500 acres.

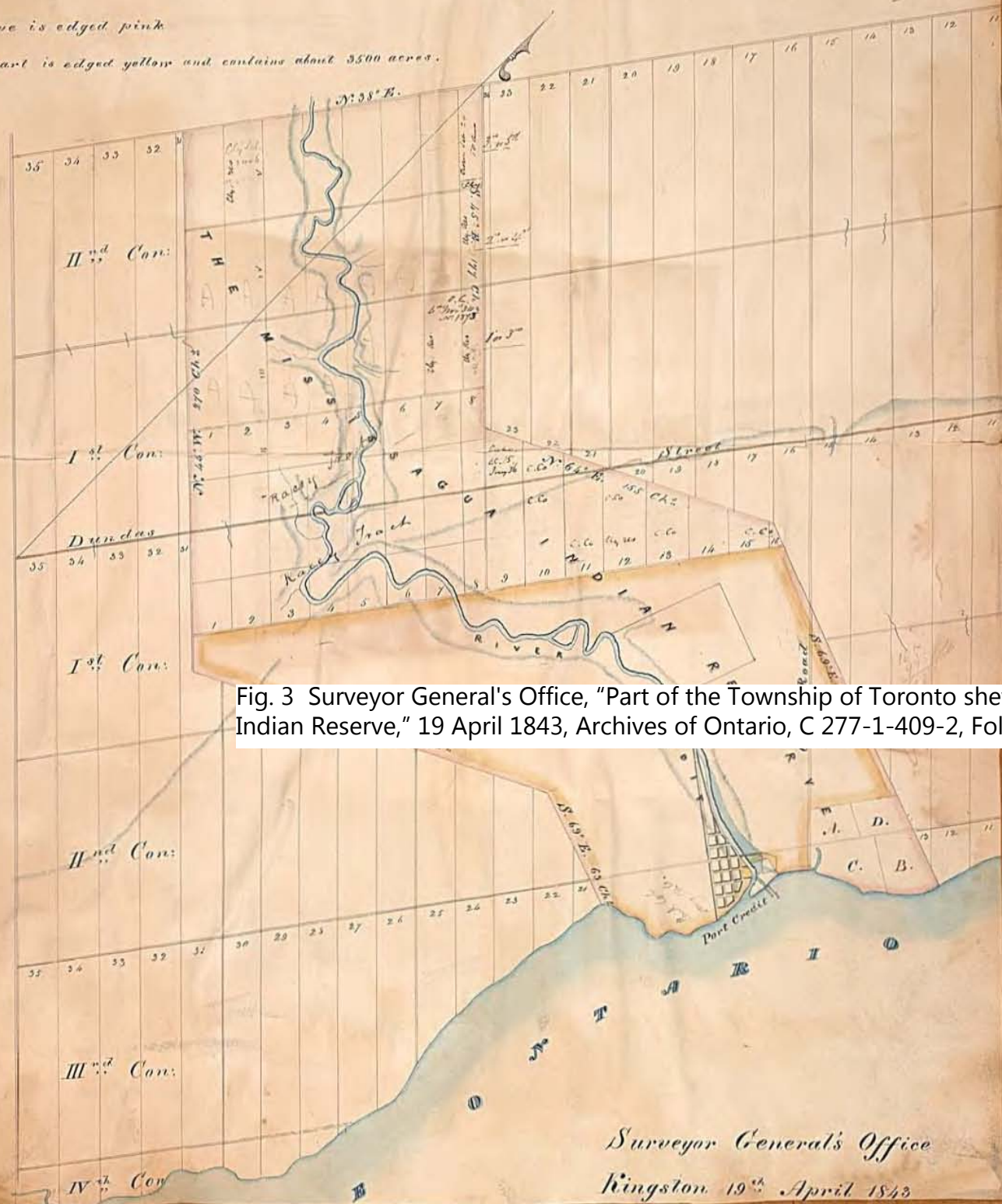


Fig. 3 Surveyor General's Office, "Part of the Township of Toronto showing Indian Reserve," 19 April 1843, Archives of Ontario, C 277-1-409-2, Folde

Surveyor General's Office  
Kingston 19<sup>th</sup> April 1843



Fig. 4 George R. Tremain, Detail from "Tremain's Map of the County of Peel, Canada West" (Toronto: G.R. & G.M. Tremain, 1859).





Fig. 5 A.E. Guidal, Detail from "Toronto Township," 1917 *Toronto District Commercial Directory Atlas* (Toronto: Map & Advertising Company, 1917).



Fig. 6 Existing pump house as seen from the approaching cart path



Fig. 7 Existing pump house in relation to washroom building and temporary mobile unit





Fig. 8 Existing pump house in relation to temporary mobile unit and former pump house built into slope



Fig. 9 Existing pump house as viewed from clubhouse hill





Fig. 10 Existing pump house and temporary mobile unit as seen from river flats



Fig. 11 Interior view of existing pump house



Fig. 12 Another interior view of existing pump house



Fig. 13 Washroom building





Fig. 14 Halfway house



Fig. 15 Close-up view of halfway house





Fig. 16 Front facade of clubhouse



Fig. 17 Detail of clubhouse, showing rough-hewn Credit Valley sandstone ground floor and chimney and upper walls in mock half timbering





Fig. 18 Close-up view of clubhouse walling



Fig. 19 Former pump house built into slope with temporary mobile unit beside it



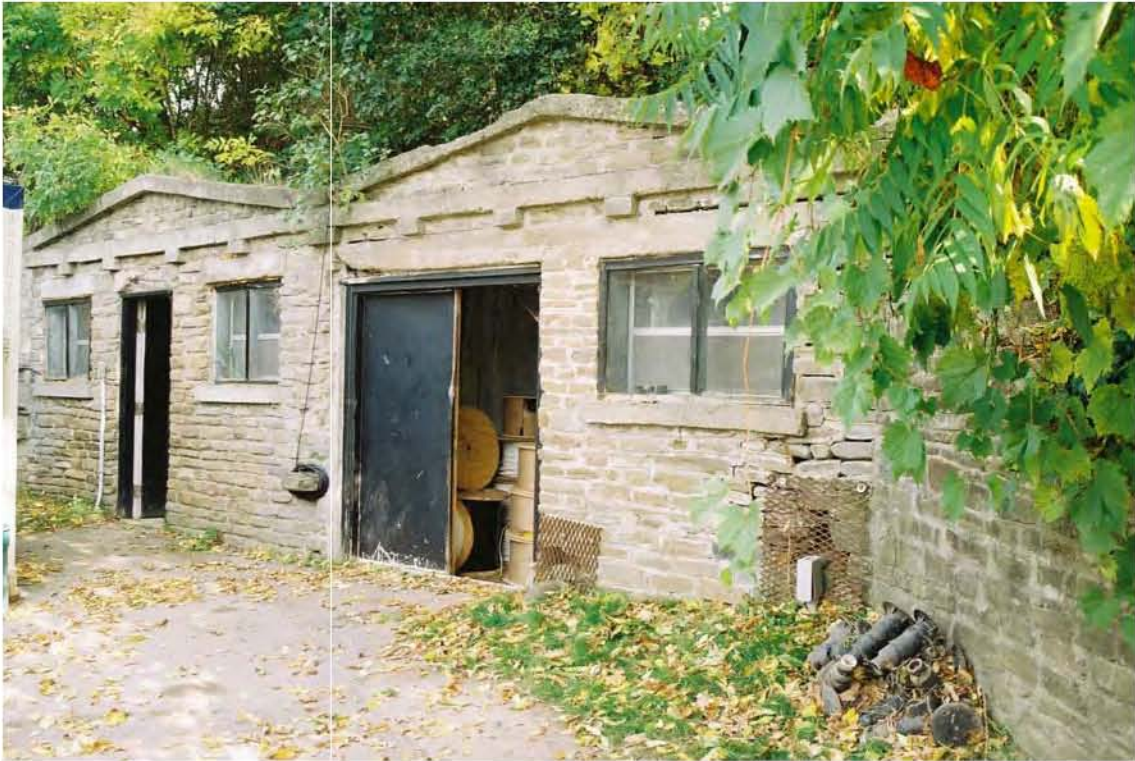


Fig. 20 Another view of former pump house

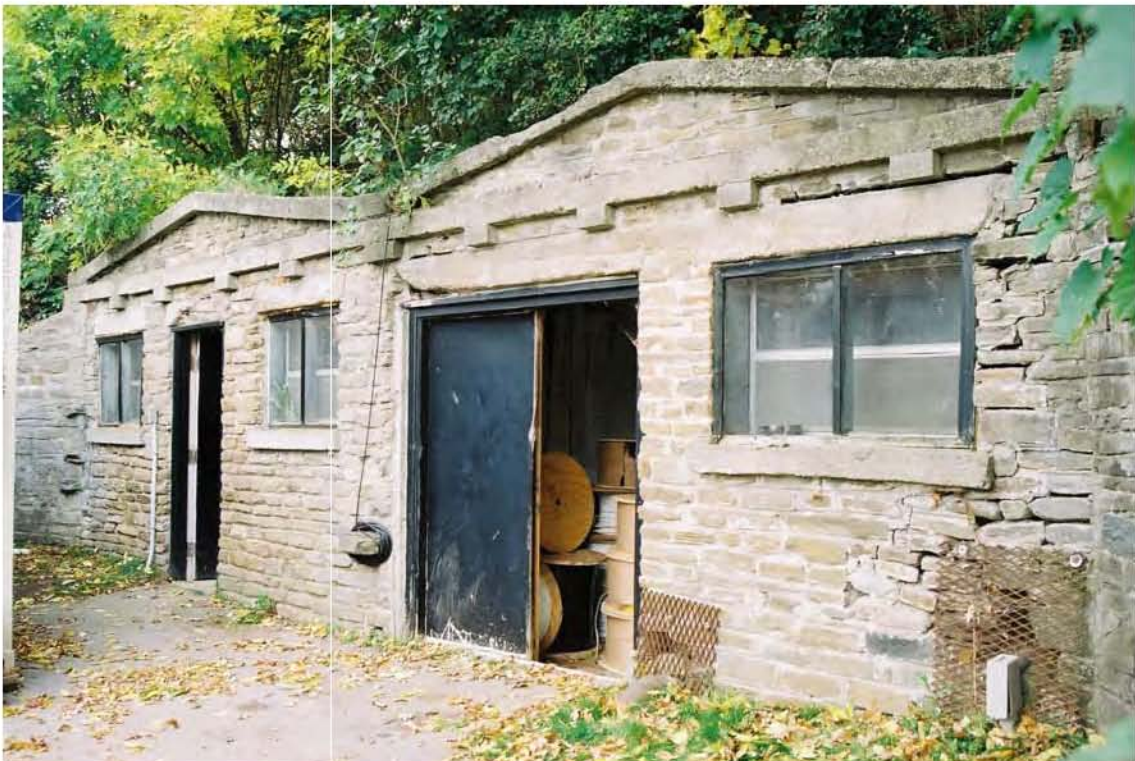


Fig. 21 Another view of former pump house





Fig. 22 Another view of former pump house, showing the eastern flanking buttress



Fig. 23 Another view of former pump house, showing the western flanking buttress





Fig. 24 Detail of rough-hewn Credit Valley sandstone face on former pump house, its concrete window sill and cast-iron intake pipe at ground

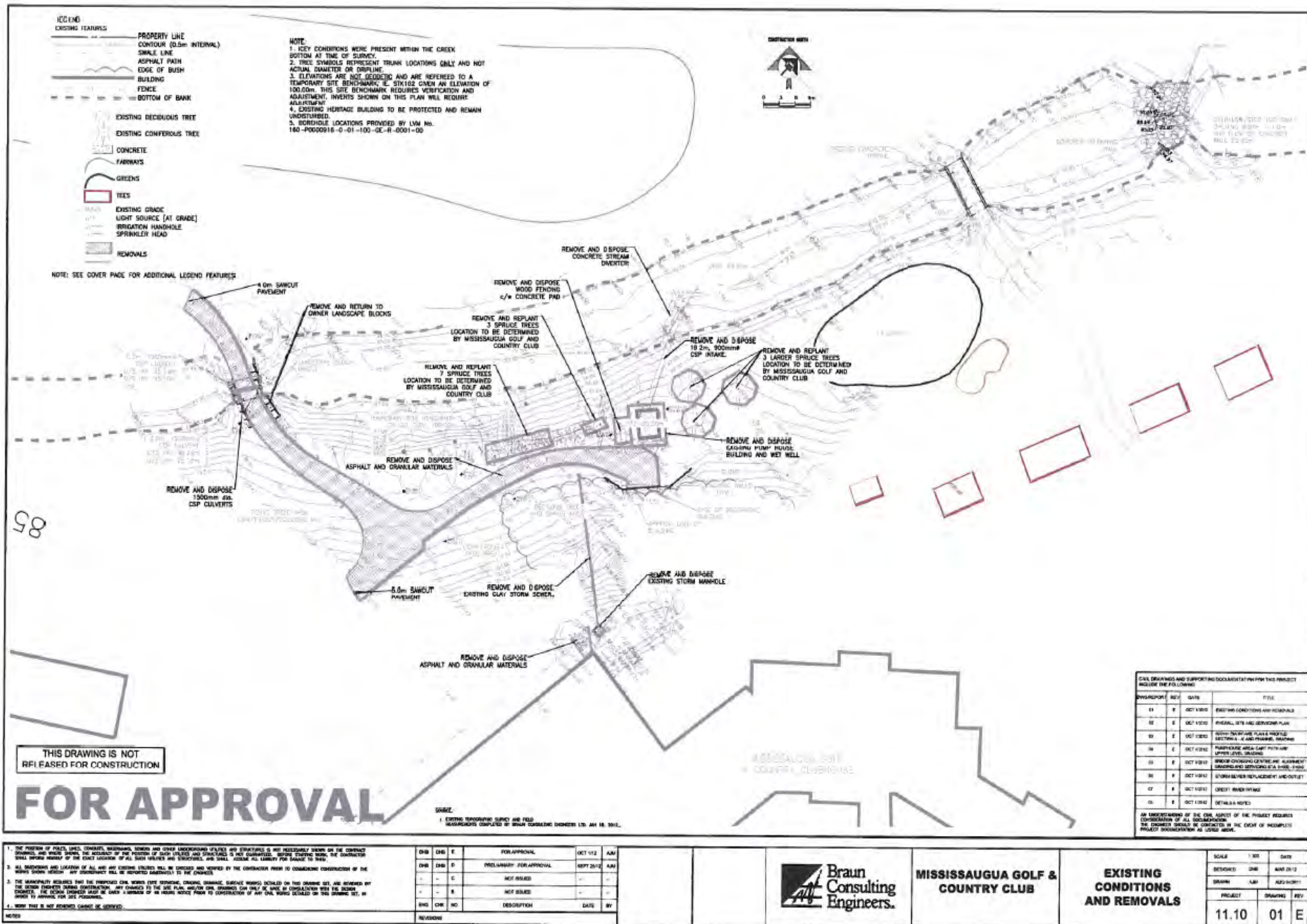


Fig. 25 Interior view of former pump house, showing poured concrete construction



Fig. 26 An entrance to the former pump house, showing depth of concrete wall





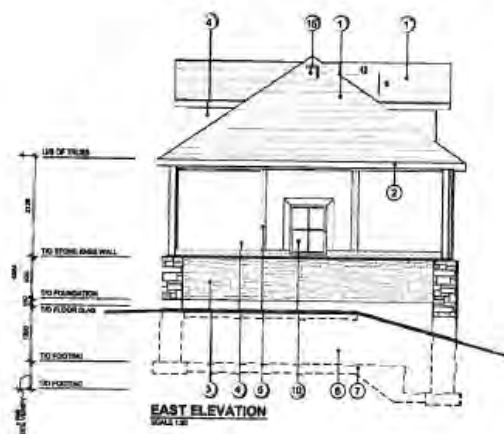
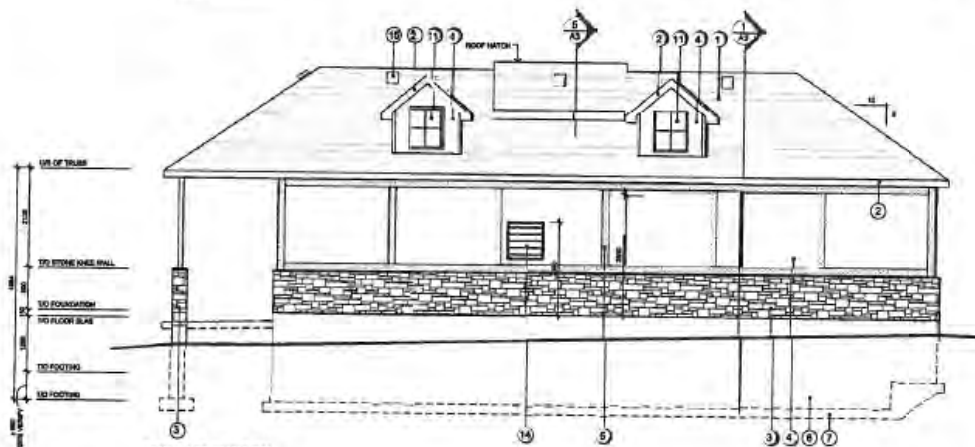
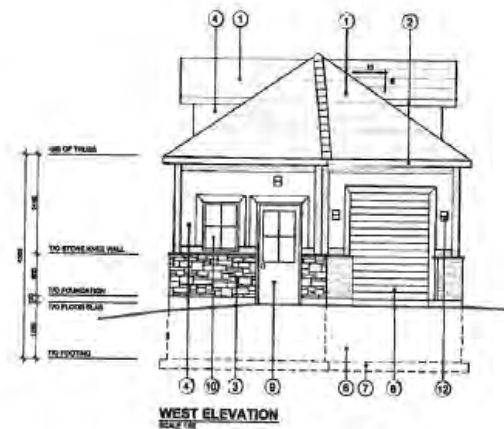
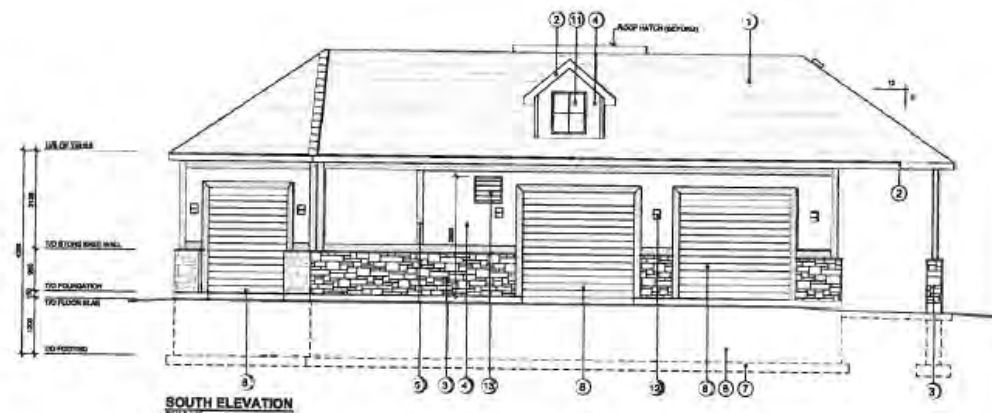












**NORTH ELEVATION**  
SCALE 1/8"

**MATERIALS LEGEND**

- 1 ASPHALT SHINGLES (OWNER TO DETERMINE STYLE/COLOR)
- 2 PREFIN METAL FABRIC (OWNER TO DETERMINE COLOR) OR DON'T WANTED NOTE
- 3 BUILDING STONE (OWNER TO DETERMINE COLOR, PROFILE, QUANTITY)
- 4 STUCCO FINISH (OWNER TO DETERMINE COLOR)
- 5 SH-40 PLYWOOD (WOOD TRIM)
- 6 CONCRETE FOUNDATION WALL (OWNER TO FIN PLAN FOR SOIL & BROWNSHAW NOTES)
- 7 CONCRETE STAIR FOOTINGS (OWNER TO FIN PLAN FOR SOIL & BROWNSHAW NOTES)
- 8 2x4x8 PREFIN METAL INSULATED ROLL-UP DOOR
- 9 2x4x8 INSULATED HOLLOW METAL DOOR OR HOLLOW METAL FRAME
- 10 2x4x8 1/2\"/>

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Date	Issue
SEPT 18 2012	ISSUED FOR OWNER REVIEW
SEPT 26 2012	ISSUED FOR OWNER REVIEW # 2
OCT 5 2012	ISSUED FOR FINAL APPROVAL

**TACOMA**  
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**BRAUN CONSULTING**  
**ENGINEERS**  
551 WILLOW ROAD, GUELPH, ONTARIO

Project Title  
**PUMP HOUSE**  
MISSISSAUGA, ONTARIO

Drawing  
**ELEVATIONS**

Scale  
AS NOTED  
Date  
SEPT. 2012  
Drawn By  
S. KOLLOMAN  
Project No.  
TE-21472-12

Sheet #  
**A2**

Fig. 31 Tacoma Engineers, "Pump House: Elevations," 3 Oct. 2012.

Date	Issue
SEPT 18 2012	ISSUED FOR OWNER REVIEW
SEPT 26 2012	ISSUED FOR OWNER REVIEW # 2
OCT 3 2012	ISSUED FOR FINAL APPROVAL

175 Speedvale Avenue West  
Guelph, Ontario N1H 1C3  
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[www.tacomenghewers.com](http://www.tacomenghewers.com)

**PUMP HOUSE**  
MISSISSAUGA, ONTARIO

## SECTIONS AND FRAMING DETAILS

Scale	AS NOTED	Orig. #  <div style="font-size: 48pt; text-align: center;">A3</div>
Date	SEPT, 2012	
Drawn By	SJKLEMAN	
Project No.		

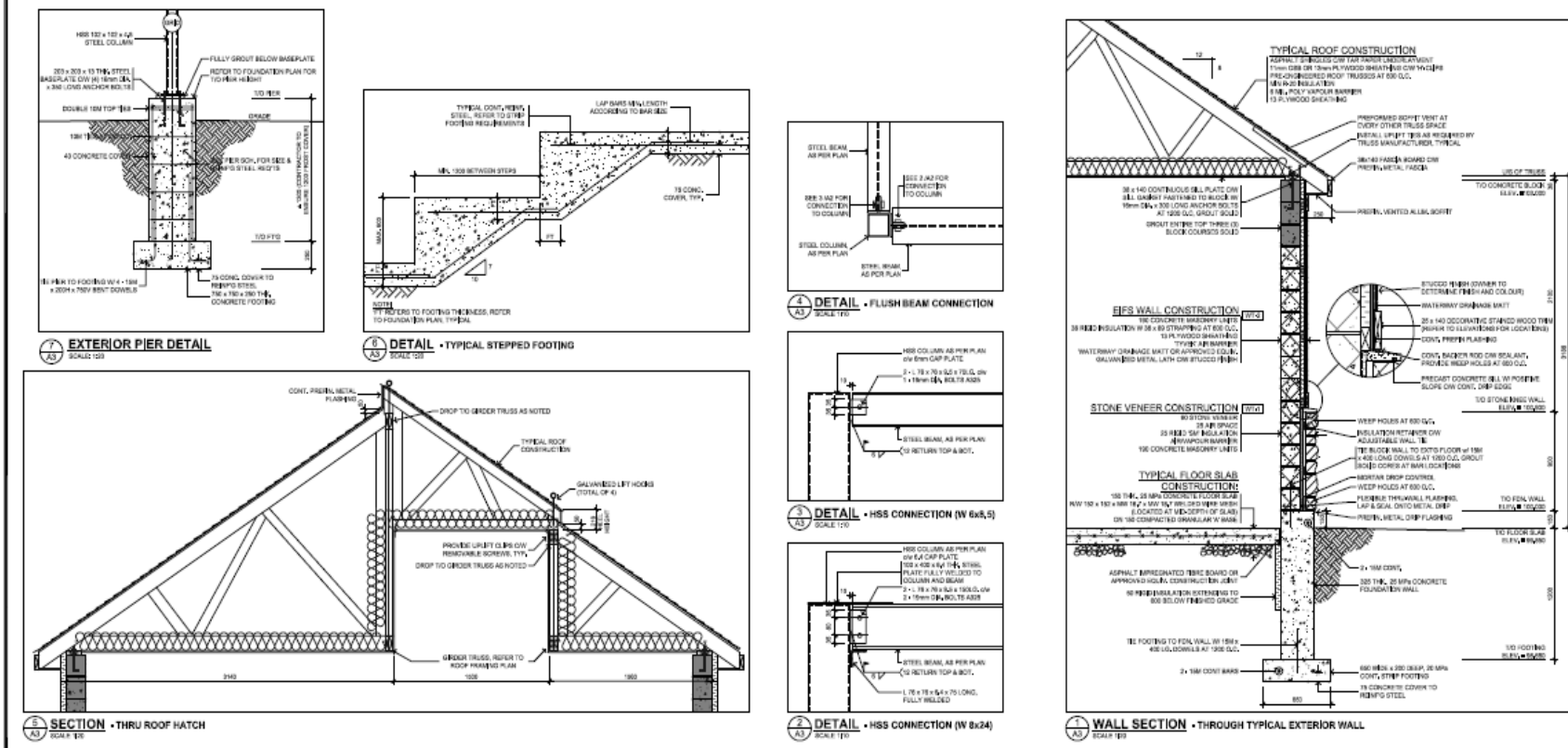


Fig. 32 Tacoma Engineers, "Pump House: Sections and Framing Details," 3 Oct. 2012.

## Appendix B: Sources of Historical Information

Archives Mississauga Golf & Country Club. V. 3. pp. 157, 165 & "Report of the Board of Directors for the year ending 30<sup>th</sup> November, 1923, together with Financial Statements and Auditors' Report."

-----, V. 19. "President's Report 1974." "President's Report 1975." "President's Report and Financial Statements as at 30 September, 1976."

-----, unnumbered volume. "Mississauga Golf and Country Club – The Greens: Course Update." 19 Nov. 2009.

Bradley, Bettie et al. *Mississauga Golf & Country Club, 1906-1981*. [Mississauga, Ont.]: Heritage Press, [1981]. North York Central Library.

Dilse, Paul et al. "Heritage Conservation Feasibility Study of Old Port Credit Village: Stage 1 Report." 28 Nov. 2003.

-----, "Heritage Impact Statement for 1168 Mississauga Road, Mississauga." 22 Nov. 2007.

## Appendix C: Author's Qualifications

Paul Dilse has specialized in heritage planning and historical study since his graduation from the professional planning school at the University of Waterloo in 1979.

He has written official plan policies on heritage conservation for the former Municipality of Metropolitan Toronto and for the City of Cambridge (his related official plan background study, in which he delineated the boundaries of prospective heritage conservation districts across the municipality, has remained a reference document there for three decades). He has surveyed the entire municipality of the Town of Caledon to compile a comprehensive inventory of built heritage resources located on 1,643 properties. He has assessed the cultural heritage value of two French Canadian Roman Catholic churches in rural Essex County as well as the 190-acre cultural heritage landscape of the David Dunlap Observatory and Park in Richmond Hill, and successfully defended their designation under the *Ontario Heritage Act* at Conservation Review Board hearings. He has also provided expert witness testimony at the Ontario Municipal Board, successfully defending the designation of the first heritage conservation district in the Town of Markham; and contributing to the positive outcome in favour of retaining a complex of rare garden apartments in the Leaside neighbourhood of Toronto.

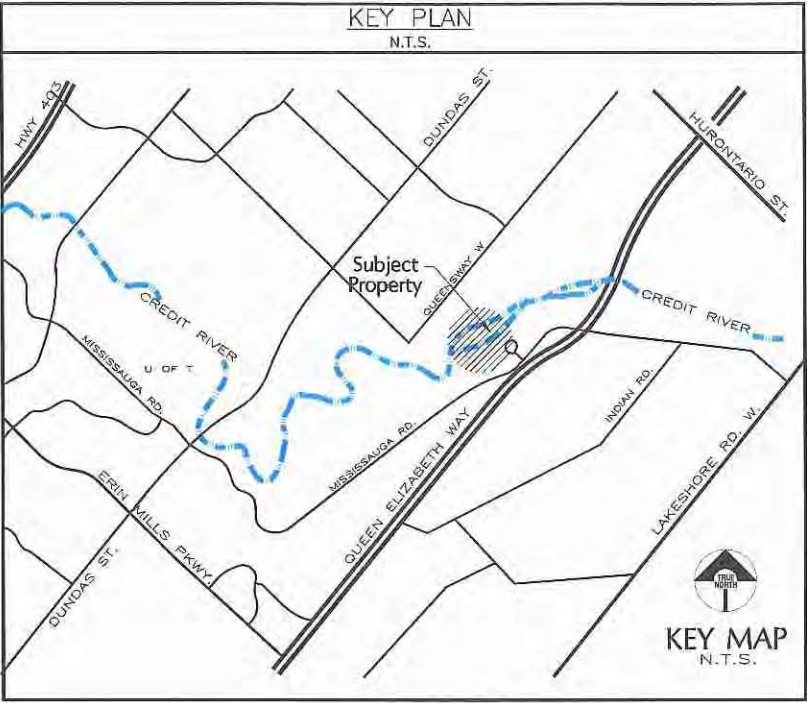
In addition to the Thornhill-Markham heritage conservation district, he has written heritage conservation district plans for Old Port Credit Village in Mississauga, the MacGregor/Albert neighbourhood in Waterloo and Lower Main Street South in Newmarket. He has also conducted a heritage conservation district study of the George Street and Area neighbourhood in Cobourg. He is, as well, the author of a report on the feasibility of establishing heritage conservation districts in Downtown Brampton. Additionally, he has prepared conservation-based design guidelines for the historic commercial centres of Alliston, Beeton, Tottenham and Picton. Currently, he is studying three areas in Downtown Whitby for protection as heritage conservation districts.

Since 2004 when municipalities in Central and Southwestern Ontario started requesting heritage impact assessments from him, he has written 46 such reports, including seven in the City of Mississauga. He has written text for commemorative plaques, including several for the Ontario Heritage Trust, and has planned an extensive program to interpret the history of the Freeport Sanatorium at the Grand River Hospital in Kitchener. His major work in 2011, a history of the Legislative Building in Queen's Park and a statement on its cultural heritage value, forms part of an historic structure report commissioned by the Legislative Assembly of Ontario.

Paul Dilse is qualified as a planner and historian by the Canadian Association of Heritage Professionals, of which he is a founding member.



Heritage Advisory Committee  
NOV 20 2012



**MISSISSAUGUA GOLF AND  
COUNTRY CLUB**  
MISSISSAUGA, ONTARIO

**PUMPHOUSE UPGRADES**

**FM** **FREDERICKS McGUIRE LTD.**  
IRRIGATION CONSULTING AND TECHNICAL SERVICES

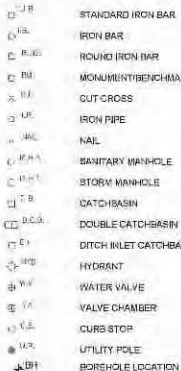
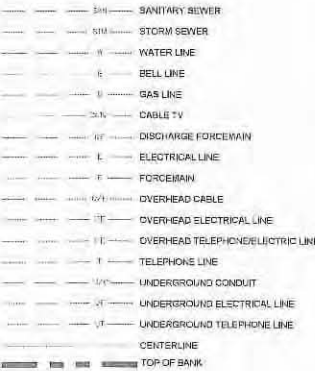
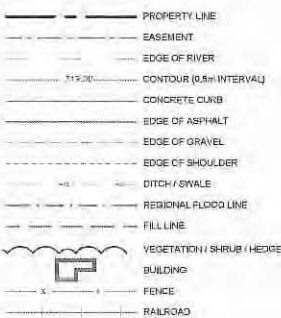
**Braun  
Consulting  
Engineers**

530 Willow Road  
Guelph, Ontario  
N1H 7G4  
Tel: (519) 836-9892  
Fax: (519) 836-9287  
[braunengineers.com](http://braunengineers.com)

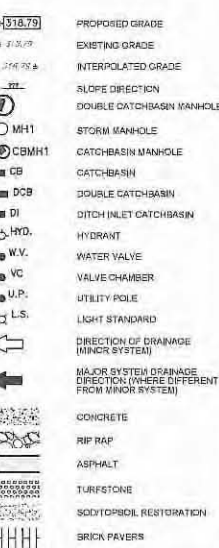
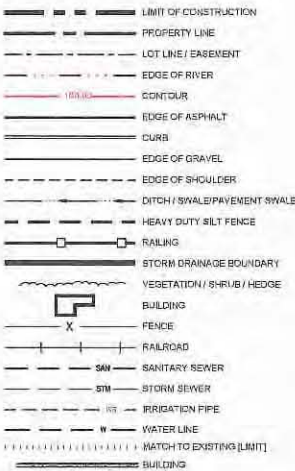
**DRAWING INDEX**

CIVIL COMPONENT			
DWG.	REV.	DATE	TITLE
01	E	OCT 1/2012	EXISTING CONDITIONS AND REMOVALS
02	E	OCT 1/2012	OVERALL SITE AND SERVICING PLAN
03	E	OCT 1/2012	800mm DIA INTAKE PLAN & PROFILE/ SECTION A-A' AND CHANNEL GRADING
04	E	OCT 1/2012	PUMPHOUSE AREA/ CART PATH AND UPPER LEVEL GRADING
05	E	OCT 1/2012	BRIDGE CROSSING CENTRELINE ALIGNMENT/ GRADING AND SERVICING STA. 0+000 - 0+040
06	E	OCT 1/2012	STORM SEWER REPLACEMENT AND OUTLET
07	E	OCT 1/2012	CREDIT RIVER INTAKE - [DRAWING NOT INCLUDED]
08	E	OCT 1/2012	DETAILS & NOTES
STRUCTURAL COMPONENT			
DWG.	REV.	DATE	TITLE
A1	-	OCT 3/2012	FOUNDATION, MAIN FLOOR AND ROOF FRAMING PLANS
A2	-	OCT 3/2012	ELEVATIONS
A3	-	OCT 3/2012	SECTIONS AND FRAMING DETAILS
A4	-	OCT 3/2012	STRUCTURAL NOTES

**EXISTING FEATURES**



**PROPOSED FEATURES**



**FOR APPROVAL**

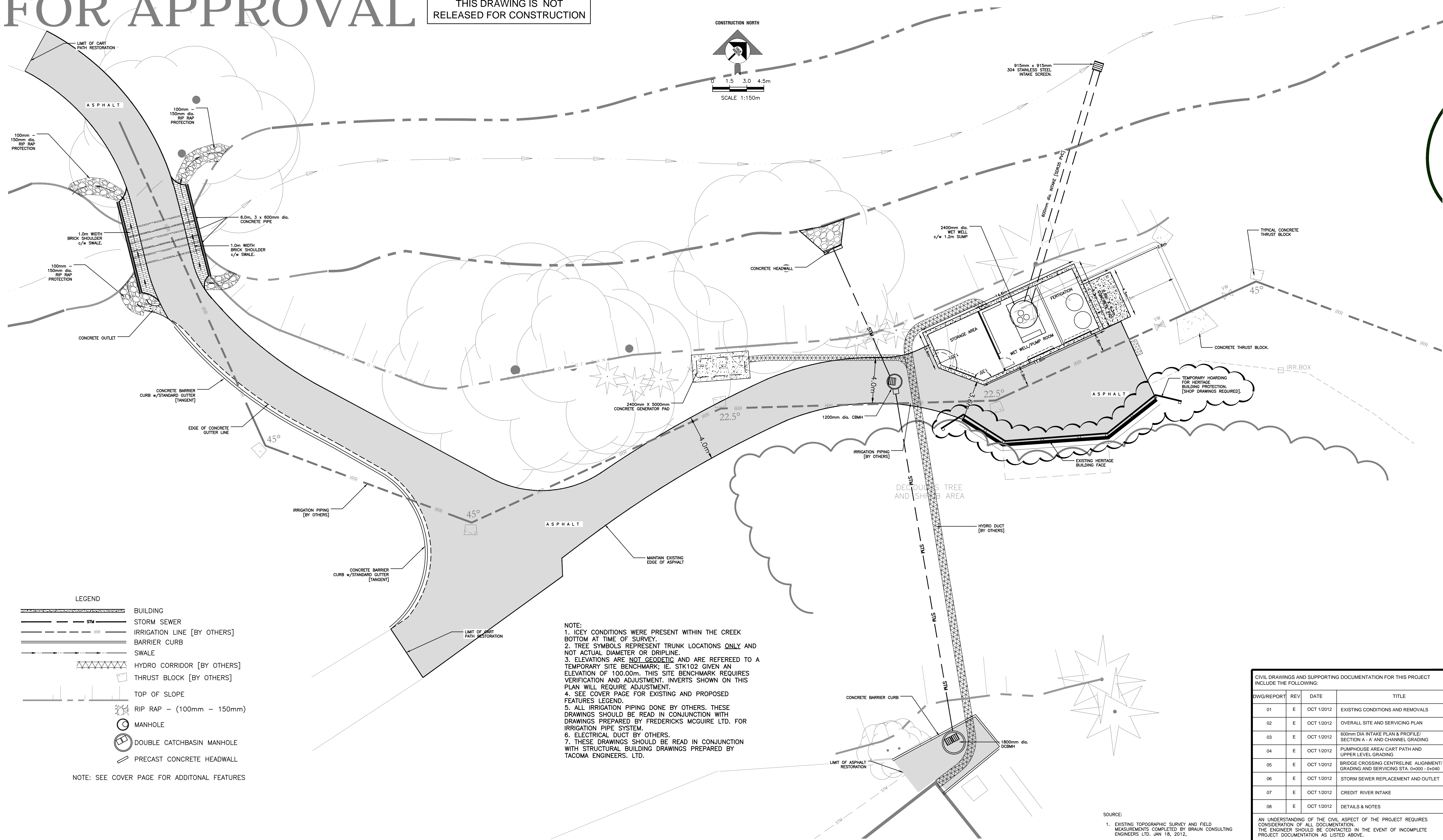






FOR APPROVAL

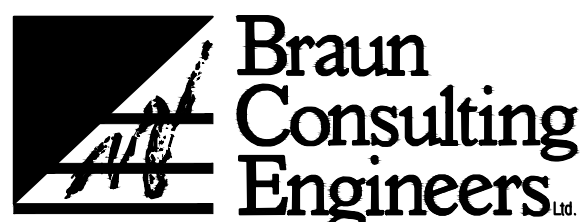
THIS DRAWING IS NOT  
RELEASED FOR CONSTRUCTION



1. THE POSITION OF POLES, LINES, CONDUITS, WATERMANS, SEWERS AND OTHER UNDERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, THE CONTRACTOR SHALL INFORM HIMSELF OF THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES, AND SHALL ASSUME ALL LIABILITY FOR DAMAGE TO THEM.
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4. WORK THAT IS NOT REVIEWED CANNOT BE CERTIFIED.

DHB	DHB	E	FOR APPROVAL	OCT 1/12	AJM
DHB	DHB	D	PRELIMINARY - FOR APPROVAL	SEPT/25/12	AJM
DHB	DHB	C	PRELIMINARY - BLDG OPTION 'D1'	AUG 23/12	AJM
DHB	DHB	B	UPDATED BUILDING LOCATION	APR 23/12	AJM
ENG	CHK	NO.	DESCRIPTION	DATE	BY

REVISIONS



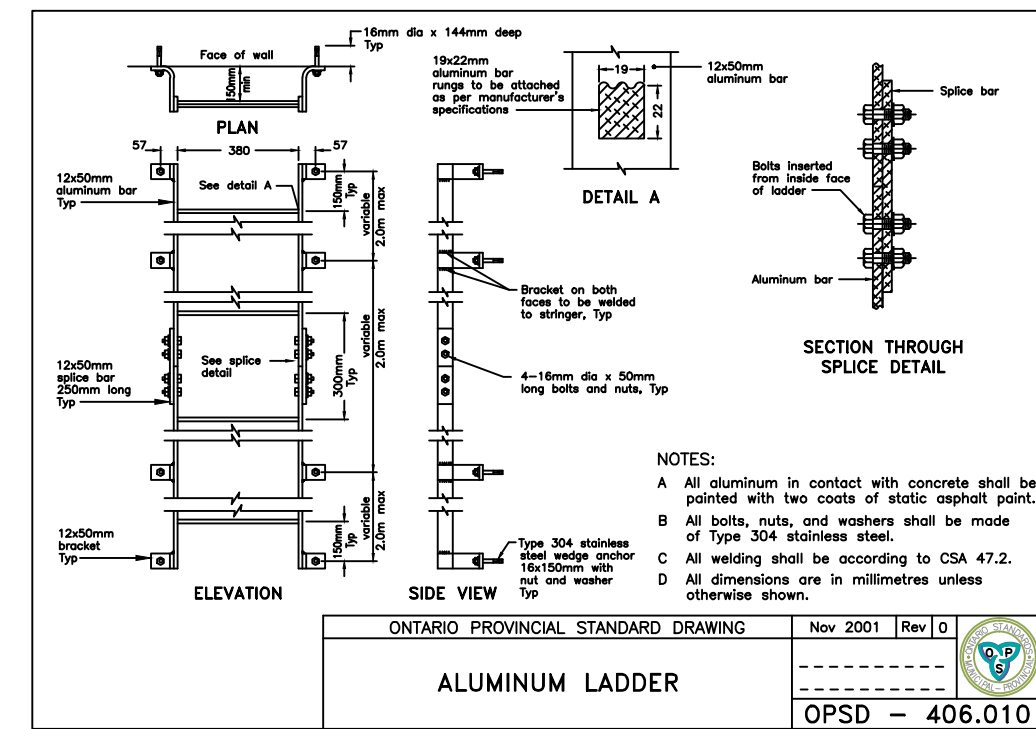
MISSISSAUGUA GOLF &  
COUNTRY CLUB

OVERALL  
SITE AND SERVICING  
PLAN

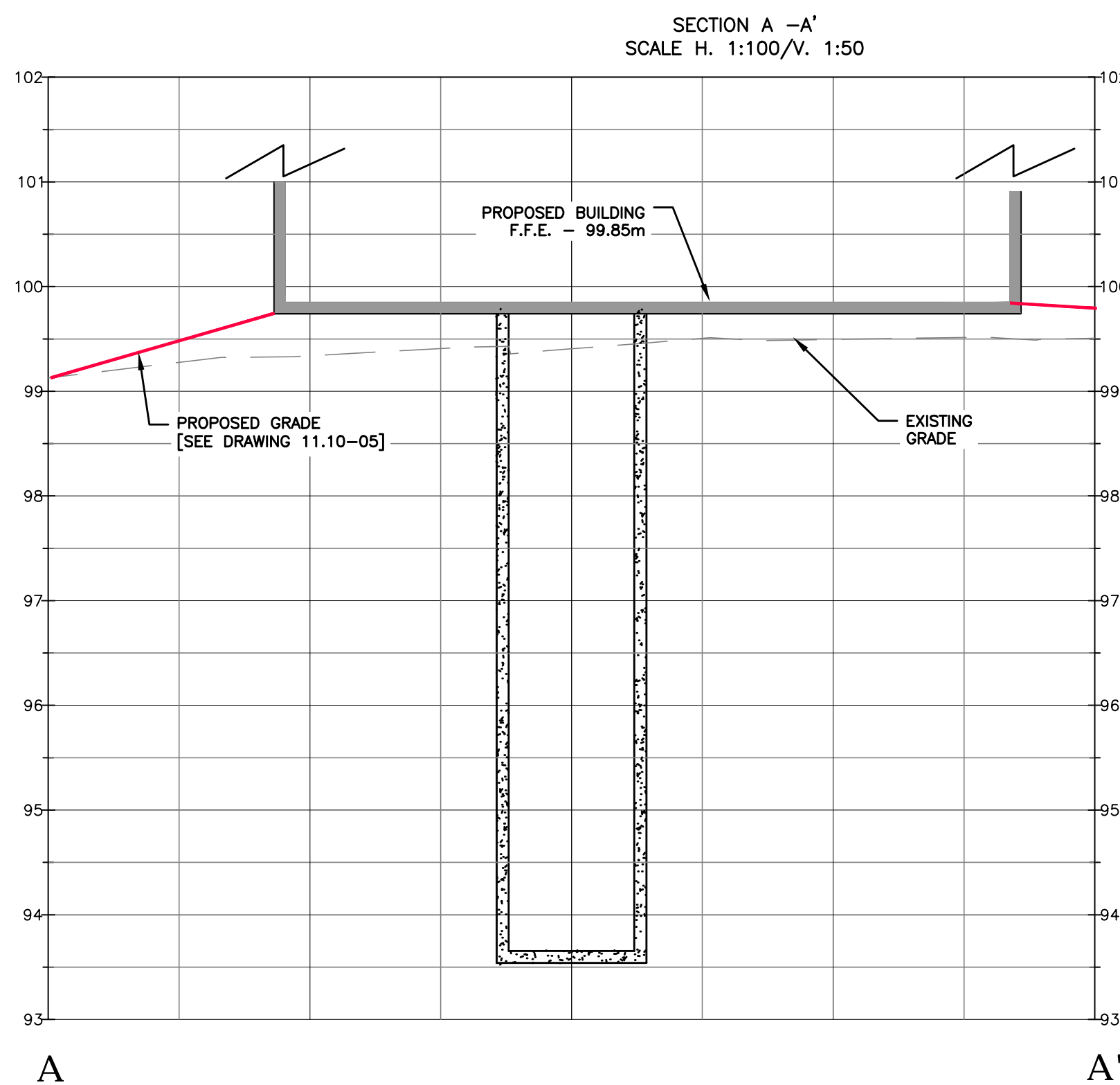
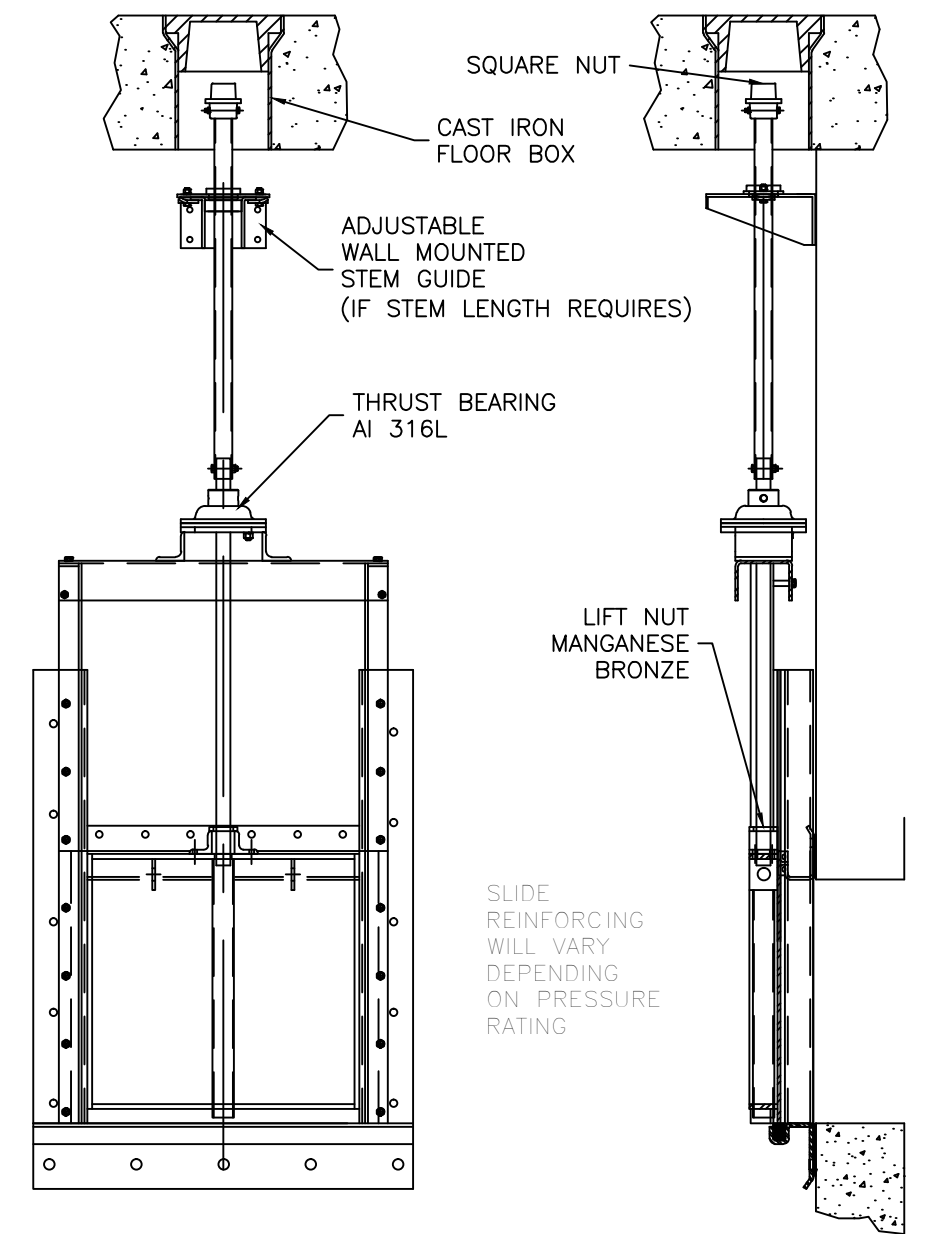
SCALE	AS SHOWN	DATE
DESIGNED	DHB	APR 23/12
DRAWN	AJM	FEB 10/12
PROJECT	DRAWING	REV.
11.10	02	E



FOR APPROVAL



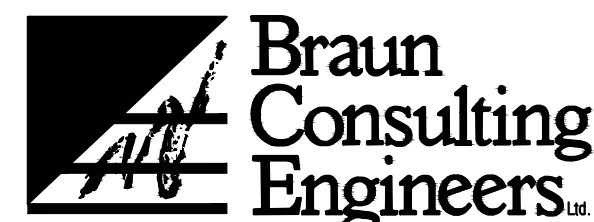
FLOW CONTROL  
SLUICE GATE "FONTAINE 20 SERIES"  
FOR 2400mm dia. WET WELL  
N.T.S.



CIVIL DRAWINGS AND SUPPORTING DOCUMENTATION FOR THIS PROJECT INCLUDE THE FOLLOWING:			
DWG/REPORT	REV	DATE	TITLE
01	E	OCT 12/012	EXISTING CONDITIONS AND REMOVALS
02	E	OCT 12/012	OVERALL SITE AND SERVING PLAN
03	E	OCT 12/012	600mm DIA INTAKE PLAN & PROFILE/ SECTION A - A' AND CHANNEL GRADING
04	E	OCT 12/012	PUMPHOUSE AREA/ CART PATH AND UPPER LEVEL GRADING
05	E	OCT 12/012	BRIDGE CROSSING CENTRELINE ALIGNMENT/ GRADING AND SERVING STA. (HWY# 1 - HWY# 4040)
06	E	OCT 12/012	STORM SEWER REPLACEMENT AND OUTLET
07	E	OCT 12/012	CREDIT RIVER INTAKE
08	E	OCT 12/012	DETAILS & NOTES

AN UNDERSTANDING OF THE CIVIL ASPECT OF THE PROJECT REQUIRES CONSIDERATION OF ALL DOCUMENTATION. THE ENGINEER SHOULD BE CONSIDERED RESPONSIBLE FOR THE EVENT OF INCOMPLETE PROJECT DOCUMENTATION AS LISTED ABOVE.

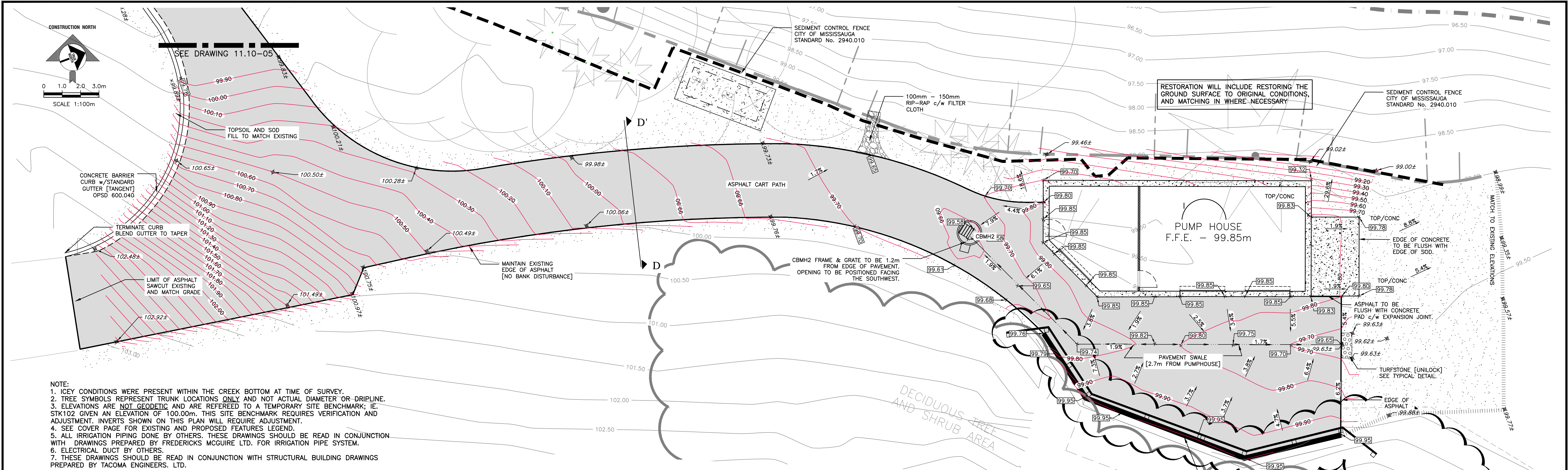
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|-----------|-----|-----|--------------------------------|------------|-----|
| DHB       | DHB | E   | FOR APPROVAL                   | OCT 1/12   | AJM |
| DHB       | DHB | D   | PRELIMINARY - FOR APPROVAL     | SEPT 25/12 | AJM |
| DHB       | DHB | C   | PRELIMINARY - BLDG OPTION 'D2' | AUG 23/12  | AJM |
| DHB       | DHB | B   | PRELIMINARY - FOR COMMENTS     | JUNE 13/12 | AJM |
| ENG       | CHK | NO. | DESCRIPTION                    | DATE       | BY  |
| REVISIONS |     |     |                                |            |     |



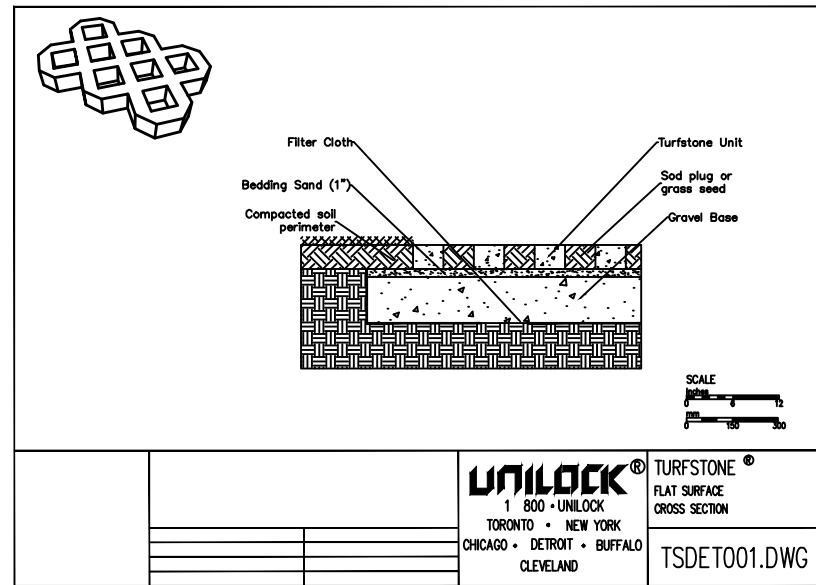
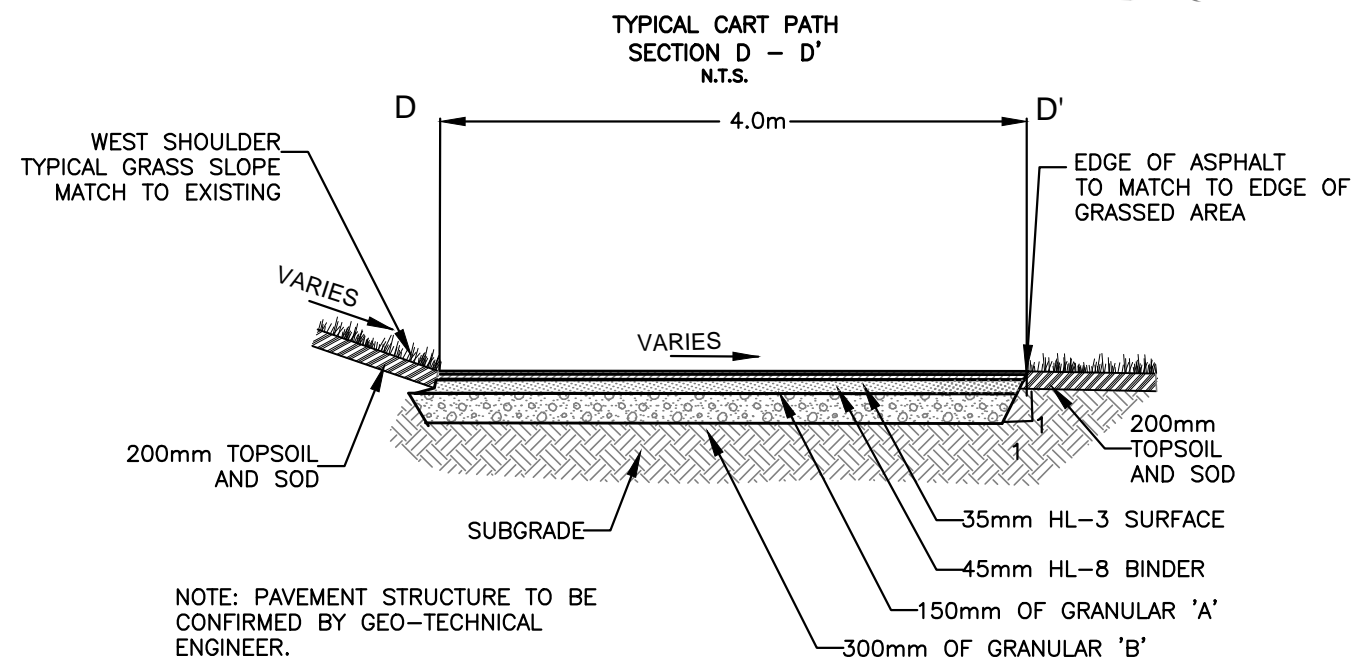
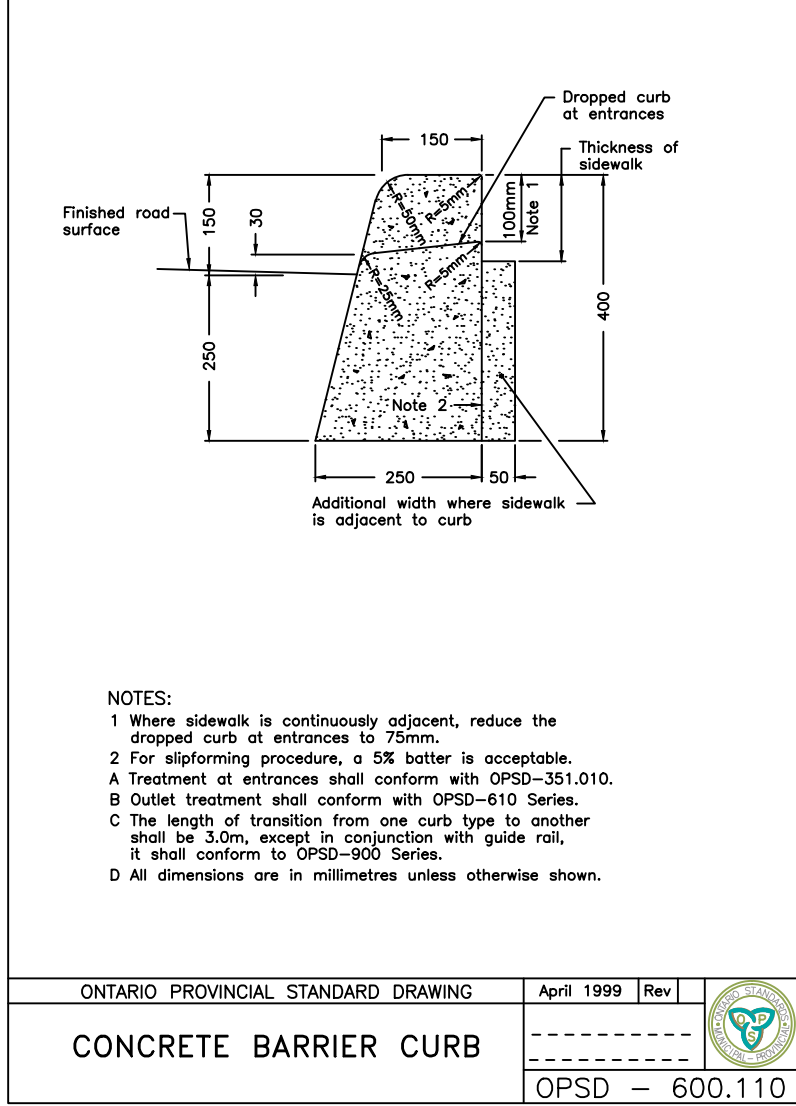
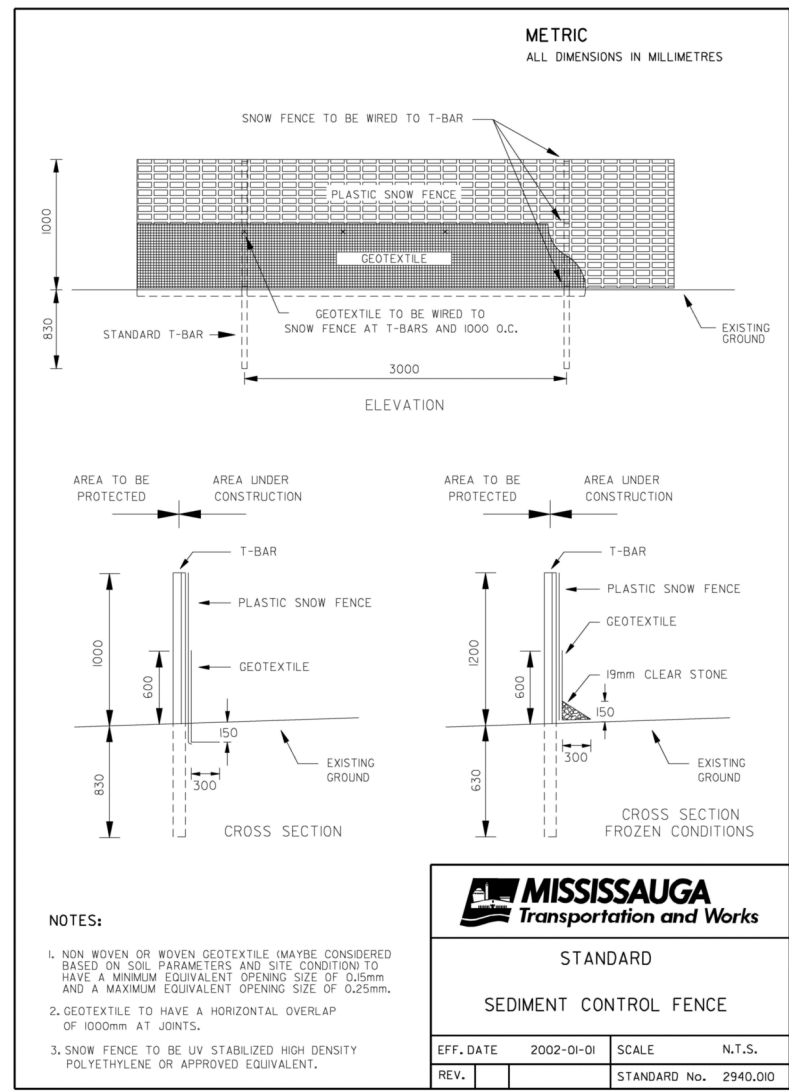
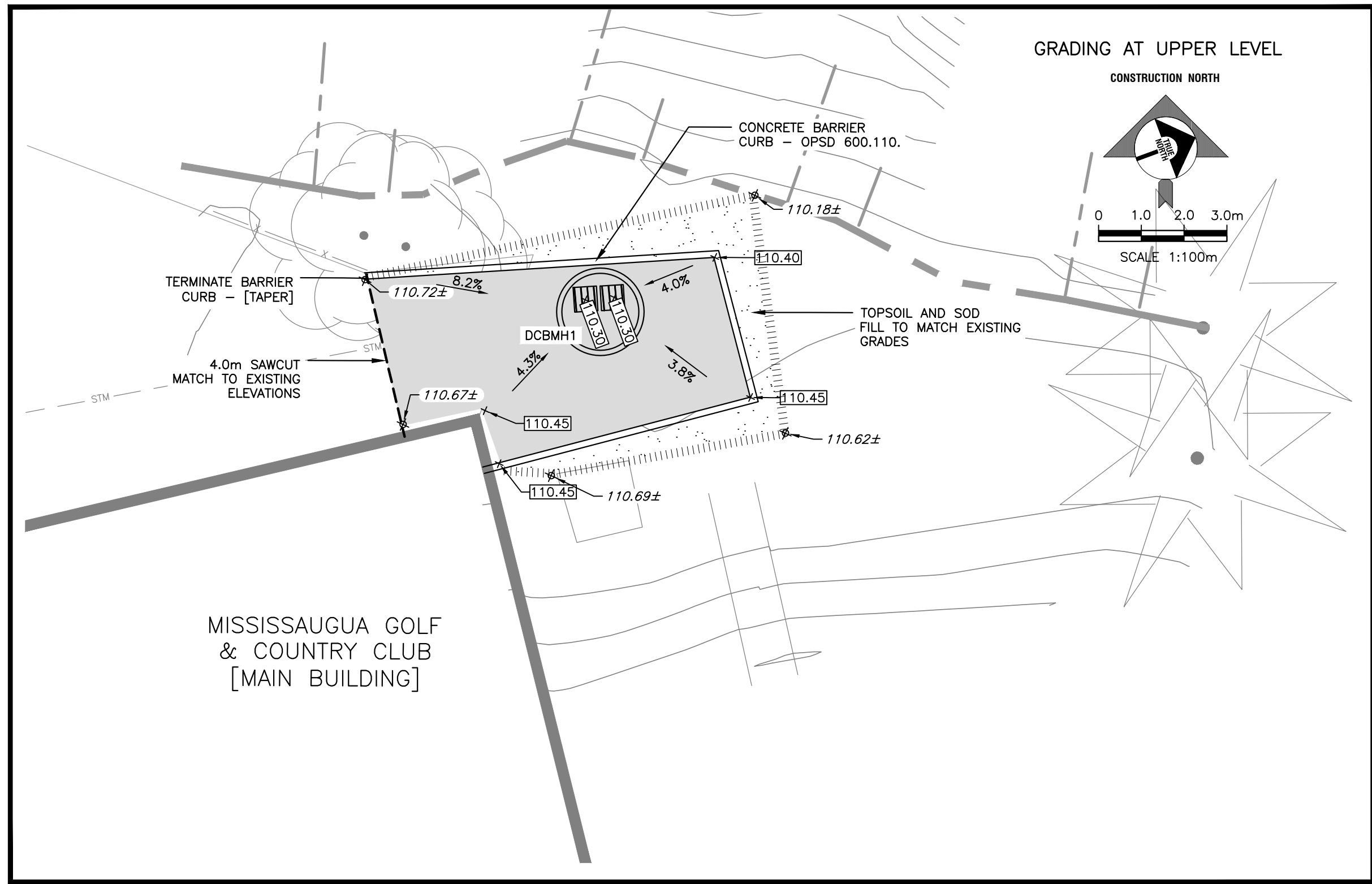
## 600mm DIA INTAKE PLAN & PROFILE/ SECTION A - A' AND CHANNEL GRADING

SCALE	AS SHOWN	DATE	
DESIGNED	DHB	MAR 28/12	
DRAWN	AJM	FEB 10/12	
PROJECT		DRAWING	REV.
11.10		03	E





NOTE:  
1. ICY CONDITIONS WERE PRESENT WITHIN THE CREEK BOTTOM AT TIME OF SURVEY.  
2. TREE SYMBOLS REPRESENT TRUNK LOCATIONS ONLY AND NOT ACTUAL DIAMETER OR DRIPLINE.  
3. ELEVATIONS ARE NOT GEODETIC AND ARE REFERRED TO A TEMPORARY SITE BENCHMARK; I.E. STK102 GIVEN AN ELEVATION OF 100.00m. THIS SITE BENCHMARK REQUIRES VERIFICATION AND ADJUSTMENT. INVERTS SHOWN ON THIS PLAN WILL REQUIRE ADJUSTMENT.  
4. SEE COVER PAGE FOR EXISTING AND PROPOSED FEATURES LEGEND.  
5. ALL IRRIGATION PIPING DONE BY OTHERS. THESE DRAWINGS SHOULD BE READ IN CONJUNCTION WITH DRAWINGS PREPARED BY FREDERICKS MCQUIRE LTD. FOR IRRIGATION PIPE SYSTEM.  
6. ELECTRICAL DUCT BY OTHERS.  
7. THESE DRAWINGS SHOULD BE READ IN CONJUNCTION WITH STRUCTURAL BUILDING DRAWINGS PREPARED BY TACOMA ENGINEERS. LTD.



CIVIL DRAWINGS AND SUPPORTING DOCUMENTATION FOR THIS PROJECT INCLUDE THE FOLLOWING:				
DWG/REPORT	REV	DATE	TITLE	
01	E	OCT 1/2012	EXISTING CONDITIONS AND REMOVALS	
02	E	OCT 1/2012	OVERALL SITE AND SERVICING PLAN	
03	E	OCT 1/2012	600mm DIA INTAKE PLAN & PROFILE/ SECTION A - A' AND CHANNEL GRADING	
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06	E	OCT 1/2012	STORM SEWER REPLACEMENT AND OUTLET	
07	E	OCT 1/2012	CREDIT RIVER INTAKE	
08	E	OCT 1/2012	DETAILS & NOTES	

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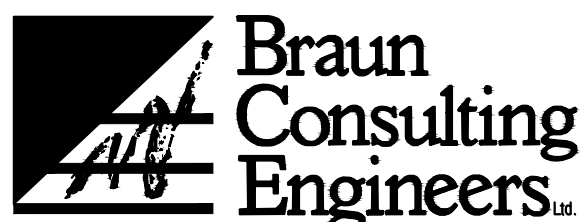
SOURCE:  
1. EXISTING TOPOGRAPHIC SURVEY AND FIELD MEASUREMENTS COMPLETED BY BRAUN CONSULTING ENGINEERS LTD. JAN 18, 2012.

THIS DRAWING IS NOT  
RELEASED FOR CONSTRUCTION

FOR APPROVAL

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DHB	DHB	E	FOR APPROVAL	OCT 1/12	AJM
DHB	DHB	D	PRELIMINARY - FOR APPROVAL	SEPT 25/12	AJM
--	--	C	NOT ISSUED	--	--
--	--	B	NOT ISSUED	--	--
ENG	CHK	NO.	DESCRIPTION	DATE	BY
REVISIONS					

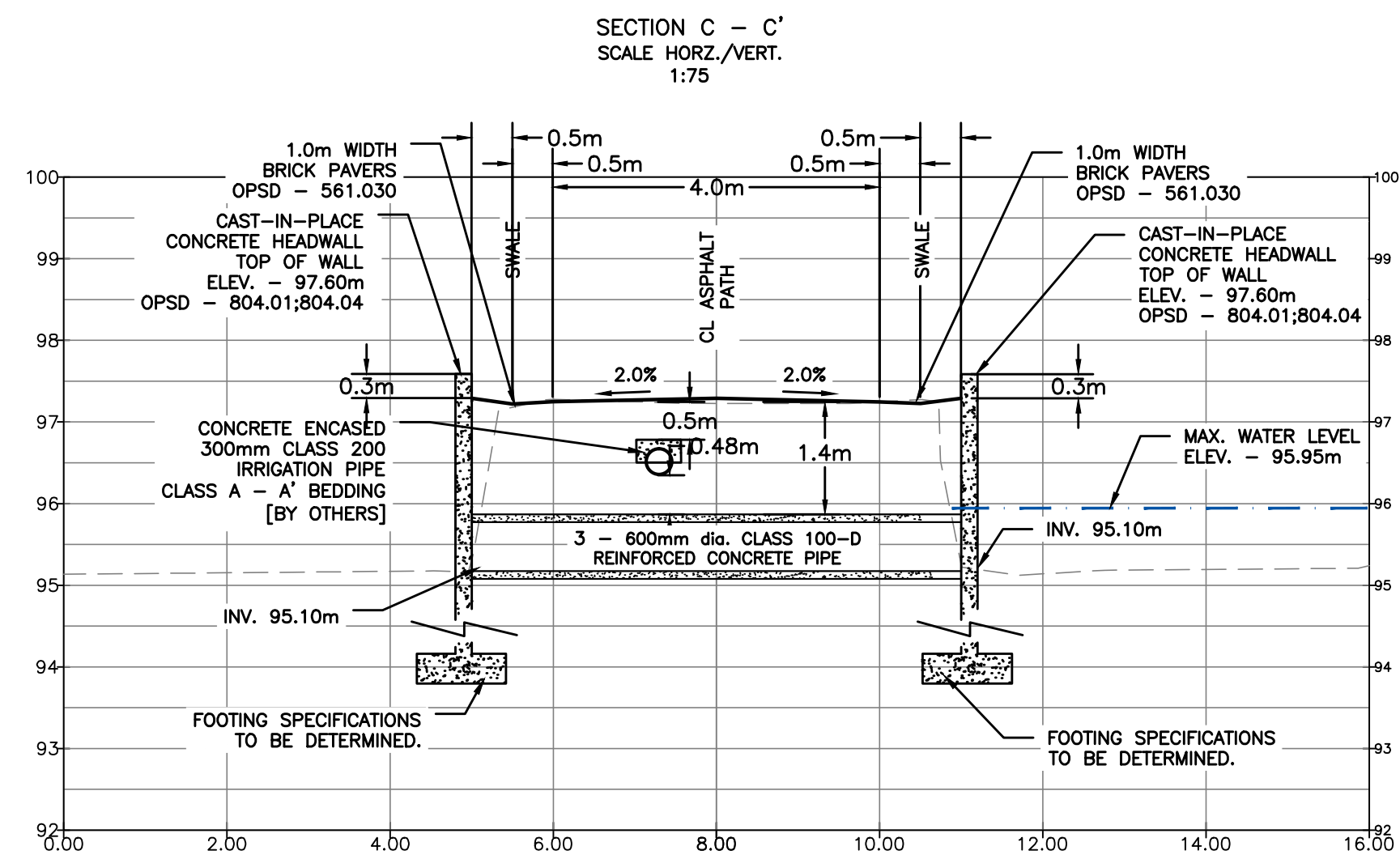
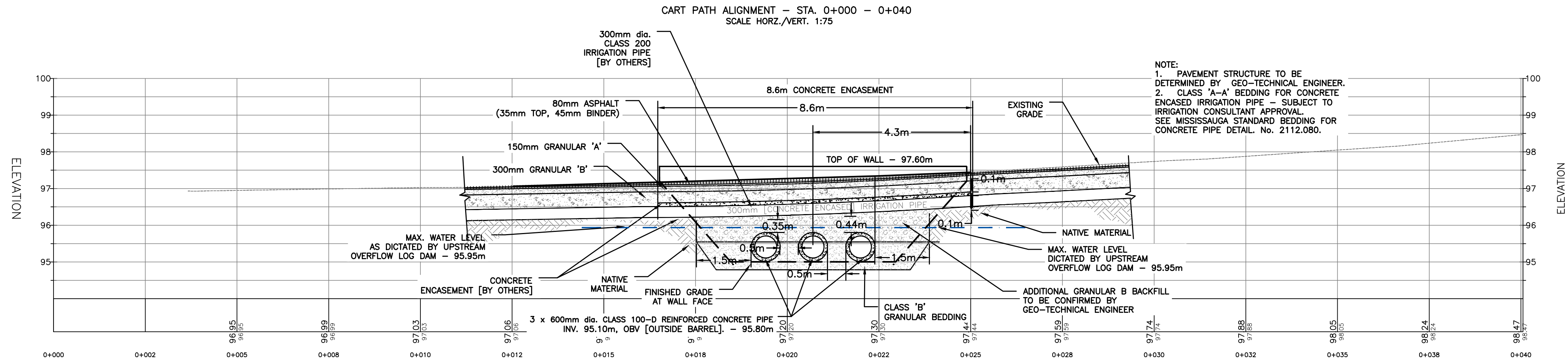


MISSISSAUGUA GOLF &  
COUNTRY CLUB

PUMPHOUSE AREA/  
CART PATH AND  
UPPER LEVEL GRADING

SCALE	1:100	DATE
DESIGNED	DHB	SEPT 11/12
DRAWN	AJM	FEB 10/12
PROJECT	DRAWING	REV.
11.10	04	E



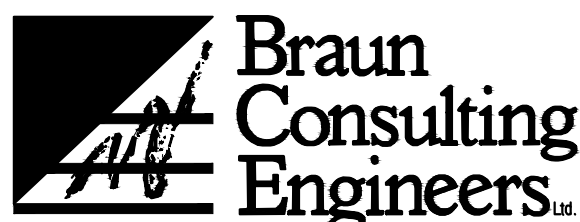


NOTE:

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6. ELECTRICAL DUCT BY OTHERS.
7. THESE DRAWINGS SHOULD BE READ IN CONJUNCTION WITH STRUCTURAL BUILDING DRAWINGS PREPARED BY TACOMA ENGINEERS, LTD.

FOR APPROVAL

DHB	DHB	E	FOR APPROVAL	OCT 1/12	AJM
DHB	DHB	D	PRELIMINARY - FOR APPROVAL	SEPT 25/12	AJM
--	--	C	NOT ISSUED	--	--
--	--	B	NOT ISSUED	--	--
ENG	CHK	NO.	DESCRIPTION	DATE	BY
REVISIONS					



MISSISSAUGUA GOLF &  
COUNTRY CLUB

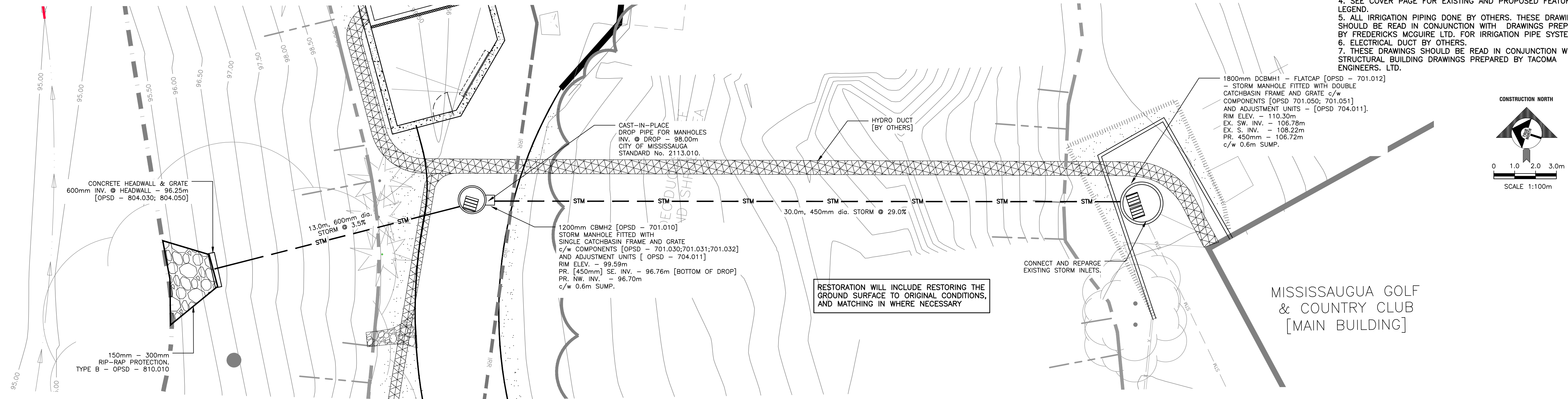
BRIDGE CROSSING  
CENTRELINE  
ALIGNMENT/ GRADING  
AND SERVICING  
STA. 0+000 - 0+040

SCALE	AS SHOWN	DATE	
DESIGNED	DHB	SEPT 2012	
DRAWN	AJM	FEB 10/12	
PROJECT		DRAWING	REV.
11.10		05	E

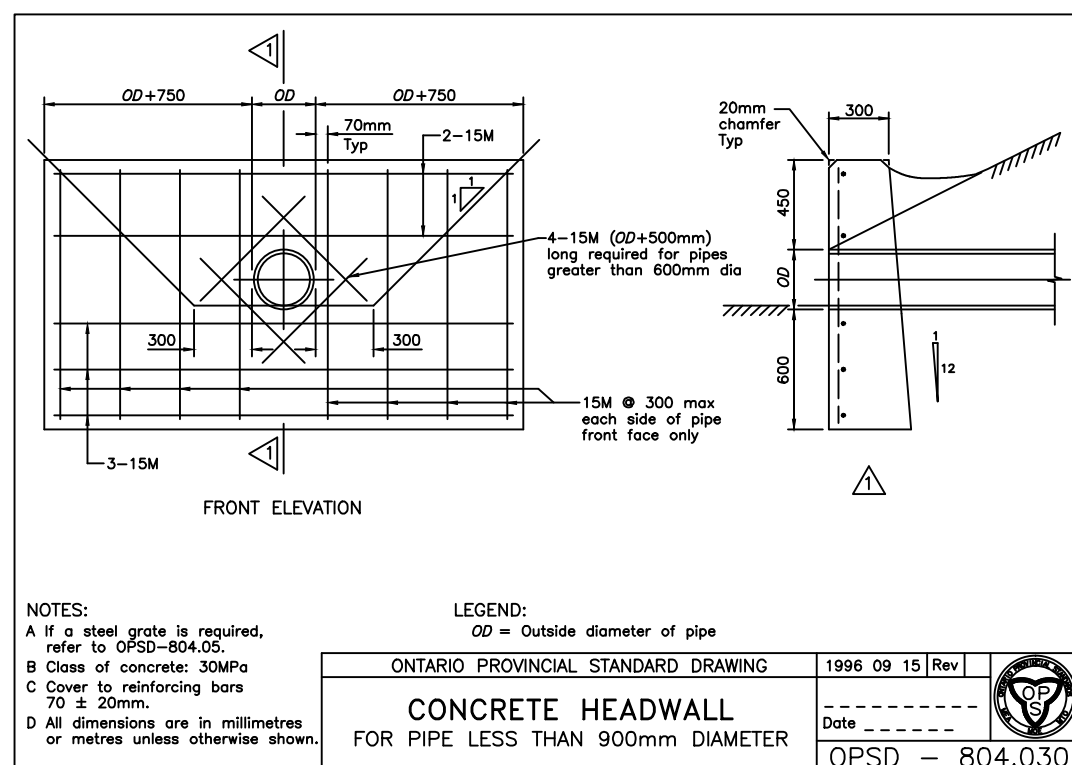
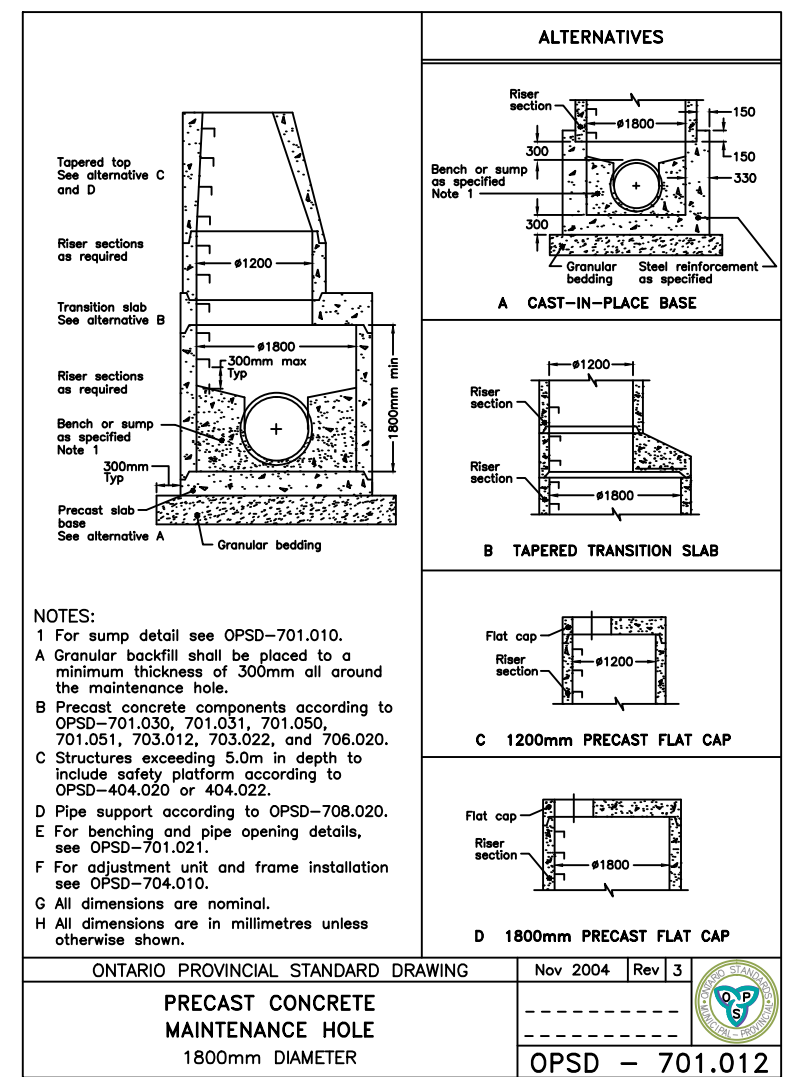
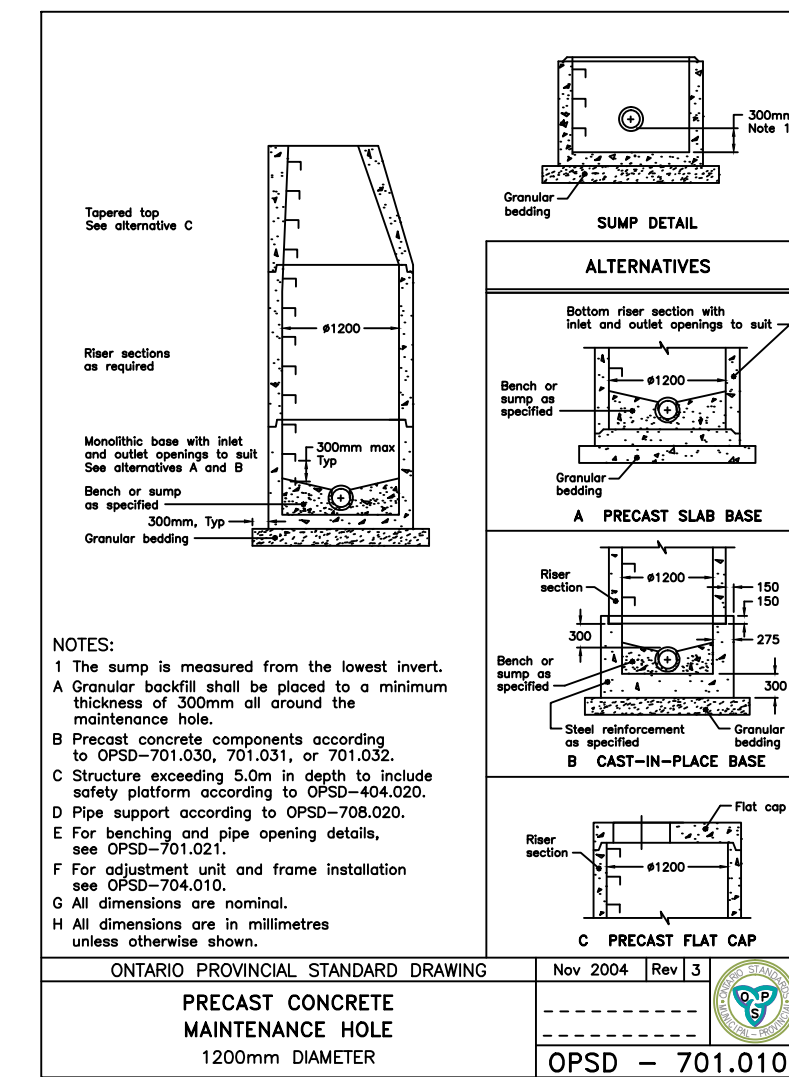
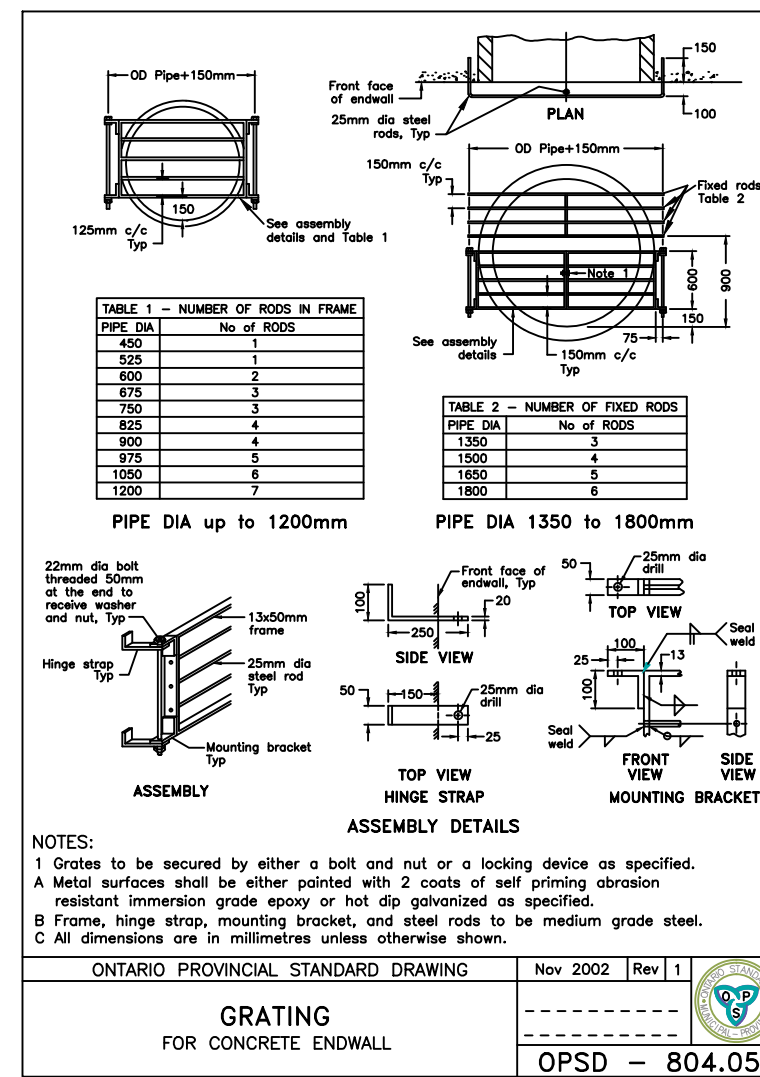
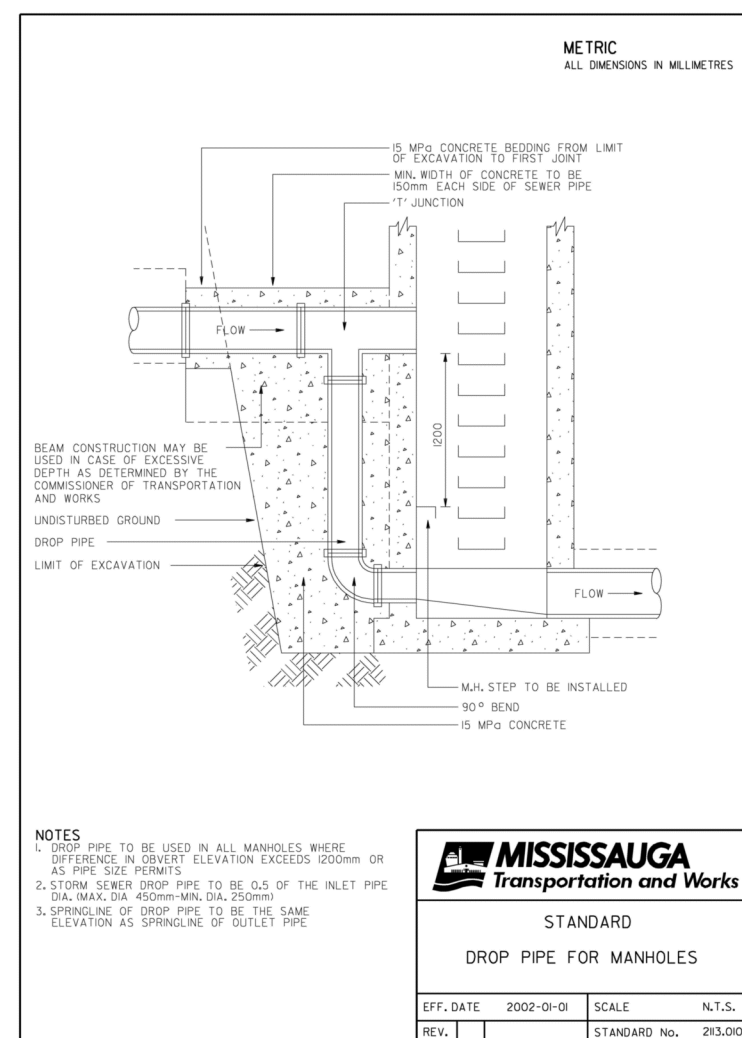
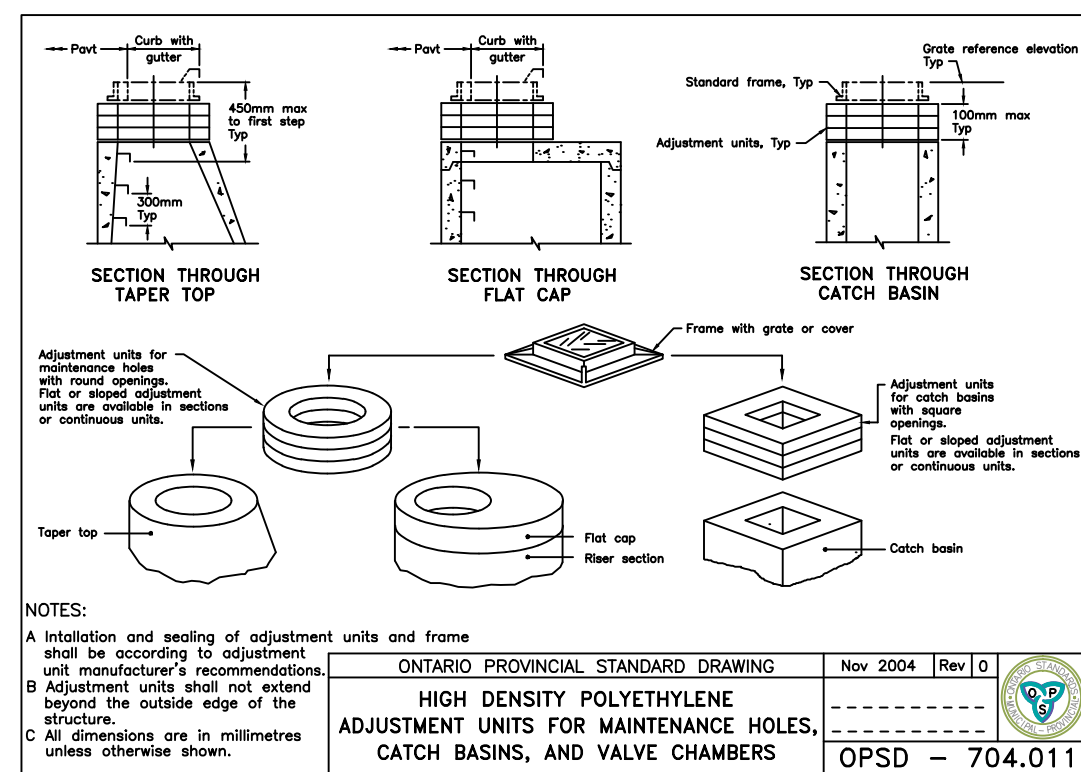
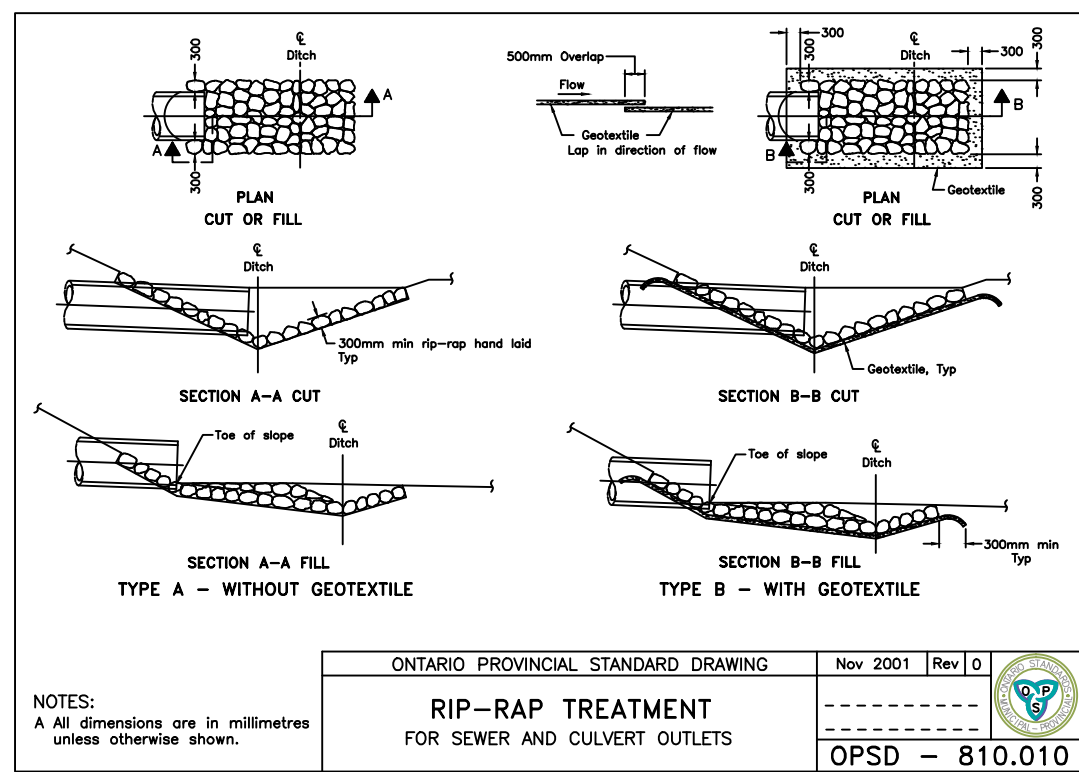
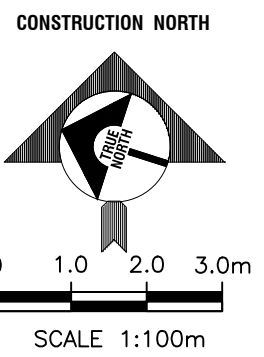


THIS DRAWING IS NOT  
RELEASED FOR CONSTRUCTION

# FOR APPROVAL



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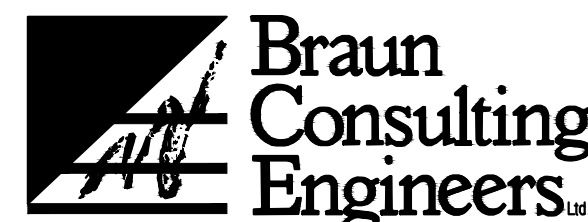
SOURCE:

1. EXISTING TOPOGRAPHIC SURVEY AND FIELD MEASUREMENTS COMPLETED BY BRAUN CONSULTING ENGINEERS LTD. JAN 18, 2012.

1. THE POSITION OF POLES, LINES, CONDUITS, WATERMANS, SEWERS AND OTHER UNDERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, THE CONTRACTOR SHALL INFORM HIMSELF OF THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES, AND SHALL ASSUME ALL LIABILITY FOR DAMAGE TO THEM.
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NOTES

DHB	DHB	E	FOR APPROVAL	OCT 1/12	AJM
DHB	DHB	D	PRELIMINARY - FOR APPROVAL	SEPT 25/12	AJM
--	--	C	NOT ISSUED	--	--
--	--	B	NOT ISSUED	--	--
ENG	CHK	NO.	DESCRIPTION	DATE	BY
REVISIONS					



MISSISSAUGUA GOLF &  
COUNTRY CLUB

STORM SEWER  
REPLACEMENT  
AND OUTLET

SCALE	AS SHOWN	DATE
DESIGNED	DHB	SEPT 12/12
DRAWN	AJM	FEB 10/12
PROJECT	DRAWING	REV.
11.10	06	E



#### A. GENERAL

1. THE STANDARD DRAWINGS AND SPECIFICATIONS OF THE PROVINCE OF ONTARIO (OPSS, OPSD) AND THE MUNICIPALITY CONSTITUTE PART OF THE PLANS AND SPECIFICATIONS OF THE WORKS SHOWN HEREON. ALL UNDERGROUND SERVICE MATERIALS AND INSTALLATIONS TO BE IN ACCORDANCE WITH THE LATEST APPLICABLE CODES AND STANDARDS.

2. ALL DIMENSIONS AND LOCATION OF ALL AND ANY EXISTING UTILITIES WILL BE CHECKED AND VERIFIED BY THE CONTRACTOR PRIOR TO COMMENCING CONSTRUCTION OF THE WORKS SHOWN HEREON. ANY DISCREPANCY WILL BE REPORTED IMMEDIATELY TO THE ENGINEER.

3. THE POSITIONS OF POLE ALIGNMENTS, CONDUITS, WATERMANS, SEWERS AND OTHER UNDERGROUND UTILITIES AND STRUCTURES ARE NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, THE CONTRACTOR WILL INFORM HIMSELF OF THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES, AND WILL ASSUME ALL LIABILITY FOR ANY DAMAGE DONE TO THEM.

4. ALL CONSTRUCTION WORK WILL BE COMPLETED IN ACCORDANCE WITH THE REQUIREMENTS OF THE OCCUPATIONAL HEALTH AND SAFETY ACT AND REGULATIONS FOR CONSTRUCTION PROJECTS.

5. FILL MATERIAL WILL BE COMPACTED TO A DRY DENSITY OF NO LESS THAN 95.0% OF THE MAXIMUM DRY DENSITY AS DETERMINED BY THE STANDARD PROCTOR DENSITY TEST, UNLESS OTHERWISE NOTED OR ADVISED BY THE PROJECT GEOTECHNICAL ENGINEER.

6. ALL AREAS DISTURBED DURING CONSTRUCTION OF THE WORKS WILL BE RESTORED TO THEIR ORIGINAL CONDITION OR BETTER, TO THE SATISFACTION OF THE ENGINEER.

7. PRIOR TO THE COMMENCEMENT OF UNDERGROUND SERVICING CONSTRUCTION, THE CONTRACTOR WILL VERIFY THE EXISTING SERVICE LOCATION AND INVERT ELEVATIONS AND WILL NOTIFY THE ENGINEER IMMEDIATELY OF ANY DISCREPANCIES.

8. PRIOR TO THE COMMENCEMENT OF SITE CONSTRUCTION, THE CONTRACTOR WILL ERECT, CONSTRUCT AND MAINTAIN SITUATION CONTROL MEASURES TO THE SATISFACTION OF THE OWNER. ALL MEASURES WILL BE INSPECTED AFTER ANY PRECIPITATION TO ENSURE CONTINUED SATISFACTORY OPERATION. ANY NECESSARY MODIFICATIONS WILL BE MADE IMMEDIATELY.

9. TAKE NECESSARY PRECAUTIONS TO PRESERVE EXISTING TREES DURING THE CONSTRUCTION PERIOD.

10. ANY CONSTRUCTION WITHIN THE MUNICIPALITY RIGHT OF WAY WILL BE COMPLETED UNDER SEPARATE CONTRACT BY CITY FORCES. SITE WORKS WILL BE CONTAINED WITHIN THE PROPERTY EXCEPT WHERE APPROVED BY THE MUNICIPALITY.

11. PRIOR TO THE COMMENCEMENT OF SITE CONSTRUCTION, THE CONTRACTOR WILL ERECT, CONSTRUCT AND MAINTAIN HOARDING CONTROL MEASURES TO THE SATISFACTION OF THE OWNER. ALL MEASURES WILL BE INSPECTED AFTER ANY PRECIPITATION TO ENSURE CONTINUED SATISFACTORY OPERATION. ANY NECESSARY MODIFICATIONS WILL BE MADE IMMEDIATELY.

#### B. SANITARY SEWERS

1. ALL SANITARY SEWERS (PIPE, FITTINGS, CONNECTIONS) WILL BE PVC PIPE PER A.S.T.M. D3034-74, SDR 35 SPECIFICATION UNLESS OTHERWISE NOTED.

2. ALL MANHOLES TO BE PRECAST CONCRETE 1200mm DIA. WITH BENCHING AS PER OPSD 701.010.

#### C. STORM SEWERS - GENERAL

1. BEDDING AS PER MISSISSAUGA STANDARD No. 212.080 OR AS APPROPRIATE TO SITE CONDITIONS.

2. ALL MANHOLES AND CATCHBASIN MANHOLES TO BE PRECAST CONCRETE AS PER SIZE AND TYPE SPECIFIED ON DRAWING AND CORRESPONDING OPSD.

3. CATCHBASINS SHALL BE PRECAST CONCRETE, SINGLE AS PER OPSD 705.010 OR TYPE 'A', DOUBLE AS PER OPSD 705.020. TYPE 'A' CATCH BASIN LEADS AND ALL SERVICE CONNECTIONS TO SEWER MAIN LINES SHALL BE INSTALLED PER OPSD 708.010 AND 708.02.

#### D. STORM SEWERS - MATERIAL SPECIFICATION

1. CONCRETE PIPE: WILL CONFORM TO OPSD 1820 WHICH INCLUDES CANCSA STANDARD SPECIFICATION A507-1402 AND CANCSA STANDARD SPECIFICATION A507-2. ALL CONCRETE PIPE SHALL BE MANUFACTURED UNDER THE ONTARIO CONCRETE PLANT PREQUALIFICATION PROGRAM ADMINISTERED BY THE OPS, MTO, MEA AND THE OPCA.

#### 2. PVC PIPE

WILL CONFORM TO OPSD 1821 AND BE CSA CERTIFIED IN ACCORDANCE TO THE STANDARD SPECIFICATION B182-02 FOR PVC SEWER PIPE AND FITTINGS AND STANDARD SPECIFICATION B182-02 FOR PROFILE POLYETHYLENE SEWER PIPE AND FITTINGS. PIPE AND FITTINGS WILL HAVE A MAXIMUM STANDARD DIMENSION RATIO OF 31 (SDR31) AND MINIMUM PIPE STIFFNESS OF 320 KPA. AS MAY BE NECESSARY BASED ON THE DESIGN CRITERIA AND SITE CONDITIONS, THE MAXIMUM DIAMETER OF PIPE ALLOWED UNDER THIS SPECIFICATION IS 450mm.

#### 3. PE PIPE

WILL CONFORM TO OPSD 1840. UTILIZING VIRGIN RESIN, GASKETED BELL AND SPIGOT CONFIGURATION AND WILL BE CERTIFIED BY CSA IN ACCORDANCE TO THE STANDARD SPECIFICATION CSA B162.06-02 FOR PROFILE POLYETHYLENE SEWER PIPE AND FITTINGS FOR LEAK-PROOF SEWER APPLICATIONS. JOINTS WILL BE WATER TIGHT IN ACCORDANCE WITH CLAUSE 6.1.3 OF THE SPECIFICATION. ELASTOMERIC GASKET JOINTS WILL NOT LEAK WHEN TESTED IN ACCORDANCE WITH ASTM 3212. THE INTERNAL HYDROSTATIC PRESSURE WILL BE 1000 kPa. PIPE AND FITTINGS WILL HAVE A MINIMUM PIPE STIFFNESS OF 320 KPA. AS MAY BE NECESSARY BASED ON THE DESIGN CRITERIA AND SITE CONDITIONS, THE MAXIMUM DIAMETER OF PIPE ALLOWED UNDER THIS SPECIFICATION WILL BE 450mm.

#### 4. CORRUGATED STEEL PIPE

ALUMINIZED STEEL TYPE 2, 2.8mm THICK CONFORMING TO THE MOST RECENT REVISION OF THE FOLLOWING SPECIFICATIONS: CSA G401 - 93 CORRUGATED STEEL PIPE PRODUCTS, ASTM A425 AND A760, AASHTO M274 AND M36. SHOP DRAWINGS REQUIRED.

#### E. SEWER INSTALLATION SPECIFICATION

##### 1. RIGID PIPE

ALL WORK WILL BE CARRIED OUT IN ACCORDANCE TO OPSD 410.514 AND OPSD 802.030 UTILIZING SUITABLE NATIVE MATERIAL FROM SPRINGLINE OF THE PIPE TO SURFACE OF ROAD STRUCTURE. A PROVISIONAL ITEM FOR IMPORTED GRANULAR BACKFILL WILL BE UTILIZED WHERE THE PROJECT ENGINEER OR GEOTECHNICAL ENGINEER, UPON WRITTEN AUTHORIZATION, DEEMS NATURAL MATERIAL UNSUITABLE, SURPLUS OR UNSUITABLE EXCAVATED MATERIAL WILL BE DISPOSED OF AS SPECIFIED IN OPSD 206.

##### 2. FLEXIBLE PIPE

ALL WORK WILL BE CARRIED OUT IN ACCORDANCE TO OPSD 410.514 AND OPSD 802.010 WITH WELL GRADED GRANULAR MATERIAL COMPACTED TO ONE FOOT ABOVE THE CROWN OF THE PIPE AND MAINTAINING TRENCH WIDTHS AS SPECIFIED IN OPSD 802.010 OR BY THE PIPE MANUFACTURER WHICH EVER IS GREATER. SURPLUS OR UNSUITABLE EXCAVATED MATERIAL WILL BE DISPOSED OF AS SPECIFIED IN OPSD 206.

##### 3. STORM SEWER - QUALITY

IT IS THE OWNER'S RESPONSIBILITY TO CONDUCT ROUTINE INSPECTION AND MAINTENANCE OF GOSS TRAPS OR ANY OTHER GRI. GRI INTERCEPTION DEVICES OR SYSTEMS INSTALLED OR CONSTRUCTED ON THE OWNER'S PROPERTY.

##### 4. PIPE BEDDING WILL BE CLASS B PER MISSISSAUGA STANDARD No. 212.080.

5. THE SURFACE UPON WHICH THE PIPE IS TO BE LAID WILL BE TRUE TO GRADE AND ALIGNMENT.

6. WHEN BELL AND SPIGOT IS TO BE LAID, RECESSES WILL BE SHAPED TO RECEIVE THE BELLS.

7. AN UNCOMPLETED LAYER OF MATERIAL 150mm IN DEPTH WILL BE PLACED UNDER THE MIDDLE THIRD OF THE PIPE DIAMETER ALONG THE LENGTH OF THE TRENCH.

8. BEDDING MATERIAL PLACED IN THE HAUNCHES MUST BE COMPACTED PRIOR TO CONTINUED PLACEMENT OF COVER MATERIAL.

9. BEDDING WILL BE PLACED IN LAYERS NOT EXCEEDING 200mm IN THICKNESS, LOOSE MEASUREMENT, AND COMPACTED TO 95% OF THE MAXIMUM DRY DENSITY BEFORE A SUBSEQUENT LAYER IS LAYED.

10. BEDDING ON EACH SIDE OF THE PIPE WILL BE COMPLETED SIMULTANEOUSLY. AT NO TIME WILL THE LEVELS ON EACH SIDE DIFFER BY MORE THAN THE UNCOMPLETED LAYER.

##### 11. MANHOLE TESTING

ALL PIPE INSTALLED UNDER THIS ITEM WILL INCLUDE FIELD-TESTING IN ACCORDANCE WITH OPSD 410.07 15.05. NOTWITHSTANDING, A MANHOLE OR PIG NOT LESS THAN 95% OF THE BASE INSIDE DIAMETER (AS DEFINED IN THE CSA STANDARD TO WHICH THE PIPE IS MANUFACTURED) WILL BE SUCCESSFULLY DRAIN THROUGH ALL FLEXIBLE SEWER PIPES INSTALLED UNDER THIS CONTRACT. A TOTAL OF TWO TESTS WILL BE COMPLETED, ONE UPON SUBSTANTIAL COMPLETION AND THE SECOND AT THE END OF THE MAINTENANCE PERIOD. ALL TESTS WILL BE CARRIED OUT IN THE PRESENCE OF THE PROJECT ENGINEER OR HIS REPRESENTATIVE. IF THE PIPE IS NOT DAMAGED, OR REPLACED AT NO ADDITIONAL COST TO THE OWNER, THE CONTRACTOR WILL BE RESPONSIBLE FOR ALL EXPENSES AND DELAYS DUE TO THE REPAIR OR REPLACEMENT OF DEFORMED OR DAMAGED PIPE.

#### F. SEWER ACCEPTANCE SPECIFICATION

##### 1. RIGID PIPE

ALL PIPE INSTALLED UNDER THIS ITEM WILL BE FIELD TESTED IN ACCORDANCE WITH OPSD 410.07 15.05. ANY PIPE FAILING TO SATISFY THE TESTING AS SPECIFIED BY THE PROJECT ENGINEER WILL BE REPAIRED TO THE SATISFACTION OF THE PROJECT ENGINEER AT NO ADDITIONAL COST TO THE OWNER. THE CONTRACTOR WILL BE RESPONSIBLE FOR ALL EXPENSES AND DELAYS DUE TO THE REPAIR OF DAMAGED PIPE.

##### 2. FLEXIBLE PIPE

ALL PIPE INSTALLED UNDER THIS ITEM WILL INCLUDE FIELD-TESTING IN ACCORDANCE WITH OPSD 410.07 15.05. NOTWITHSTANDING, A MANHOLE OR PIG NOT LESS THAN 95% OF THE BASE INSIDE DIAMETER (AS DEFINED IN THE CSA STANDARD TO WHICH THE PIPE IS MANUFACTURED) WILL BE SUCCESSFULLY DRAIN THROUGH ALL FLEXIBLE SEWER PIPES INSTALLED UNDER THIS CONTRACT. A TOTAL OF TWO TESTS WILL BE COMPLETED, ONE UPON SUBSTANTIAL COMPLETION AND THE SECOND AT THE END OF THE ONE YEAR MAINTENANCE PERIOD. ALL TESTS WILL BE CARRIED OUT IN THE PRESENCE OF THE PROJECT ENGINEER OR HIS REPRESENTATIVE. IF THE PIPE IS NOT DAMAGED, OR REPLACED AT NO ADDITIONAL COST TO THE OWNER, THE CONTRACTOR WILL BE RESPONSIBLE FOR ALL EXPENSES AND DELAYS DUE TO THE REPAIR OR REPLACEMENT OF DEFORMED OR DAMAGED PIPE.

#### G. WATER DISTRIBUTION SYSTEM

1. ALL WATERMANS AND DOMESTIC WATER SERVICE CONNECTIONS LESS THAN OR EQUAL TO 80mm DIA. SHALL BE TYPE 'K' COPPER PIPE. ALL PIPE JOINTS SHALL BE COMPRESSION STYLE. ALL WATER SERVICE CONNECTIONS SHALL BE INSTALLED PER CITY STD. SD-26.

2. ALL WATERMANS GREATER THAN OR EQUAL TO 100mm DIA. SHALL BE POLYVINYL CHLORIDE (PVC) PIPE, CLASS 150, CONFORMING TO A.W.W.A. C900-75 SPECIFICATIONS. WATERMAIN BEDDING SHALL BE IN ACCORDANCE WITH CITY STD. SD-26 AND SHALL INCLUDE THE INSTALLATION OF A LIGHT COLOURED COPPER TRACER WIRE, PER CITY REQUIREMENTS.

3. ALL WATERMAIN FITTINGS SHALL BE MECHANICAL JOINT, CEMENT LINED, CAST IRON, AND INSTALLED IN ACCORDANCE WITH CITY STD SD-27. LINE VALVES SHALL BE GATE VALVES PER CITY STD SD-24. ALL WJ FITTINGS SHALL INCLUDE CATHODIC PROTECTION PER CITY REQUIREMENTS.

4. WATERMAIN UNDER BUILDING FOOTING SHALL BE PVC UP TO A POINT AT LEAST 300 mm ABOVE FINISHED FLOOR IN THE MECHANICAL ROOM - IN ORDER TO COMPLY WITH OBC 7.6.1.5(6).

5. FIRE HYDRANTS SHALL BE INSTALLED COMPLETE WITH A SECONDARY VALVE AND BOX PER CITY STD. SD-26. HYDRANT TYPE TO BE AS PER THE MUNICIPALITY SPECIFICATION SD-200. SECTION 2.5. PRIVATE HYDRANTS SHALL BE PAINTED 'RED BARRIE' AND GREEN CAP. CITY HYDRANTS SHALL BE PAINTED 'YELLOW BARREL AND GREEN CAP'.

6. WATER METERS TO BE LOCATED WITHIN 1m OF WHERE WATER LINE ENTERS BUILDING - LOCATION AND ARRANGEMENT TO SATISFACTION OF THE MUNICIPALITY.

7. INSTALLATION OF BACKFLOW PREVENTION DEVICE TO BE INSTALLED AS PER THE MUNICIPALITY BY-LAW SCHEDULE CITED 'BACKFLOW PREVENTION REGULATIONS'.

8. WATERMAIN TO BE CONSTRUCTED 2.0m BELOW GRADE UNLESS OTHERWISE NOTED.

9. WATERMAIN TESTING WILL CONFORM TO OPSD 701 WITH THE FOLLOWING EXCEPTIONS: THE TEST PRESSURE DURING HYDROSTATIC TESTING SHALL BE 1.5 TIMES THE OPERATING PRESSURE. ALL ARRANGEMENTS FOR SAMPLING AND TESTING SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR. THE RESULTS OF ALL TESTS SHALL BE TO THE SATISFACTION OF THE UNIVERSITY OF GUELPH.

#### H. ELECTRICAL

1. ELECTRICAL DUCTING AND DESIGN BY OTHERS.

#### I. SEDIMENT & EROSION

1. WEEKLY ENVIRONMENTAL INSPECTIONS DURING SERVICING INSTALLATION AND FOLLOWING ALL SIGNIFICANT PRECIPITATION EVENTS WILL BE COMPLETED AND DOCUMENTED. ENVIRONMENTAL INSPECTIONS DURING CONSTRUCTION AND FOLLOWING ALL SIGNIFICANT PRECIPITATION EVENTS (PRECIPITATION > 1.0mm) WILL BE COMPLETED AND ANY DOCUMENTATION WILL BE PROVIDED TO THE OWNER.

1. ALL EXPOSED AREAS NOT SUBJECT TO ACTIVE CONSTRUCTION WITHIN 30 DAYS ARE TO BE REVEGETATED AS PER OPSD 572. IMMEDIATELY UPON COMPLETION OF AREA GRADING, RE-VEGETATION AS PER OPSD 572 SHOULD BE OF LOCAL GENETIC SPECIES AND SEED STOCK, REFER TO PROJECT SPECIFICATION FOR APPROPRIATE SEED MIXTURE.

2. STOCKPILES OF CLEARED MATERIALS AS WELL AS EQUIPMENT FUELING AND MAINTENANCE AREAS WILL BE LOCATED AWAY FROM NATURAL AREAS AND CONVEYANCE ROUTES.

3. SITE WORKS ARE TO BE STAGED IN SUCH A MANNER THAT EROSION WILL BE MINIMIZED AND THAT BARRIERS AND SEDIMENTATION FACILITIES WITHIN THE SITE ARE PROVIDED TO CONTROL ANY EROSION THAT DOES OCCUR.

4. ALL SILT FENCING TO BE INSTALLED AS PER MISSISSAUGA STANDARD No. 294.010 PRIOR TO THE COMMENCEMENT OF ANY GRADING, EXCAVATION OR DEMOLITION. ENVIRONMENTAL INSPECTIONS WILL BE COMPLETED BY A QUALIFIED ENVIRONMENTAL INSPECTOR. REPORTS WILL BE SUBMITTED MONTHLY TO THE MUNICIPALITY.

5. CLEARING AND GRUBBING OF THE SITE WILL BE KEPT TO A MINIMUM AND VEGETATION REMOVED ONLY IN ADVANCE OF IMMEDIATE CONSTRUCTION.

6. STOCKPILES OF EARTH OR TOPSOIL WILL BE LOCATED AND PROTECTED TO MINIMIZE ENVIRONMENTAL INTERFERENCE. STOCKPILES SHOULD NOT BE LOCATED IMMEDIATELY ADJACENT TO DITCHES OR ROAD ALLOWANCES.

7. EROSION CONTROL FENCING IS TO BE INSTALLED AROUND THE BASE OF ALL STOCKPILES. A PERIMETER DITCH LEADING TO A SETTLING AREA OR SEDIMENTATION TRAP WILL BE INSTALLED AROUND THE STOCKPILE.

8. EROSION PROTECTION WILL BE PROVIDED AROUND ALL STORM AND SANITARY MHs, OPEN DITCHES, SWALES AND WATERCOURSES.

9. ADDITIONAL EROSION CONTROL MEASURES MAY BE REQUIRED AS SITE DEVELOPMENT PROGRESSES. THE CONTRACTOR IS TO PROVIDE ALL ADDITIONAL EROSION CONTROL STRUCTURES, AS REQUESTED BY THE PROJECT ENGINEER.

10. THE CONTRACTOR IS TO MONITOR ALL EROSION CONTROL STRUCTURES TO ENSURE FENCING IS INSTALLED AND MAINTAINED.

11. EROSION CONTROL STRUCTURES WILL BE MONITORED REGULARLY AND ANY DAMAGE TO STRUCTURES REPAIRED IMMEDIATELY. SEDIMENT IS TO BE REMOVED WHEN ACCUMULATIONS REACH A MAXIMUM OF 1/2 THE HEIGHT OF THE FENCE. CLOGGED FILTER MATERIALS MUST BE REPLACED AS REQUIRED, OR DIRECTED BY THE PROJECT ENGINEER.

12. ALL EROSION CONTROL STRUCTURES WILL REMAIN IN PLACE UNTIL ALL DISTURBED GROUND SURFACES HAVE BEEN RESTABILIZED.

13. NO ALTERNATE METHODS OF EROSION PROTECTION WILL BE PERMITTED UNLESS APPROVED BY THE PROJECT ENGINEER.

14. THE CONTRACTOR IS RESPONSIBLE TO ENSURE THAT MUNICIPAL AND PRIVATE ROADWAYS AND SIDEWALKS ARE CLEARED OF ALL SEDIMENTS FROM VEHICULAR TRACKING ETC. TO AND FROM THE SITE AT THE END OF EACH WORK DAY.

15. DUST CONTROL IS REQUIRED DURING THE CONSTRUCTION PERIOD AND UNTIL THE SITE IS STABILIZED. DUST CONTROL MEASURES WILL BE IMPLEMENTED AS REQUIRED, TO THE SATISFACTION OF THE PROJECT ENGINEER.

16. EROSION AND SEDIMENT CONTROL TO BE PROVIDED BY SILT FENCING AS PER MISSISSAUGA STANDARD No. 294.010 AT ALL LOCATIONS DURING CONSTRUCTION WHERE SURFACE RUNOFF LEAVES THE SITE UNCONTROLLED.

#### K. MISCELLANEOUS

1. SITE PAVEMENT WORKS SHALL BE COMPLETED IN ACCORDANCE WITH THE GEOTECHNICAL ENGINEER'S REPORT.

2. CONCRETE SHALL HAVE A 28 DAY STRENGTH OF 32 MPA, AND AN AIR CONTENT 6%. SUBMIT CONCRETE MIX DESIGN FOR REVIEW.

3. ALL DRAWINGS SHALL BE READ IN CONJUNCTION WITH THE STRUCTURAL ENGINEERING DRAWINGS PROVIDED BY TACOMA ENGINEERS LTD.

4. REFER TO LANDSCAPE PLANS FOR TREE PROTECTION AND LANDSCAPING LAYOUT.

5. ALL PAVEMENT AND BOULEVARD AREAS DISTURBED BY THE CONSTRUCTION OF THE PROPOSED SITE WORKS WILL BE RESTORED TO THEIR ORIGINAL CONDITION OR BETTER TO THE SATISFACTION OF THE ENGINEER ON THE OWNER.

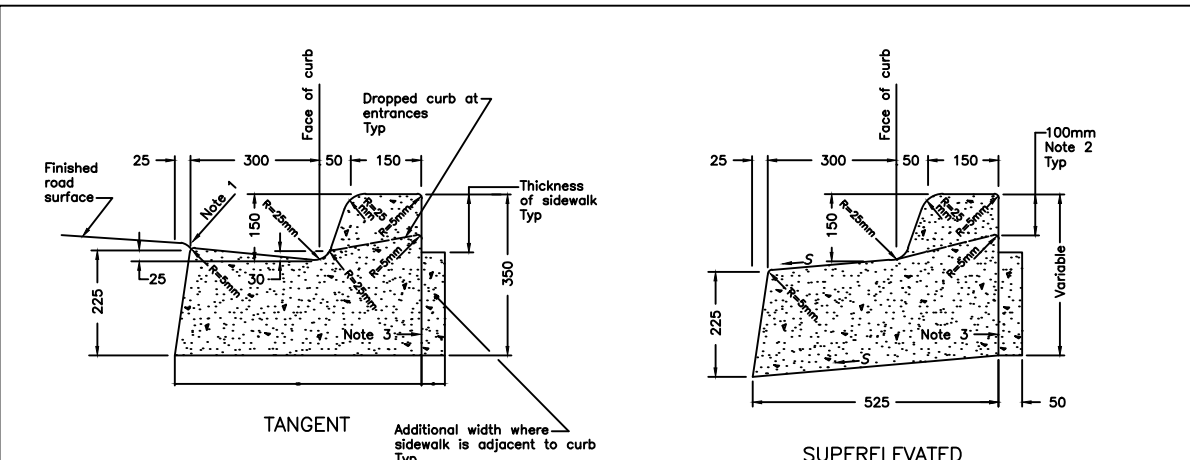
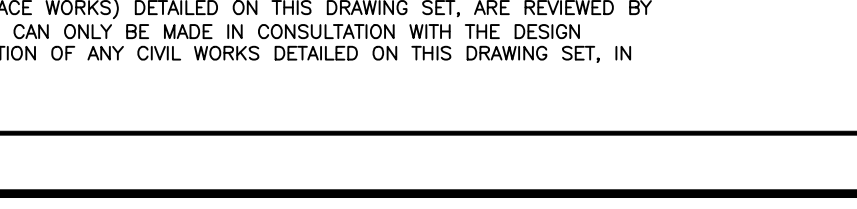
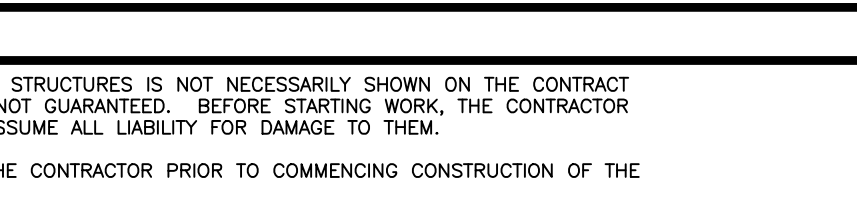
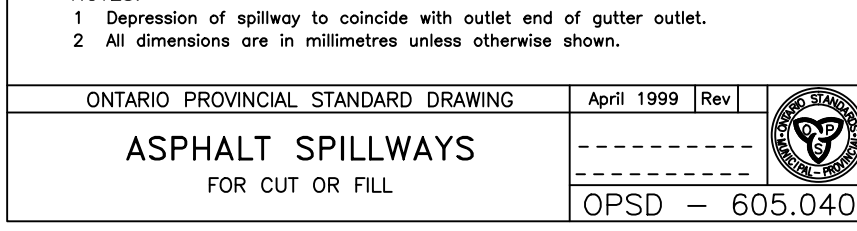
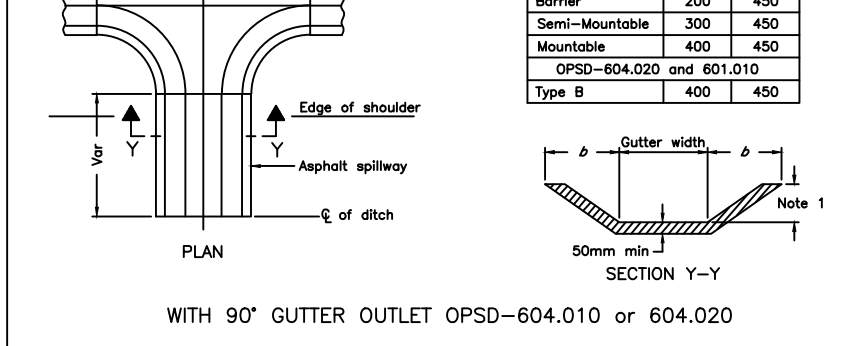
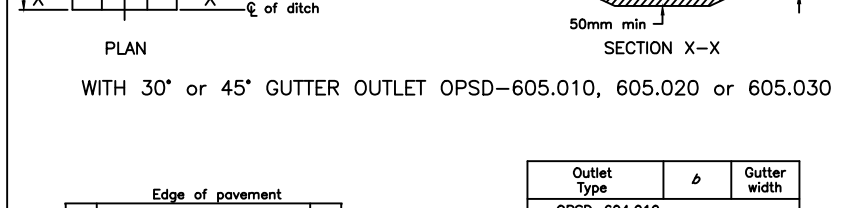
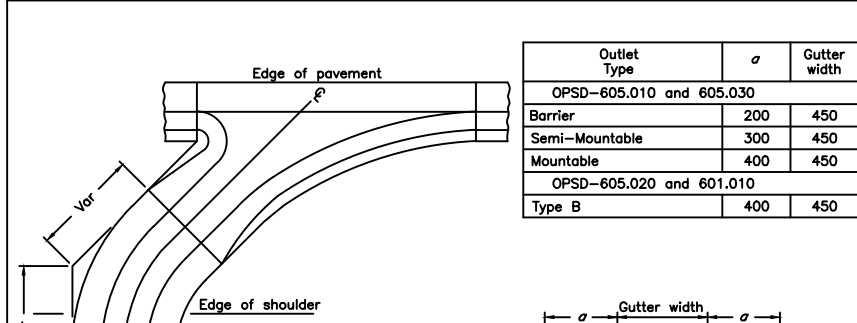
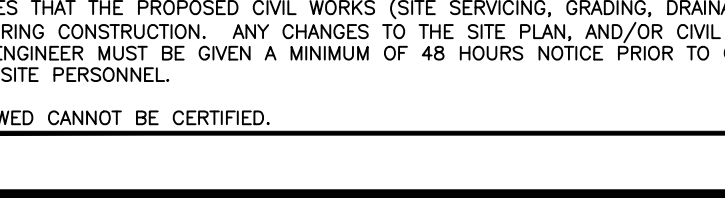
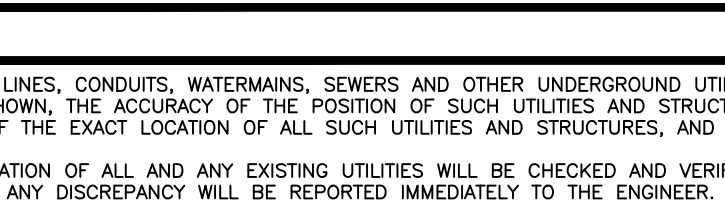
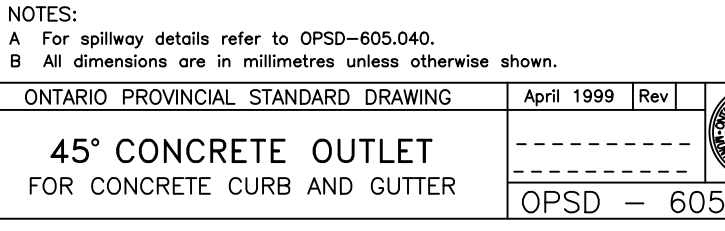
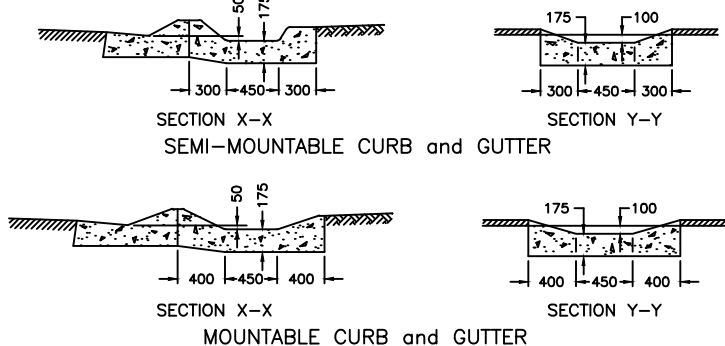
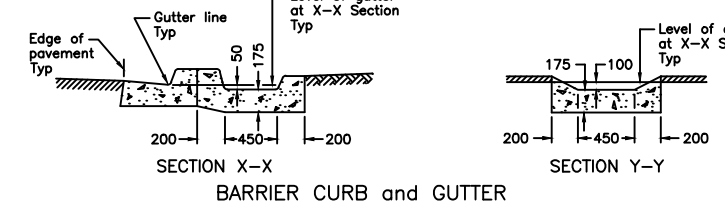
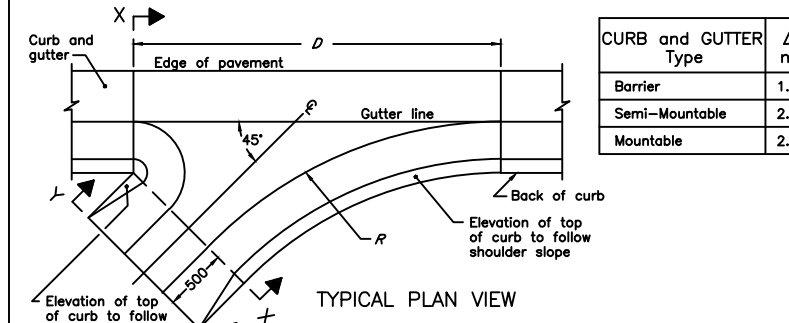
6. DO NOT DISPOSE OF SOLVENTS, CLEANING SOLUTIONS, LUBRICANTS, FUEL, PAINT AND SIMILAR SUBSTANCES ON THE SITE. DISPOSE OF SUCH MATERIALS OFF-SITE AND ONLY IN ACCORDANCE WITH MUNICIPAL, PROVINCIAL, AND FEDERAL REQUIREMENTS AND GUIDELINES.

7. RE CONSTRUCTION LAYOUT THE ENGINEER WILL PROVIDE THE CONTRACTOR WITH DIGITAL FILES OF THE DESIGN DRAWINGS - INCLUDING REFERENCE TO A BENCH MARK AND BASELINE. FOR THE CONTRACTORS LAYOUT PURPOSES, THE CONTRACTOR WILL PROVIDE ALL LAYOUT - INITIAL GROUND SURFACE SURVEY AS WELL AS INTERIM SURVEY CONTROL. DAY TO DAY LAYOUT AND GRADE CONTROL WILL BE THE RESPONSIBILITY OF THE CONTRACTOR. THE CONTRACTOR WILL PROVIDE THE ENGINEER WITH MANPOWER / ASSISTANCE, AS REQUIRED OR REQUESTED, TO CHECK THE LAYOUT AND ACCURACY OF WORK COMPLETED BY THE CONTRACTOR. FOR QUALITY AND QUANTITY CONTROL (PAYMENT) PURPOSES, THE CONTRACTOR WILL PROVIDE THE ENGINEER WITH DIGITAL SURVEY INFORMATION. THE CONTRACTOR WILL PROVIDE THE PROGRESS OF THE PROJECT, AND DATA COLLECTED FROM THE FINAL SURVEY AT PROJECT COMPLETION.

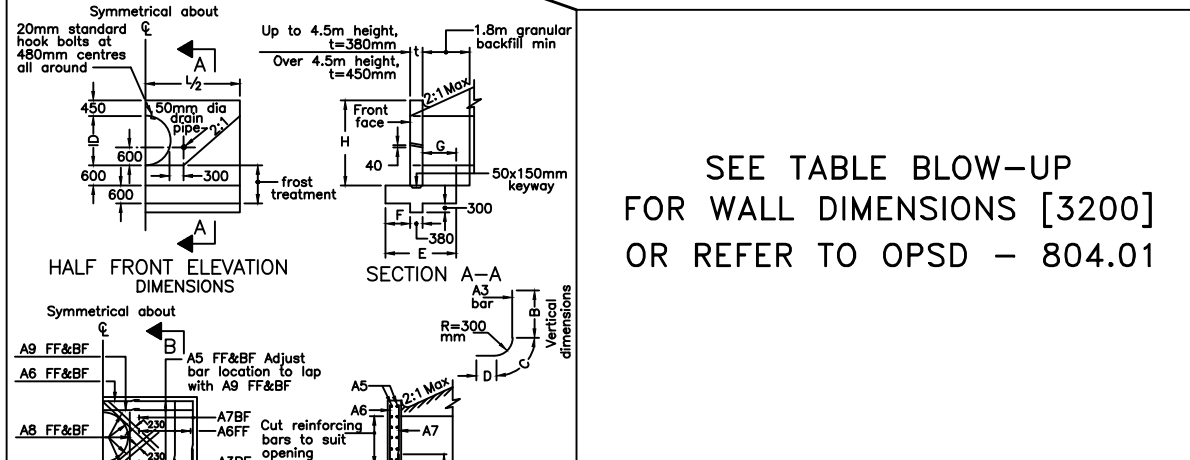
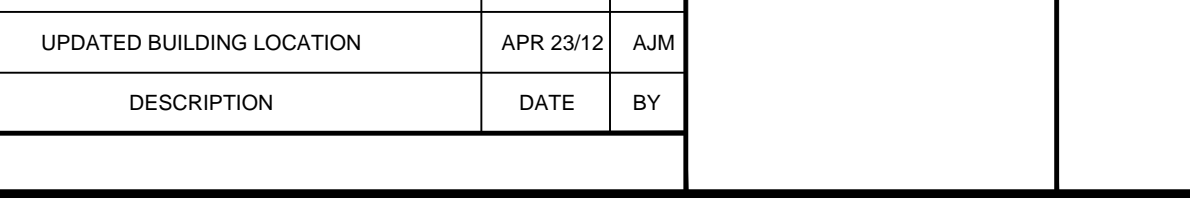
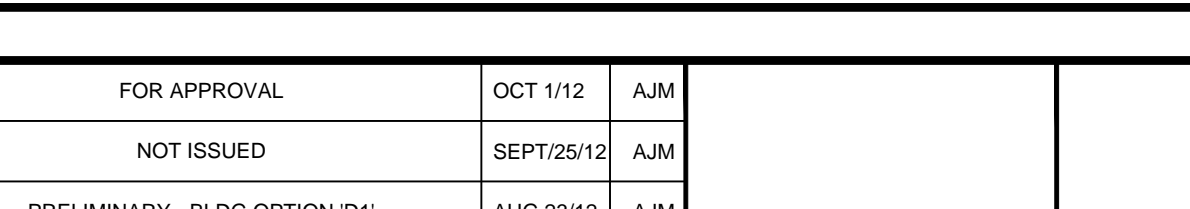
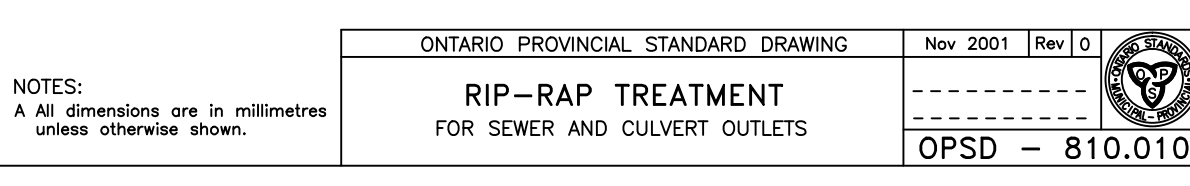
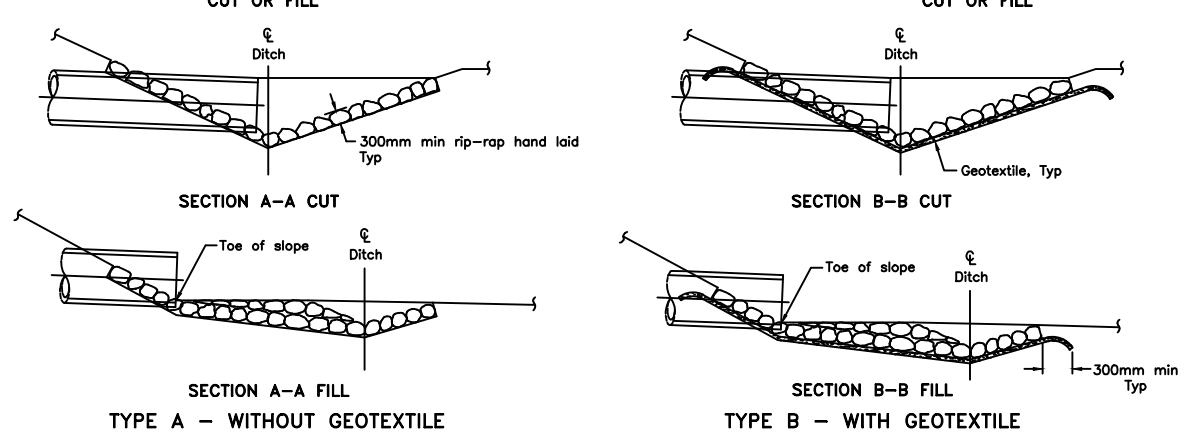
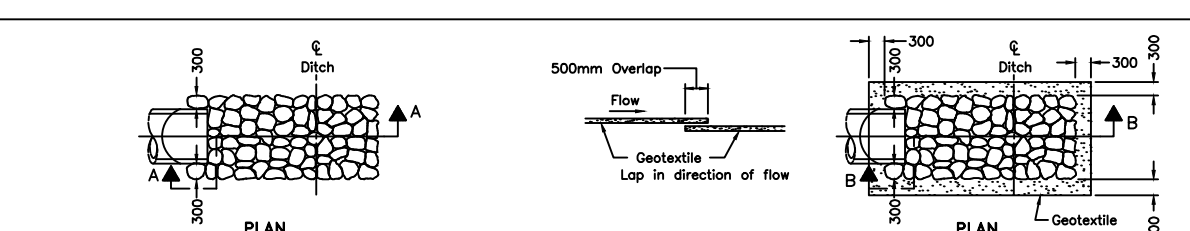
TABLE 1 - CONCRETE AND STEEL DIMENSIONS AND QUANTITIES		TABLE 2 - TO BE DETERMINED BY ENGINEER AND SHOWN ON TABLE I	
Length of	Length of	Length of	Length of
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5. Length of	6. Length of	7. Length of	8. Length of
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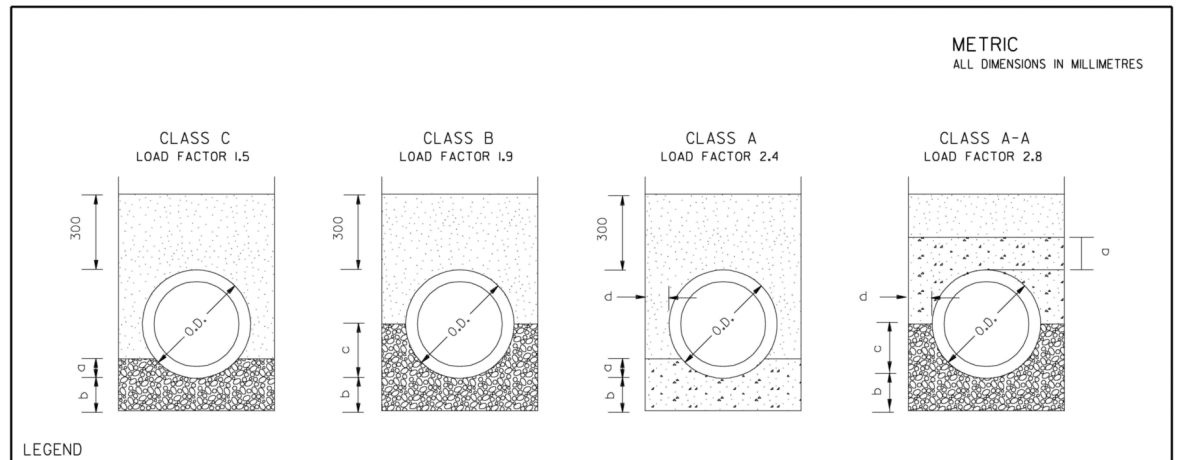
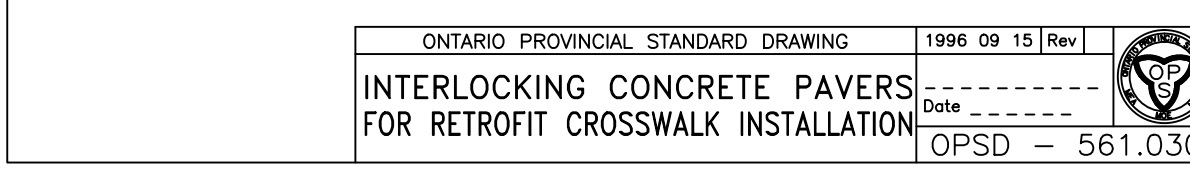
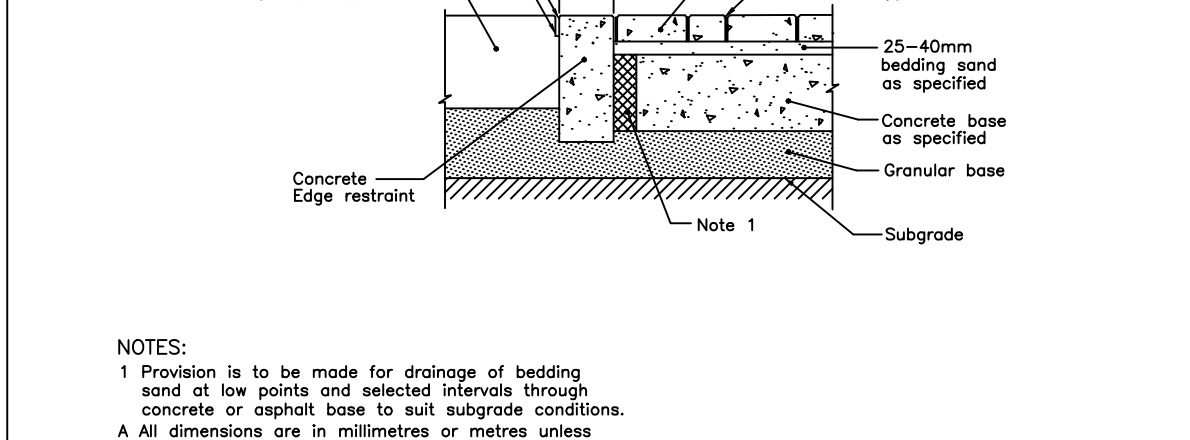
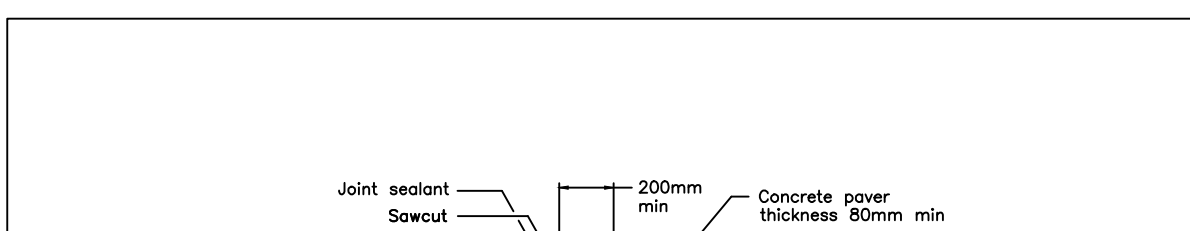
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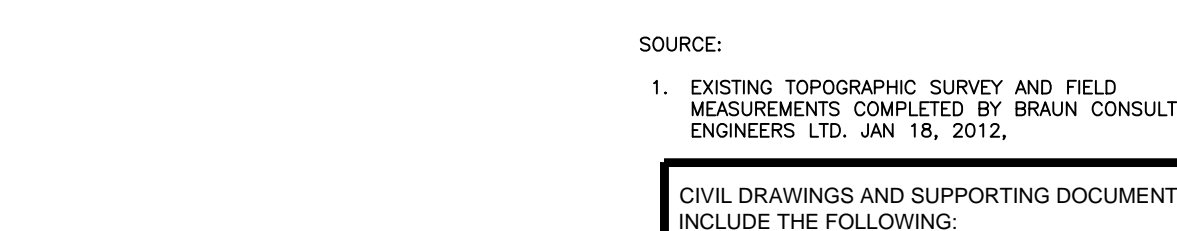
Outlet Type	a	b	Gutter width
OPSD-605.010 and 605.030	200	450	
OPSD-605.020 and 601.010	300	450	
Type B	400	450	



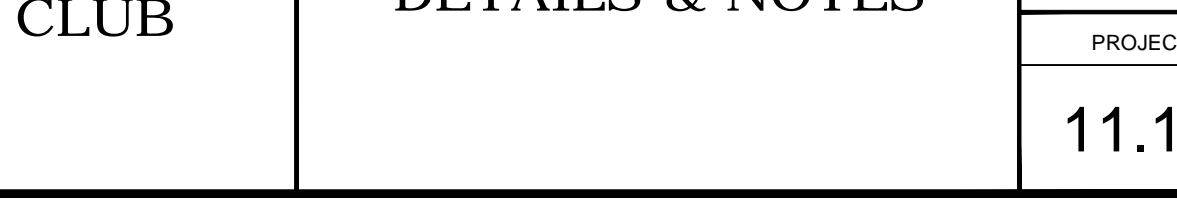
Outlet Type	a	b	Gutter width
OPSD-605.010 and 605.030	200	450	
OPSD-605.020 and 601.010	300	450	
Type B	400	450	



Class	Load Factor	Concrete	Steel
Class C	1.0	1000	1000
Class B	1.5	1500	1500
Class A	2.0	2000	2000
Class A-A	2.5	2500	2500



Bedding Type	Concrete	Steel
Bedding Type 1	1000	1000
Bedding Type 2	1500	1500
Bedding Type 3	2000	2000
Bedding Type 4	2500	2500

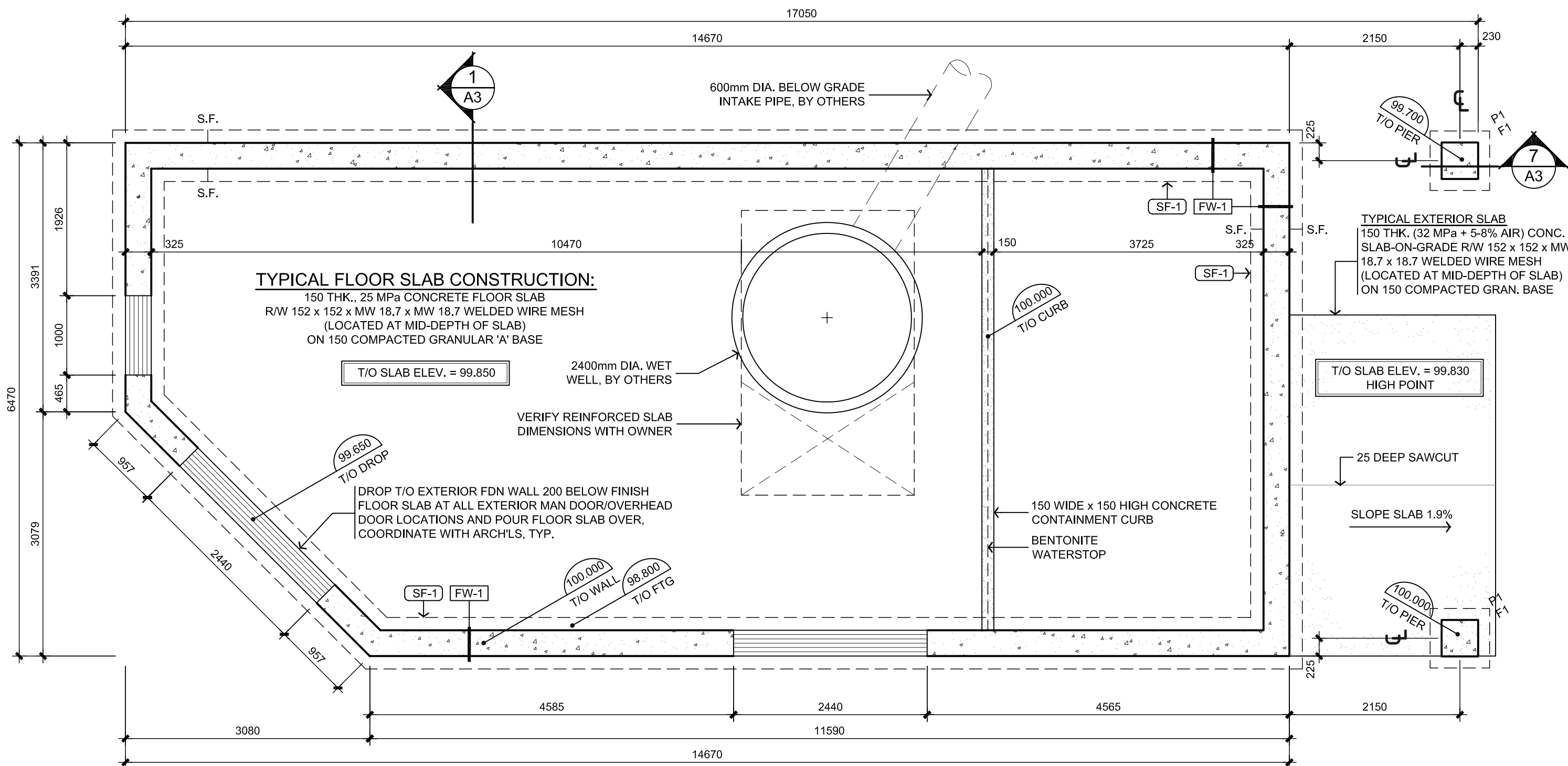


DWG/REPORT	REV	DATE	TITLE
01	E	OCT 1/2012	EXISTING CONDITIONS AND REMOVALS
02	E	OCT 1/2012	OVERALL SITE AND SERVICING PLAN
03	E	OCT 1/2012	600mm DIA INTAKE PLAN & PROFILE/ SECTION A - A AND CHANNEL GRADING
04	E	OCT 1/2012	PUMPHOUSE AREA/ CART PATH AND UPPER LEVEL GRADING
05	E	OCT 1/2012	BRIDGE CROSSING CENTRELINE ALIGNMENT/ GRADING AND SERVICING STA. 0+000 - 0+040
06	E	OCT 1/2012	STORM SEWER REPLACEMENT AND OUTLET
07	E	OCT 1/2012	CREDIT RIVER INTAKE
08	E	OCT 1/2012	DETAILS & NOTES

SCALE	AS SHOWN	DATE
DESIGNED	DHB	APR 23/12
DRAWN	AJM	FEB 10/12
PROJECT	DRAWING	REV.
11.10	08	E

NOTES
1. THE POSITION OF POLES, LINES, CONDUITS, WATERMANS, SEWERS AND OTHER UNDERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, THE CONTRACTOR SHALL INFORM HIMSELF OF THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES, AND WILL ASSUME ALL LIABILITY FOR ANY DAMAGE DONE TO THEM.
2. ALL DIMENSIONS AND LOCATION OF ALL AND ANY EXISTING UTILITIES WILL BE CHECKED AND VERIFIED BY THE CONTRACTOR PRIOR TO COMMENCING CONSTRUCTION OF THE WORKS SHOWN HEREON. ANY DISCREPANCY WILL BE REPORTED IMMEDIATELY TO THE ENGINEER.





**FOUNDATION PLAN**  
SCALE 1:50

**LEGEND**  
S.F. STEPPED FOOTING - REFER TO DETAIL 'A/3'. LOCATIONS INDICATED ON FOUNDATION PLAN ARE FOR REFERENCE ONLY. CONTRACTOR IS TO ENSURE MINIMUM 1200 FROST COVER TO U/S OF ALL FOOTINGS. LOCATE STEPPED FOOTINGS AS NECESSARY TO ACHIEVE SUFFICIENT COVER

**PAD FOOTING SCHEDULE**

F1: 750 x 750 x 250 THK. CONCRETE PAD FOOTING

**PIER SCHEDULE**

TYPICAL FOR ALL CONCRETE PIERS:  
REFER TO FOUNDATION PLAN FOR T/O PIER ELEV.  
P1: 460 x 460 CONCRETE PIER  
R/W 4 - 15 VERTICAL BARS  
C/W 10M TIES AT 250 OC.  
DOUBLE TOP TIE  
4 - 15M x 200H x 750V BENT DOWELS

**FOUNDATION WALL SCHEDULE**

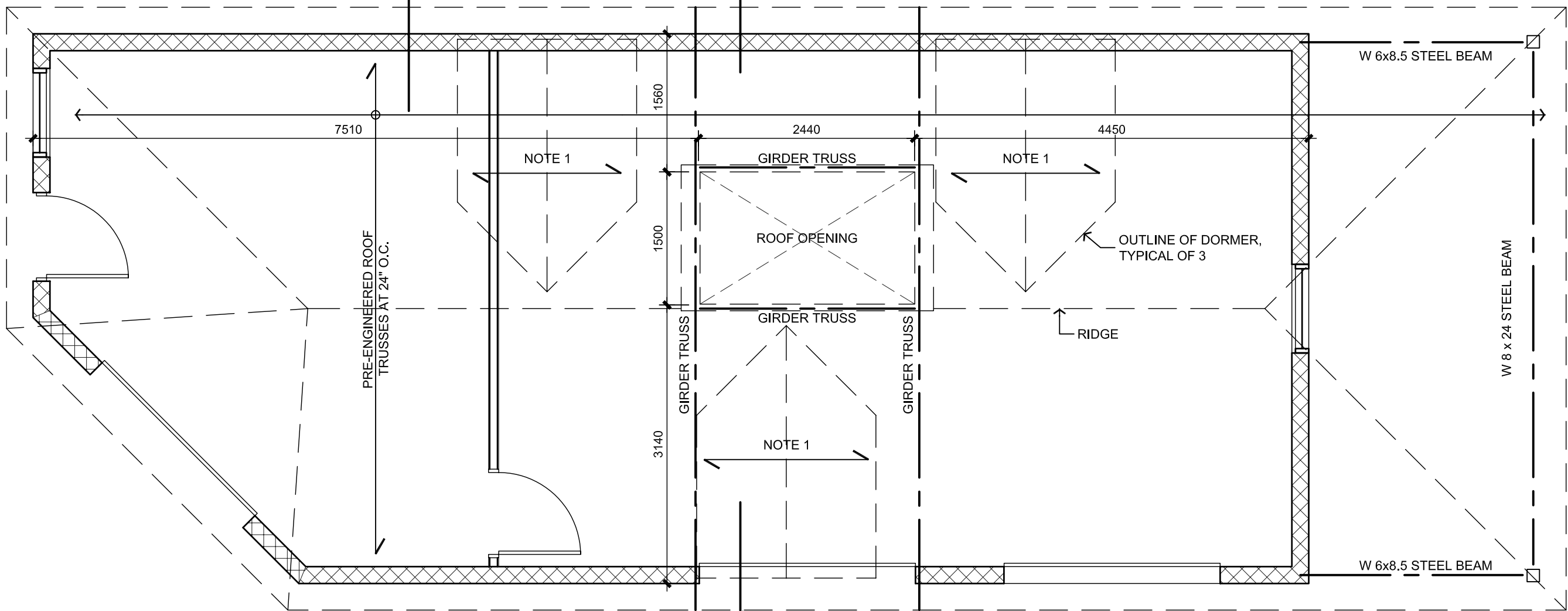
FW-1 325 THK. CONCRETE R/W 2 - 15M CONT. AT T/O WALL

**NOTES:**  
1. TIE ALL STRIP FOOTINGS TO WALL W/ 15M x 400 LONG DOWELS AT 1200 OC., U.N.O.

**STRIP FOOTING SCHEDULE**

SF-1 650 WIDE x 200 THK. R/W 2 - 15M CONTINUOUS

**NOTES:**  
1. PROVIDE 75 CONCRETE COVER TO U/S OF REINFORCING STEEL PLACED AGAINST SOIL, U.N.O.  
2. REFER TO WALL SCHEDULE FOR DOWELS REQUIREMENTS FROM PIER ABOVE.  
3. FOOTINGS TO BE FOUNDED ON SOILS WITH A MIN. 144 kPa (3000 psf) BEARING CAPACITY. TO BE VERIFIED BY A GEOTECHNICAL ENGINEER PRIOR TO CONSTRUCTION.



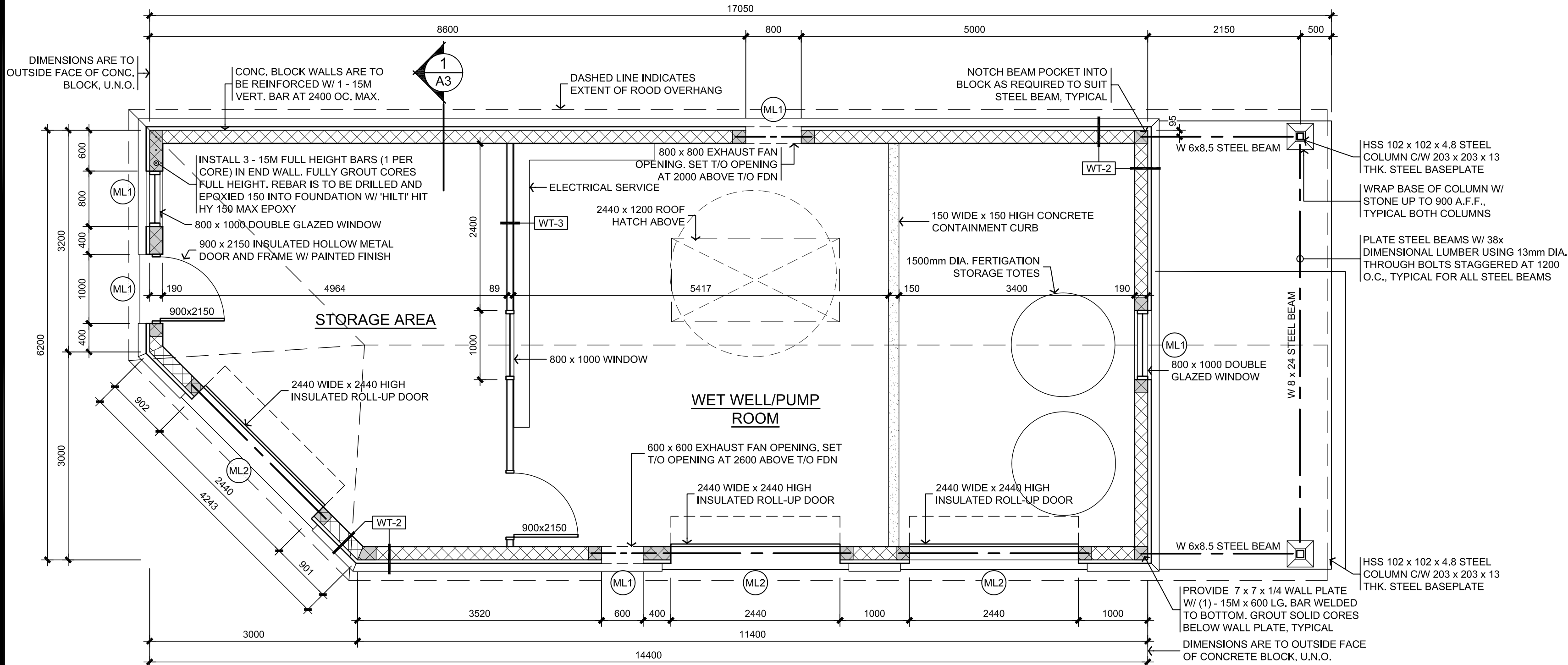
**ROOF FRAMING PLAN**  
SCALE 1:50

**NOTES**

REFER TO FLOOR PLAN FOR DIMENSIONS

**NOTES -AS REFERENCED ON ROOF FRAMING PLAN**

1. 38 x 89 AT 400 O.C. + 38 x 140 RIDGE BOARD DORMER FRAMING C/W 13 PLYWOOD. FRAME OVER TOP OF PRE-ENGINEERED ROOF TRUSSES. PROVIDE 38 x 89 AT 400 O.C. DORMER WALLS. PROVIDE BLOCKING B/W TRUSSES BELOW DORMERS



**FLOOR PLAN**  
SCALE 1:50

**ARCHITECTURAL WALL SCHEDULE**

**STONE VENEER**  
WT-1 (EXTENDING FROM T/O FDN. TO 900 ABOVE T/O FDN.)  
90 STONE VENEER TO 1200 ABOVE T/O FOUNDATION (OWNER TO DETERMINE SIZE, STYLE, COLOUR AND ORIENTATION)  
25 AIR SPACE  
25 RIGID 'SM' INSULATION  
AIR/VAPOUR BARRIER  
190 CONCRETE MASONRY UNITS (PAINTED ONE SIDE)  
C/W 9 ga. LADDER TYPE JOIST REINFORCING AT 600mm O.C. VERT. (3 BLOCK COURSES)

**WT-2**  
EIFS (EXTERIOR INSULATION FINISHING SYSTEM) EXTENDING FROM 900 ABOVE T/O FDN. TO U/S OF TRUSSES  
GALVANIZED METAL LATH C/W STUCCO FINISH  
WATERWAY DRAINAGE MATT OR APPROVED EQUIV.  
TYVEK AIR BARRIER  
13 PLYWOOD SHEATHING  
38 RIGID INSULATION W/ 38 x 89 STRAPPING AT 600 O.C.  
190 CONCRETE MASONRY UNITS (PAINTED ONE SIDE) C/W 9 ga. LADDER TYPE JOIST REINFORCING AT 600mm O.C. VERT. (3 BLOCK COURSES)  
**INTERIOR PARTITION WALL**  
13 PLYWOOD SHEATHING  
WT-3 38x89 SPF WOOD STUDS AT 400 O.C.  
13 PLYWOOD SHEATHING

**BLOCK LINTEL SCHED.**

ML1 2 - L 64 x 64 x 6.4  
ML2 2 - L 89 x 89 x 6.4

**NOTES:**  
1. MIN. BEARING FOR STEEL  
2. LINTELS TO BE 150, U.N.O.

**MASONRY REINFORCING SCHEDULE**

ALL CONCRETE BLOCK WALLS ARE TO BE REINFORCED W/ 15M VERTICAL FULL HEIGHT BARS AT 2400 OC. MAXIMUM

INSTALL 1 - 15M VERTICAL BAR IN ONE (1) CORE BESIDE OPENING. FULL HEIGHT AND GROUT SOLID. ENSURE A MINIMUM BAR LAP LENGTH OF 600mm. DRILL AND EPOXY REBAR 150 INTO FOUNDATION AND EPOXY W/ 'HILT' HIT HY 150 MAX. REINFORCED CORES ARE TO BE GROUTED SOLID DOWN TO FOUNDATION.

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Date	Issue
SEPT 18 2012	ISSUED FOR OWNER REVIEW
SEPT 26 2012	ISSUED FOR OWNER REVIEW # 2
OCT 3 2012	ISSUED FOR FINAL APPROVAL

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Client  
**BRAUN CONSULTING ENGINEERS**

530 WILLOW ROAD, GUELPH, ONTARIO

Project Title

**PUMP HOUSE**  
MISSISSAUGA, ONTARIO

Drawing  
**FOUNDATION, MAIN FLOOR AND ROOF FRAMING PLANS**

Scale	AS NOTED	Dwg. #
Date	SEPT, 2012	A1
Drawn By	S.KOLKMAN	
Project No.	TE-21472-12	



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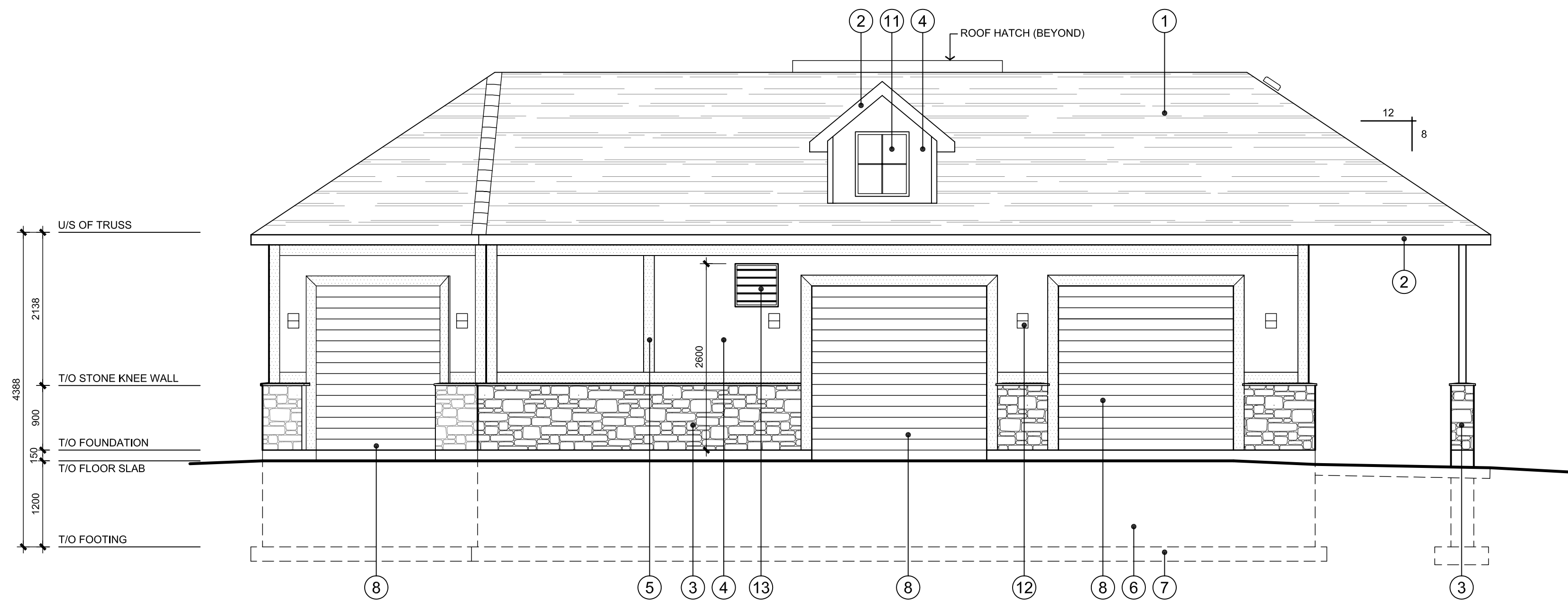
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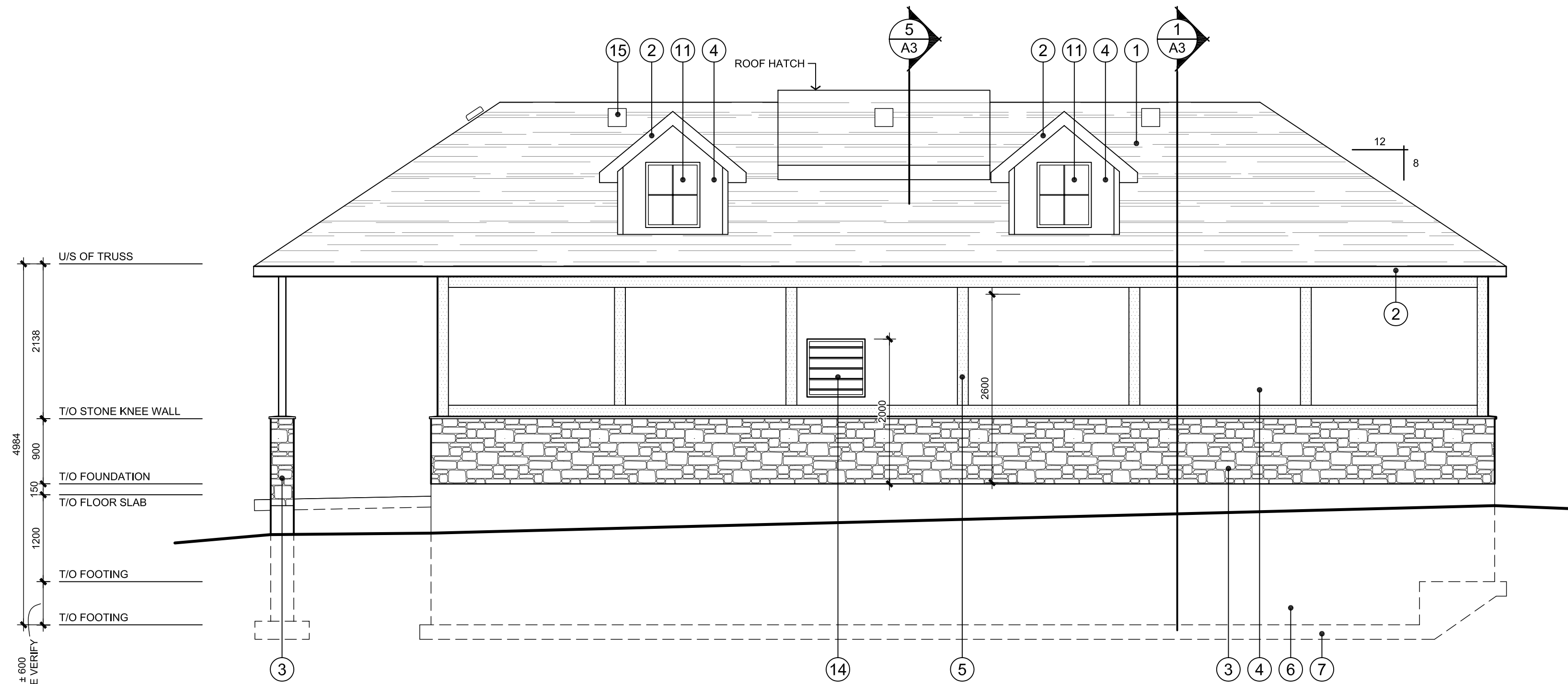
Project Title  
**PUMP HOUSE**  
MISSISSAUGA, ONTARIO

Drawing  
**ELEVATIONS**

Scale AS NOTED	Dwg. # <b>A2</b>
Date SEPT, 2012	
Drawn By S.KOLKMAN	
Project No. TE-21472-12	



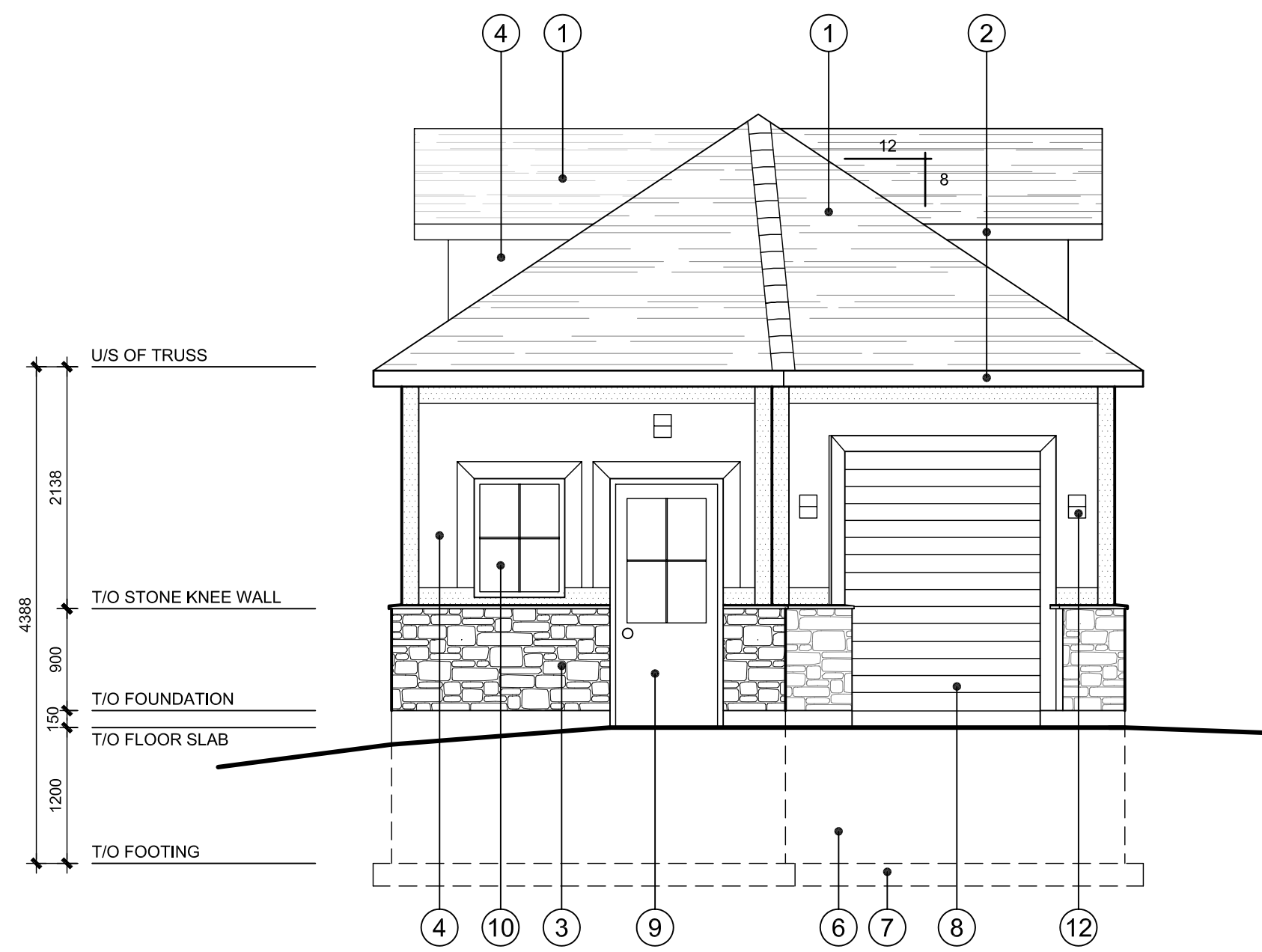
**SOUTH ELEVATION**  
SCALE 1:50



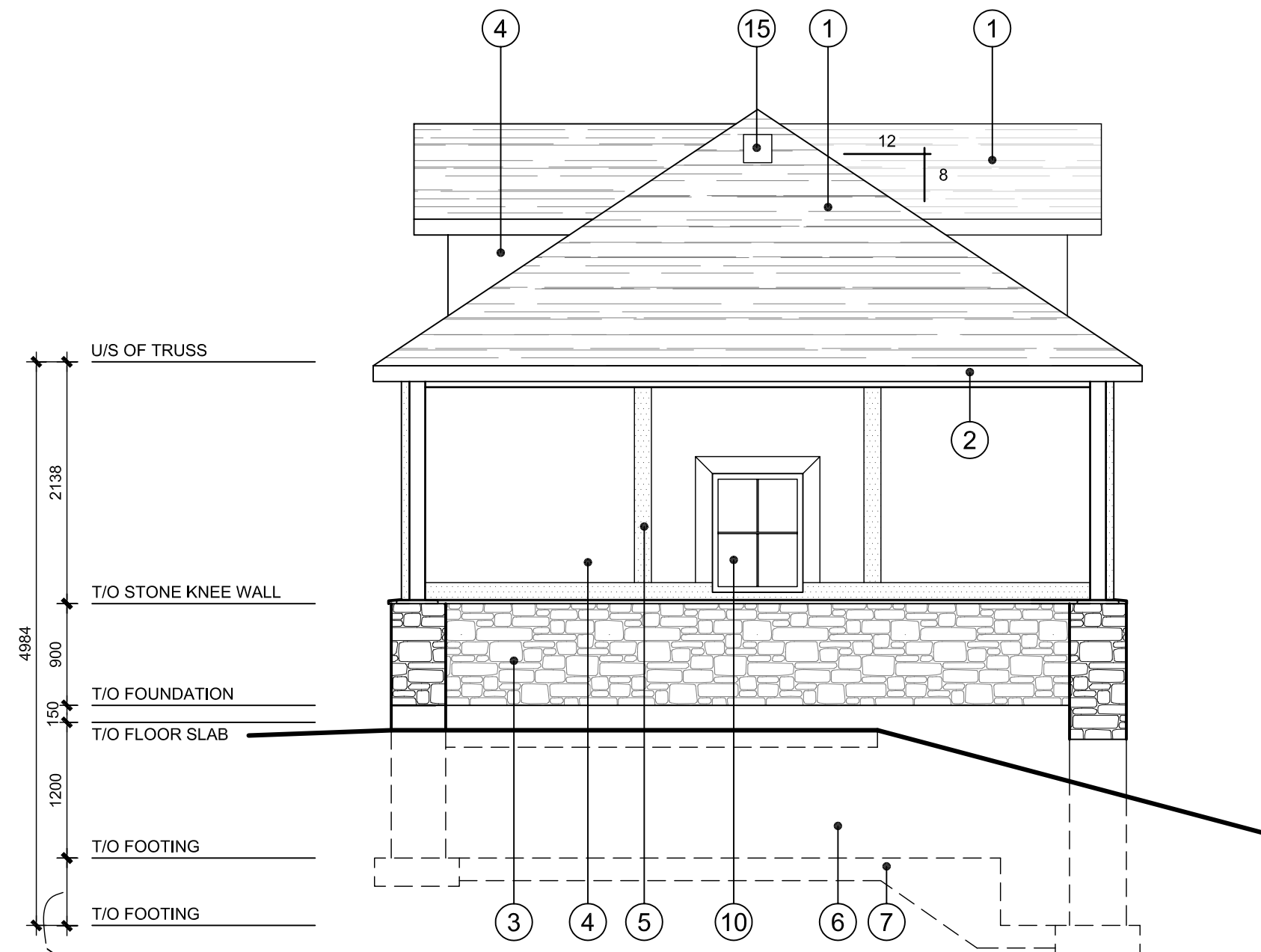
**NORTH ELEVATION**  
SCALE 1:50

**MATERIALS LEGEND**

- 1 ASPHALT SHINGLES (OWNER TO DETERMINE STYLE, COLOUR)
- 2 PREFIN. METAL FASCIA (OWNER TO DETERMINE COLOUR) C/W CONT. VENTED SOFFIT
- 3 BUILDING STONE (OWNER TO DETERMINE COLOUR, PROFILE, ORIENTATION)
- 4 STUCCO FINISH (OWNER TO DETERMINE COLOUR)
- 5 25x140 PAINTED WOOD TRIM
- 6 CONCRETE FOUNDATION WALL (REFER TO FDN PLAN FOR SIZES)
- 7 CONCRETE STRIP FOOTINGS (REFER TO FDN PLAN FOR SIZE & REINFORCING REQ'TS)
- 8 2440 x 2440 PREFIN. METAL INSULATED ROLL-UP DOOR
- 9 915 x 2150 INSULATED HOLLOW METAL DOOR C/W HOLLOW METAL FRAME
- 10 800 WIDE x 1000 HIGH DOUBLE GLAZED WINDOW
- 11 750 WIDE x 900 HIGH, FAUX (FAKE) DORMER WINDOW
- 12 EXTERIOR LIGHTING, BY OTHERS. CO-ORDINATE LOCATIONS WITH OWNER
- 13 600 x 600 EXHAUST FAN
- 14 800 x 800 INTAKE FAN
- 15 ROOF VENT, TYPICAL OF 4



**WEST ELEVATION**  
SCALE 1:50



**EAST ELEVATION**  
SCALE 1:50

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No.	Date	Revision

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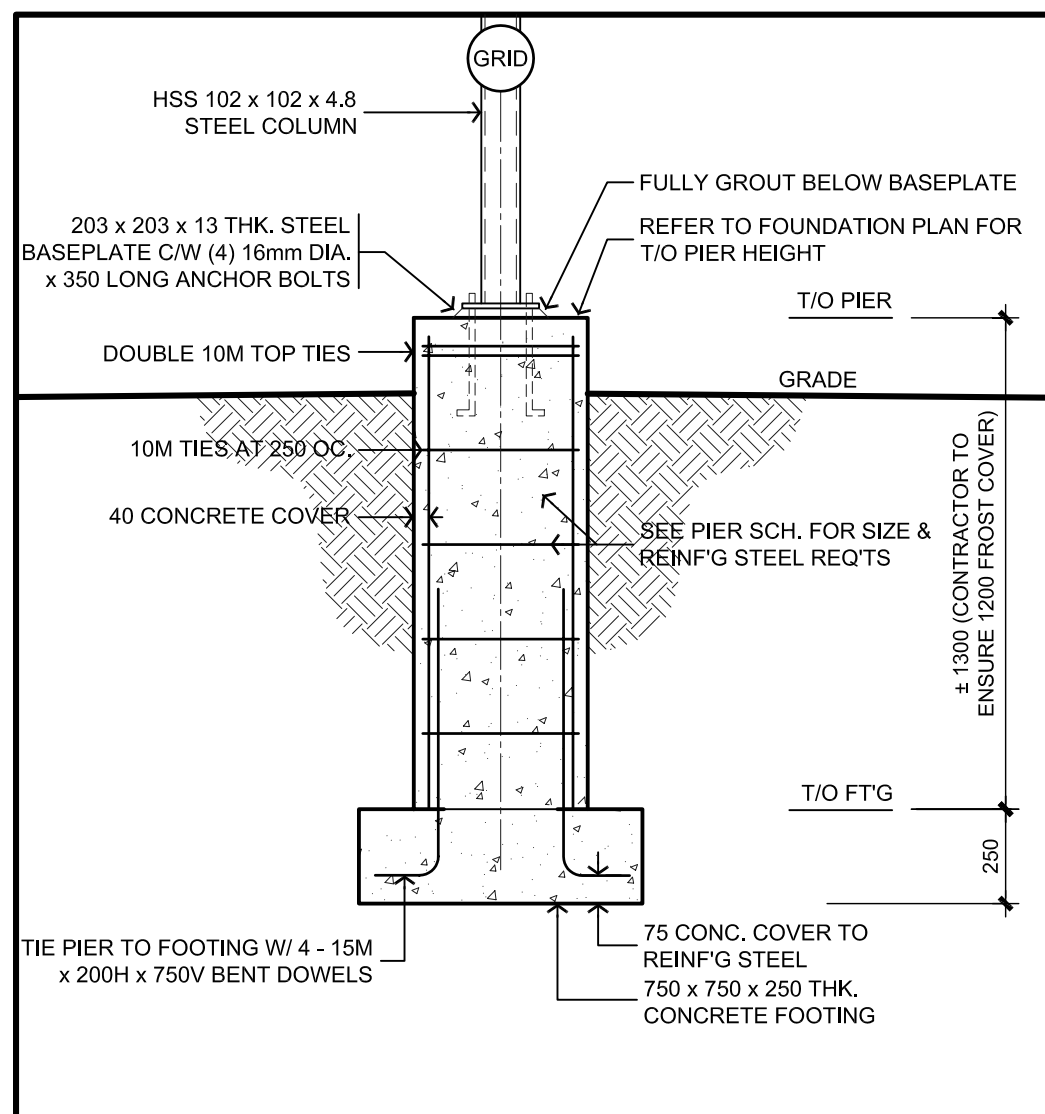
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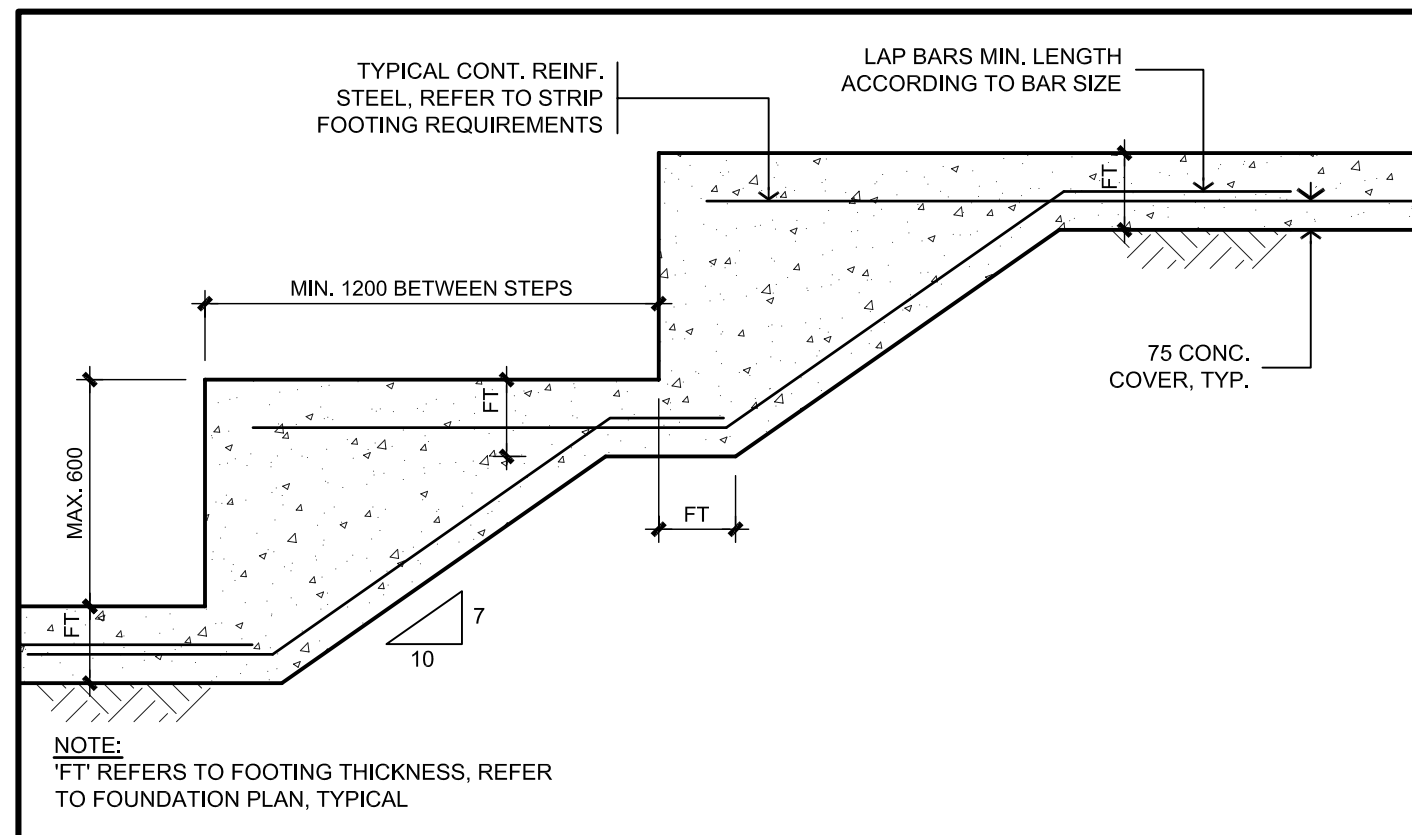
Project Title  
**PUMP HOUSE**  
MISSISSAUGA, ONTARIO

Drawing  
**SECTIONS AND FRAMING DETAILS**

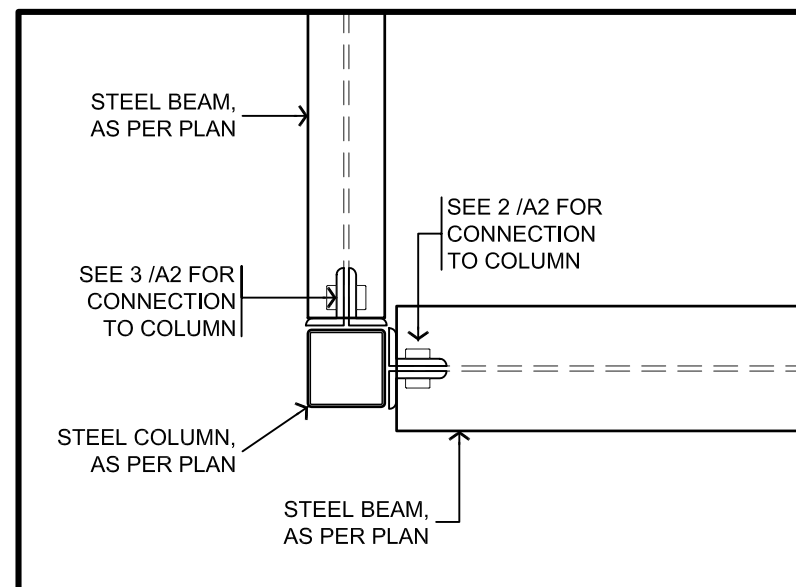
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Date SEPT, 2012	
Drawn By S.KOLKMAN	
Project No. TE-21472-12	



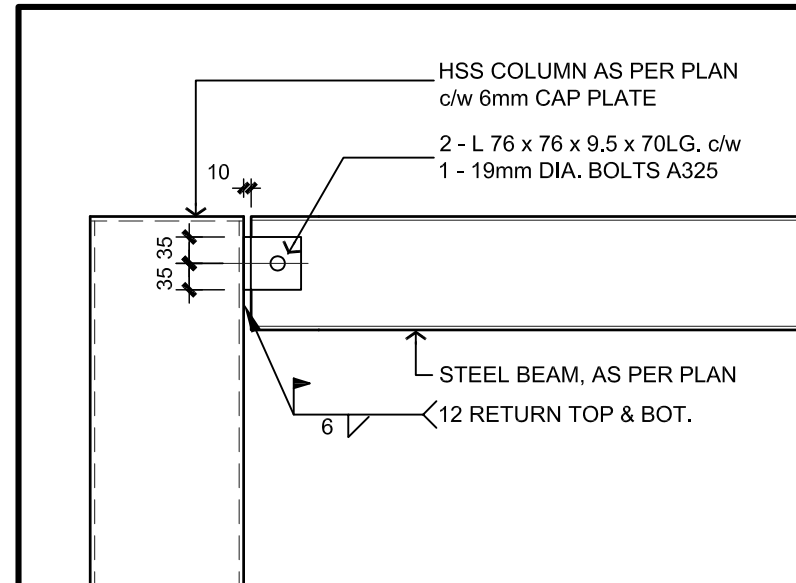
**7 EXTERIOR PIER DETAIL**  
SCALE: 1:20



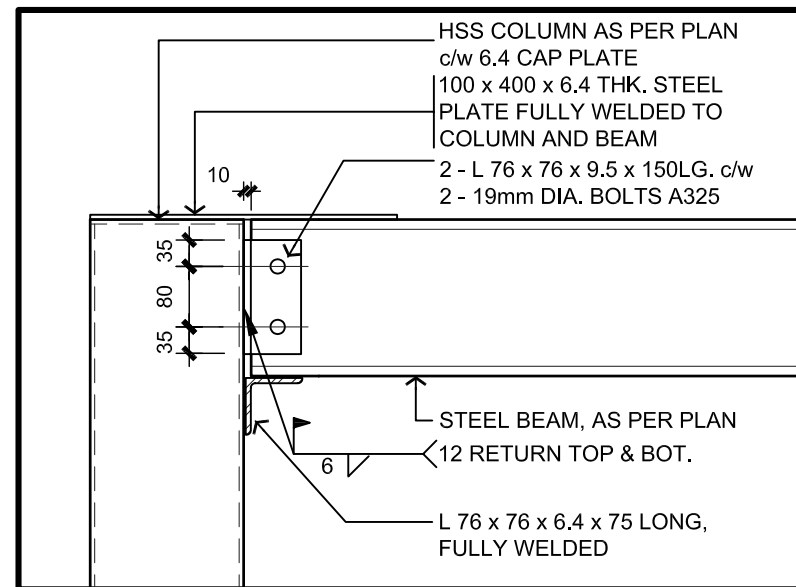
**6 DETAIL - TYPICAL STEPPED FOOTING**  
SCALE: 1:20



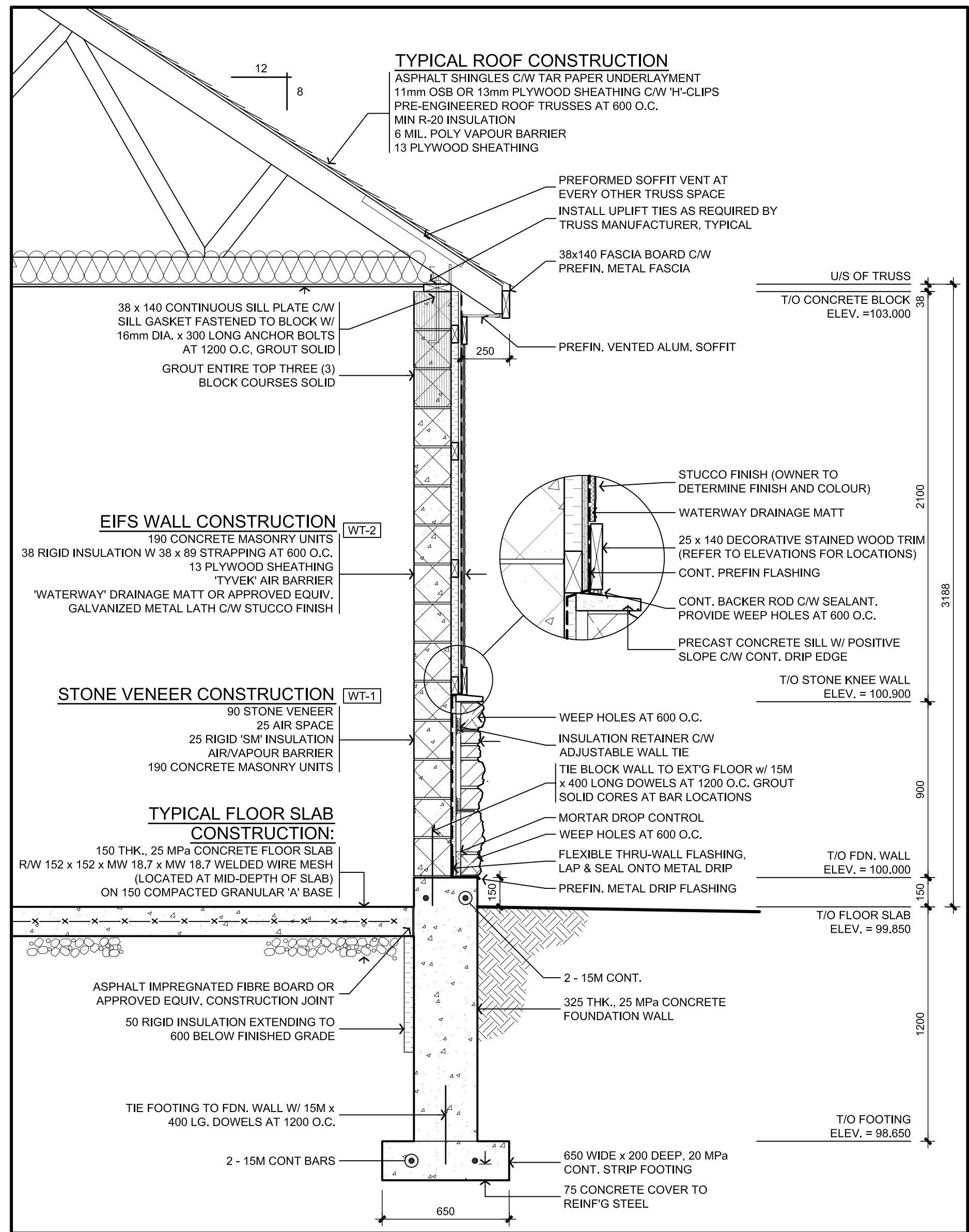
**4 DETAIL - FLUSH BEAM CONNECTION**  
SCALE: 1:10



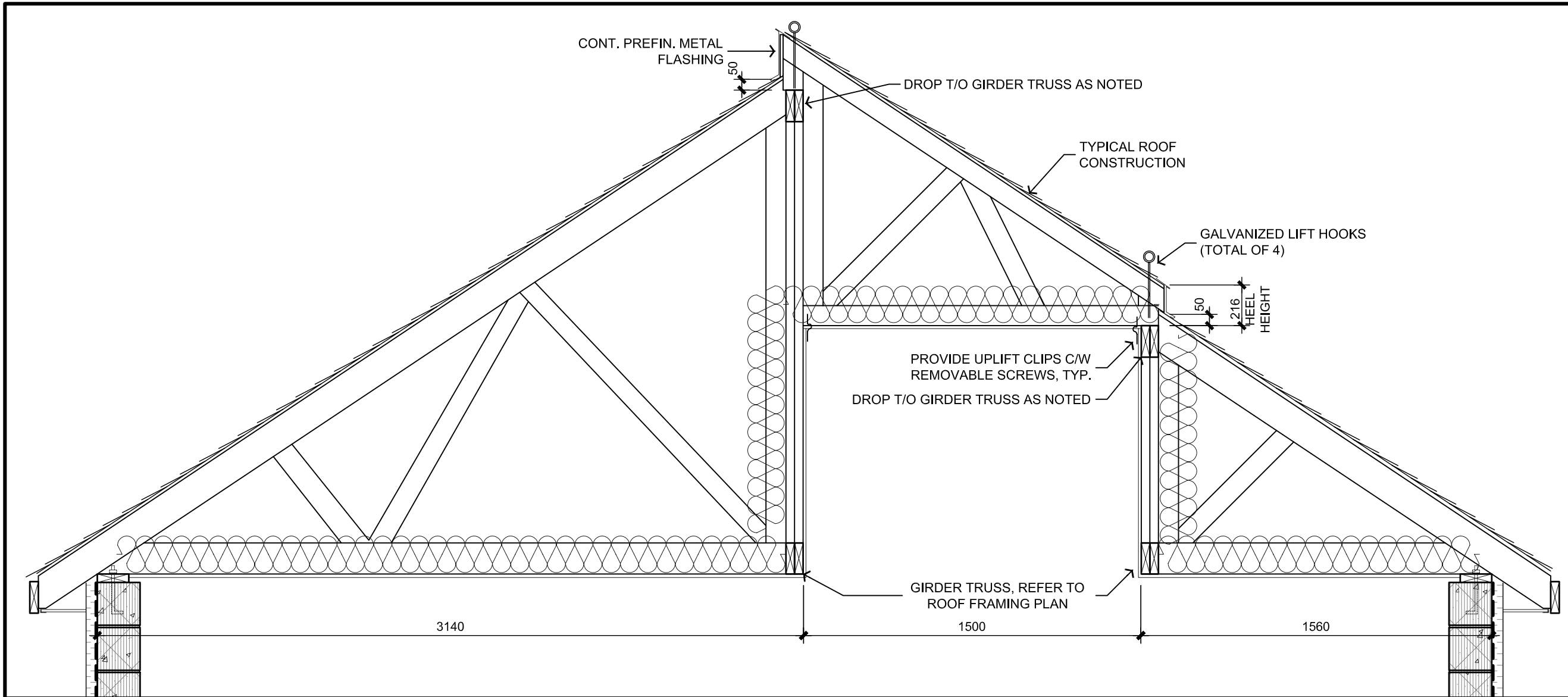
**3 DETAIL - HSS CONNECTION (W 6x8.5)**  
SCALE: 1:10



**2 DETAIL - HSS CONNECTION (W 8x24)**  
SCALE: 1:10



**1 WALL SECTION - THROUGH TYPICAL EXTERIOR WALL**  
SCALE: 1:20



**5 SECTION - THRU ROOF HATCH**  
SCALE: 1:20



GENERAL NOTES:

- UNLESS NOTED OTHERWISE ON THE DRAWINGS, THE FOLLOWING NOTES SHALL GOVERN.
- ALL WORK ON THIS PROJECT SHALL CONFORM TO THE 2006 ONTARIO BUILDING CODE (OBC 2006), ANY LOCAL REGULATIONS AND BYLAWS, AND THE CURRENT OCCUPATIONAL HEALTH AND SAFETY ACT (OHS) AND CURRENT REGULATIONS FOR CONSTRUCTION PROJECTS. ALL CODES AND STANDARDS SHALL BE THOSE REFERENCED IN OBC 2006.
- ALL STANDARDS ARE TO BE THE YEAR, EDITIONS, DOCUMENT NUMBERS, ETC AS PER OBC 2006 DIVISION 8, 1.1.3.1.2. WHERE DISCREPANCIES EXIST BETWEEN OUR DRAWINGS AND 1.1.3.1.2, THE TABLE SHALL GOVERN UNLESS NOTED OTHERWISE.
- THIS SET OF DRAWINGS SUPERCEDES AND REPLACES ALL PREVIOUS DRAWINGS.
- READ THESE DRAWINGS IN CONJUNCTION WITH ALL RELATED CONTRACT DOCUMENTS AND ARCHITECTURAL, MECHANICAL, AND ELECTRICAL DRAWINGS.
- THE CONTRACTOR SHALL VERIFY ALL CONDITIONS AND MEASUREMENTS AT THE SITE AND VERIFY ALL DIMENSIONS GIVEN ON THE STRUCTURAL DRAWINGS WITH THE ARCHITECTURAL DRAWINGS. REPORT TO THE ENGINEER ANY DISCREPANCIES OR UNSATISFACTORY CONDITIONS WHICH MAY ADVERSELY AFFECT THE PROPER COMPLETION OF THE PROJECT BEFORE PROCEEDING WITH THE WORK.
- IF ANY STRUCTURAL DISCREPANCIES ON THE DRAWINGS EXIST, THE MOST STRINGENT SHALL APPLY.
- DRAWINGS ARE NOT TO BE SCALED.
- CONSTRUCTION AND SHOP DRAWING REVIEW MUST BE PER CODE.
- SUBMIT SHOP DRAWINGS AS PER TABLE 1. SHOP DRAWINGS SHALL BE CERTIFIED BY A PROFESSIONAL ENGINEER WHERE REQUIRED AND REVIEWED BY THE CONTRACTOR FOR DIMENSIONAL CORRELATION WITH THE DRAWINGS AND FIELD CONDITIONS PRIOR TO SUBMITTING TO TACOMA ENGINEERS. FABRICATION OF ELEMENTS ON SHOP DRAWINGS MAY NOT PROCEED UNTIL SHOP DRAWINGS HAVE BEEN REVIEWED AND APPROVED BY TACOMA ENGINEERS.
- CONSTRUCTION LOADINGS SHALL NOT EXCEED THE SPECIFIED DESIGN LOADS INDICATED ON THE DRAWINGS. THE CONTRACTOR SHALL MAKE ADEQUATE PROVISION FOR CONSTRUCTION LOADS AND TEMPORARY BRACING TO KEEP STRUCTURE PLUMB AND IN TRUE ALIGNMENT AT ALL PHASES OF CONSTRUCTION. ANY BRACING MEMBERS SHOWN ON THE DRAWINGS ARE REQUIRED FOR THE FINISHED STRUCTURE AND MAY NOT BE SUPTICENT FOR ERECTION PURPOSES.
- OBC 2006 DIVISION C SECTION 1.2.2 REQUIRES GENERAL REVIEW OF THE CONSTRUCTION BY THE DESIGN PROFESSIONAL. TACOMA ENGINEERS SHALL BE GIVEN A MINIMUM OF 48 HOURS NOTICE AT (519)763-2000 BY THE CONTRACTOR FOR THE FOLLOWING REQUIRED CONSTRUCTION REVIEWS:
  - DEMOLITION – PRIOR TO COMMENCING ANY WORK.
  - FOUNDATIONS – PRIOR TO POURING FOOTINGS AND FOUNDATION WALLS.
  - STRUCTURAL FRAMING (STRUCTURAL STEEL / WOOD FRAMING) PRIOR TO COVERING WITH INTERIOR FINISHES.
  - STEEL STUDS – PRIOR TO COVERING WITH INTERIOR FINISHES.
  - REINFORCED MASONRY – PRIOR TO GROUTING.
  - FINAL FRAMING OF ALL STRUCTURAL ELEMENTS.
- RETAIN A CERTIFIED INDEPENDENT TESTING OR INSPECTION COMPANY FOR TESTING & INSPECTION FOR THE ITEMS IN TABLE 2. THIS TESTING AND INSPECTION IS TO BE PAID FOR BY THE CONTRACTOR

TABLE 1: SHOP DRAWING SUBMITTALS

ITEM	REQUIRED SUBMITTAL?	ENGINEER'S STAMP REQ'D?	NOTES
WOOD ROOF TRUSSES	YES	YES	

TABLE 2: REQUIRED TESTING & INSPECTION

RESULTS SHALL BE SUBMITTED DIRECTLY TO TACOMA ENGINEERS FROM THE TESTING COMPANY, FOR REVIEW

ITEM	REQ'D	NOTES
SOIL BEARING CAPACITY	YES	BY SOILS ENGINEER
SOIL COMPACTION	YES	BY SOILS ENGINEER
CONCRETE COMPRESSIVE TESTS	YES	MIN. 2 SETS PER POUR OR 100 CUBIC METERS
CONCRETE AIR ENTRAINMENT	YES	
CONCRETE SLUMP	NO	
MORTAR CUBES	YES	3 SETS PER FLOOR
GROUT CUBES	YES	3 SETS PER FLOOR
STRUCTURAL STEEL INSPECTION	YES	

DESIGN PARAMETERS:

- DESIGN LOADS ARE UNFACTORED UNLESS NOTED OTHERWISE.
  - CLIMATIC DESIGN DATA (MISSISSAUGA):

Snow Load	$S_g$	= 1.1 kPa
Wind Pressure	$q(g)$	= 0.49 kPa
  - BUILDING IMPORTANCE CATEGORY = Normal
  - WIND
    - Importance Factor
    - $I_w$  ULS = 1.0
    - $I_w$  SLS = 0.75
    - INTERNAL PRESSURE CATEGORY = 2
    - UNFACTORED WIND UPLIFT = 0.44 kPa
    - UNFACTORED WIND LOAD = 0.86 kPa
  - ROOF
    - Importance Factor
    - $I_s$  ULS = 1.0
    - $I_s$  SLS = 0.8
    - $S$  =  $[S_{sx}(.55)+S_r]$
    - $S$  =  $[1.1x(0.55)+0.4]$
    - $S$  = 1.0 kPa (21 psf)
    - ROOF DEAD LOAD = 0.4 kPa (10.5 psf)

FOUNDATIONS:

- ALL FOOTINGS SHALL BE FOUND IN ACCORDANCE WITH RECOMMENDATIONS OF THE GEOTECHNICAL REPORT: NAME OF REPORT, LOCATION OF REPORT OR SITE, BY xxxx ENGINEERING INC, DATED xxxxx, xxxxx, xxxxx ALTERNATE: NO GEOTECHNICAL REPORT HAS YET BEEN SUPPLIED FOR THIS PROJECT. ALL BEARING PRESSURES HAVE BEEN ASSUMED AND MUST BE VERIFIED ON SITE, PRIOR TO PLACING FOOTINGS [PREFERABLY PRIOR TO COMMENCING CONSTRUCTION]
- DESIGN BEARING PRESSURES ON UNDISTURBED NATIVE SOIL, OR APPROVED ENGINEERED FILL ARE AS FOLLOWS:

SLS, kPa (psf)	ULS, kPa (psf)	LOCATIONS
150 (3300)	225 (4500)	ALL FOOTINGS
- SOFT AREAS UNCOVERED DURING EXCAVATION SHALL BE SUB-EXCAVATED TO SOUND MATERIAL AND FILLED WITH CLEAN, FREE DRAINED GRANULAR SOIL COMPACTED TO 100% STANDARD PROCTOR DRY DENSITY (SPDD), PLACED UNDER THE DIRECTION AND SUPERVISION OF A GEOTECHNICAL ENGINEER
- SOIL BEARING CAPACITY, SITE CLASS, AND SOIL COEFFICIENTS SHOWN ON THE DRAWINGS ( $K_a$ ,  $K_p$ , DENSITY, ETC.) SPECIFIED MUST BE VERIFIED BY A GEOTECHNICAL ENGINEER PRIOR TO THE PLACING OF FOUNDATIONS. ANY NON-COMFORMANCE WITH THE SPECIFIED MINIMUM CAPACITIES MUST BE IMMEDIATELY REPORTED TO THE STRUCTURAL ENGINEER
- LOCATE ALL FOOTINGS AND PIERS CENTRALLY UNDER COLUMNS AND WALLS UNLESS NOTED OTHERWISE.
- PLACE FOOTINGS WHICH ARE EXPOSED TO FREEZING WEATHER A MINIMUM OF 1200mm (48") BELOW FINISHED GRADE UNLESS SPECIFIED OTHERWISE.
- DO NOT EXCEED A RISE OF 7 AND A RUN OF 10 IN THE LINE OF SLOPE BETWEEN ADJACENT FOOTING EXCAVATIONS OR ALONG STEPPED FOOTINGS. USE STEPS NOT EXCEEDING 600mm (24") IN HEIGHT AND NOT LESS THAN 1200mm (48") IN LENGTH.
- MAINTAIN UNSUPPORTED SIDES OF EXCAVATION ONLY IF SAFE INCLINATION OF THE SIDES OF THE EXCAVATION IS PROVIDED IN ACCORDANCE WITH THE SOIL ENGINEERS RECOMMENDATIONS. IF REQUIRED, ERECT, MAINTAIN, AND REMOVE A SUPPORTING SHORING SYSTEM ALONG THE SIDES OF THE EXCAVATION, DESIGNED BY A PROFESSIONAL ENGINEER, IN ACCORDANCE WITH THE SOILS REPORT AND OHSA.
- PROTECT SOIL FROM FREEZING ADJACENT TO AND BELOW ALL FOOTINGS.
- BACK FILL AGAINST FOUNDATION WALL IN SUCH A MANNER THAT THE LEVEL OF BACKFILLING ON ONE SIDE OF THE WALL IS NEVER MORE THAN 450mm (18") HIGHER THAN THE LEVEL ON THE LOWER SIDE OF THE WALL. EXCEPT WHERE TEMPORARY SUPPORT FOR THE WALL IS PROVIDED OR WALLS ARE DESIGNED FOR SUCH UNEVEN PRESSURES.
- SHOULD UNDERGROUND WATER BE ENCOUNTERED, PROVIDE DOWELING FACILITIES TO KEEP WATER LEVEL BELOW FOOTINGS. REFER TO SOIL ENGINEERS RECOMMENDATIONS FOR REMEDIAL MEASURES.

CONCRETE

- ALL REINFORCED CONCRETE ELEMENTS ARE DESIGNED USING THE LIMIT STATES DESIGN METHOD IN ACCORDANCE WITH CAN/CSA-A23.3.
- CONCRETE WORK SHALL CONFORM TO CAN/CSA-A23.1, 2.3 FOR MATERIALS AND WORKMANSHIP.
- CLASSES OF CONCRETE SHALL BE PLACED IN THE LOCATIONS NOTED:

CLASS OF CONCRETE	LOCATION
F-2	EXTERIOR UNREINFORCED SLABS ON GRADE, CURBS
N-1	EXTERIOR WALLS, COLUMNS AND PIERS
N-2	INTERIOR FLOOR SLABS
- CLASSES OF CONCRETE SHALL HAVE THE FOLLOWING MIX REQUIREMENTS:

CLASS OF CONCRETE	STRENGTH	W/C RATIO	AIR ENTRAINMENT	CHLORIDE ION
F-2	32 MPa	0.45	5% TO 6%	
F-2	25 MPa	0.55	4% TO 7%	
N-1	25 MPa	0.55		
N-2	20 MPa			
- ADJUST AIR ENTRAINMENT PERCENTAGE FOR AGGREGATE SIZE BASED ON A23.1-04 TABLE 4.
- CONCRETE DESIGN IS BASED ON THE ABOVE MIX REQUIREMENTS. PHYSICAL PROPERTIES (SLUMP, AGGREGATE SIZE, ETC.) TO SUIT INSTALLATION (BY OTHERS) AND SHALL NOT AFFECT REQUIREMENTS SPECIFIED.
- ALL CONCRETE TO BE TESTED SHALL BE TESTED BY A C.S.A. CERTIFIED CONCRETE TESTING LABORATORY. CONTRACTOR TO PROVIDE COPIES OF TESTING REPORTS TO TACOMA ENGINEERS. NOT LESS THAN ONE STRENGTH TEST SHALL BE MADE FOR EACH 100 m<sup>3</sup> OF CONCRETE WITH AT LEAST ONE TEST FOR EACH CLASS OF CONCRETE USED. A MINIMUM OF THREE TESTS IS REQUIRED FOR EACH CLASS.
- ALL CONCRETE SHALL BE KEPT MOIST DURING THE FIRST THREE DAYS OF CURING.
- TAKE ADEQUATE MEASURES TO PROTECT THE CONCRETE FROM EXPOSURE TO FREEZING TEMPERATURES AT LEAST SEVEN DAYS AFTER CONCRETE PLACEMENT. COLD WEATHER PROTECTION IS REQUIRED FOR ALL CONCRETE PLACED WHERE IT IS FORECASTED THAT THE TEMPERATURE WILL DROP BELOW 5°C WITHIN 24 HOURS OF PLACEMENT. PROTECTION PROVIDED, INCLUDING INSULATED TARPES, POLY COVERED STRAW, SUPPLEMENTAL HEAT AND/OR CHEMICAL ADMIXTURES, IS TO BE SUFFICIENT TO MAINTAIN A MINIMUM CURING TEMPERATURE OF 10°C FOR 3 DAYS.
- INSTALL V-NOTCH CONTROL JOINTS AT A MAXIMUM SPACING OF 24 TIMES THE WALL THICKNESS, IN BOTH SIDES OF ALL WALLS. CUT 50% OF THE HORIZONTAL REINFORCEMENT AT CONTROL JOINT LOCATIONS.
- DO NOT ADD WATER TO CONCRETE ON SITE.
- CALCIUM CHLORIDE OR ANY ADMIXTURE FORMULATION CONTAINING CHLORIDE SHALL NOT BE USED IN CONCRETE CONTAINING REINFORCEMENT, OR IN CONCRETE CLASSIFICATIONS S-1, S-2, OR C-1, C-2, OR FOR PARKING STRUCTURES, FLOORS RECEIVING DRY-SHAKO METALLIC HARDENERS, OR CONCRETE CONTAINING EMBEDDED ALUMINUM. USE ONLY IN DOSAGES LESS THAN 2% BY WEIGHT OF CEMENT.

REINFORCING STEEL:

- ALL REBAR SHALL BE DEFORMED BARS CONFORMING TO G30.18 WITH A MINIMUM YIELD STRENGTH OF 400 MPa.
- REINFORCING STEEL SHALL BE FABRICATED BY A SUPPLIER EXPERIENCED IN BAR BENDING. ALL BEND DIAMETERS SHALL CONFORM TO CAN/CSA-A23.1.
- ALL REBAR SHALL BE DETAILED, FABRICATED AND PLACED IN ACCORDANCE WITH REINFORCING STEEL MANUAL OF STANDARD PRACTICE, BY R.S.I.S., 4TH EDITION (2004).
- MAINTAIN THE FOLLOWING CLEAR CONCRETE COVER TO REINFORCEMENT (U.N.O.):
  - 40 mm (1.5") FOR CONCRETE PLACED IN FORMWORK FOR 15M OR SMALLER BARS.
  - 75 mm (3") FOR CONCRETE PLACED AGAINST THE EARTH (BOTTOM OF FOOTINGS).
- CHAIRS SHALL BE USED TO MAINTAIN THE SPECIFIED CONCRETE COVER.
  - MINIMUM BAR LAP LENGTH (25 MPa, NORMAL DENSITY, NON COATED BARS) SHALL BE:
    - 450 mm (18") FOR 10M BARS
    - 600 mm (24") FOR 15M BARS
  - LAP ALL HORIZONTAL BARS AT CORNERS WITH BENT DOWELS MEETING THE MINIMUM LAP REQUIREMENTS IN BOTH DIRECTIONS.

CONCRETE SLABS ON GRADE:

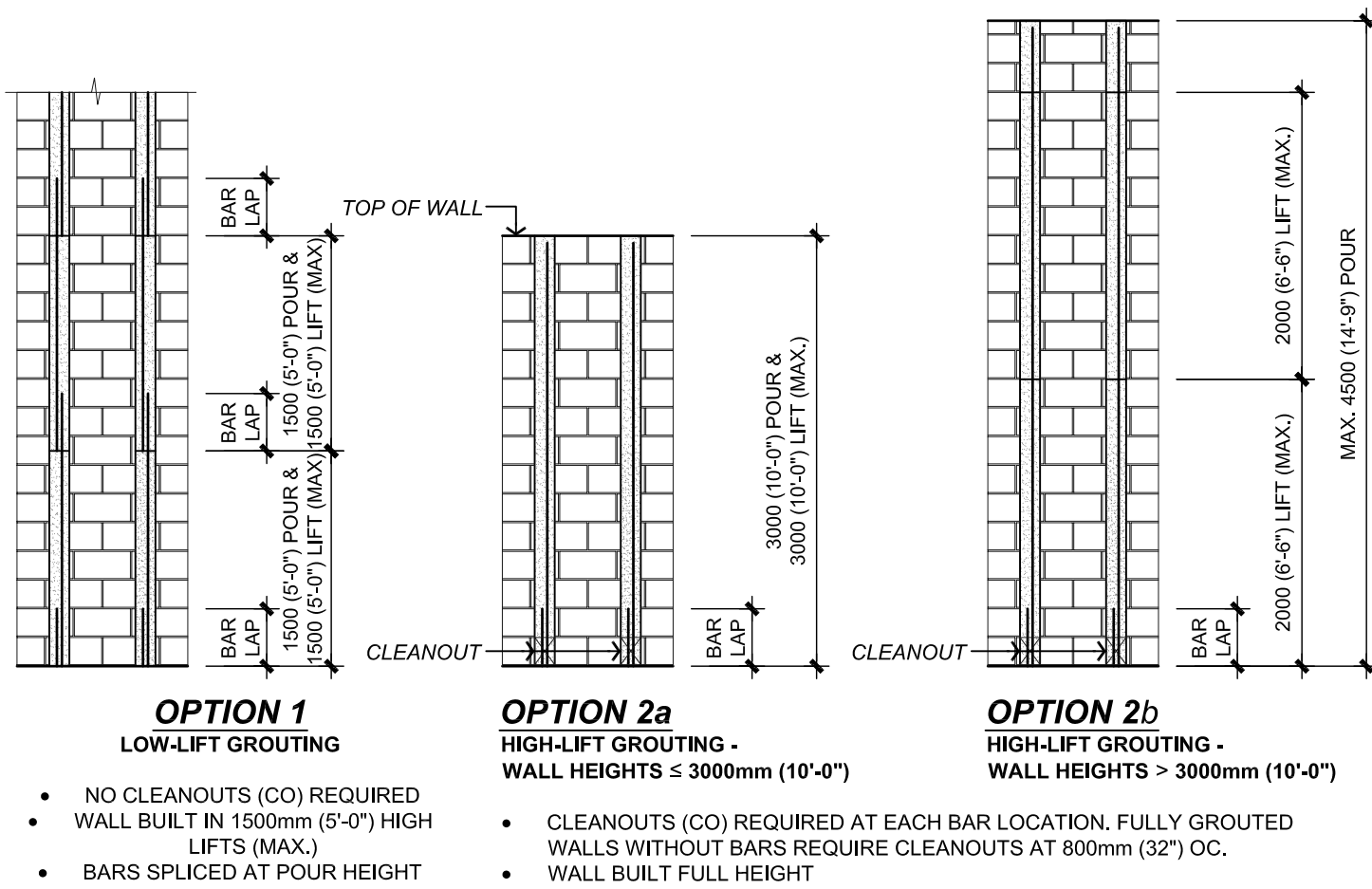
- PLACE SLAB ON 150mm (6") GRANULAR FILL COMPACTED TO 98% SPDD FOUNDON ON NATIVE SOILS OR APPROVED ENGINEERED FILL, UNLESS NOTED OTHERWISE (REFER TO SOIL ENGINEERS REPORT FOR RECOMMENDATIONS).
- SEE ARCHITECTURAL DRAWINGS FOR RECESSES AND DEPRESSIONS IN SLAB ON GRADE AND MAINTAIN SLAB THICKNESS INDICATED ON STRUCTURAL DRAWINGS IN ALL CASES.
- CONCRETE FLOORS SHALL BE COVERED WITH PLASTIC AND KEPT MOIST FOR THE FIRST THREE (3) DAYS OF CURING.
- INSTALL SAW-CUTS TO A MINIMUM OF 1/4 THE SLAB DEPTH IN THE FLOOR SLAB WITHIN 24 HOURS OF POUR. THE MAXIMUM CENTER/CENTER SPACING FOR SAW-CUTS SHALL BE 24 TIMES THE DEPTH UNLESS NOTED OTHERWISE.
- FILL SAWCUTS AND CONSTRUCTION JOINTS WITH SEMI-RIGID, FLEXIBLE EPOXY JOINT FILLER, TO THE MANUFACTURER'S SPECIFICATIONS. ACCEPTABLE FILLER IS REZI-WELD FLEX, STERNSON LOADFLEX, W.R. MEADOWS BONDFLEX, OR APPROVED ALTERNATE. USE W.R. MEADOWS GARDOX FOR EXTERIOR SAWCUTS.
- ALL SLABS ON GRADE SHALL BE REINFORCED WITH WELDED WIRE FABRIC (WWF) 152x152xMM(18.7xMM)18.7 (6"x6"x6ga"x6ga")
- SLABS ON GRADE TO BEAR ON MATERIALS CAPABLE OF 25 kPa (500 psf) BEARING PRESSURES.
- SPECIFIED SOIL BEARING CAPACITY FOR SLABS ON GRADE MUST BE VERIFIED BY A GEOTECHNICAL ENGINEER PRIOR TO PLACING THE SLABS. ANY NON-COMFORMANCE WITH THE SPECIFIED MINIMUM CAPACITIES MUST BE IMMEDIATELY REPORTED TO THE STRUCTURAL ENGINEER.
- WHERE SLAB ON GRADE IS USED TO TIE THE TOP OF A WALL RETAINING EARTH, THAT WALL SHALL BE ADEQUATELY SHORED UNTIL THE SLAB HAD BEEN PLACED AND ATTAINED 75% OF ITS DESIGN STRENGTH.

MASONRY (CONCRETE BLOCK):

- MASONRY SHALL CONFORM TO CAN/CSA S304.1 "DESIGN OF MASONRY STRUCTURES" AND CAN/CSA-A371 "MASONRY CONSTRUCTION FOR BUILDINGS".
- PROTECT ALL WORK FROM FROST DAMAGE IN ACCORDANCE WITH RECOMMENDED PRACTICES AS PUBLISHED BY THE INTERNATIONAL MASONRY ALL WEATHER COUNCIL. NO MASONRY WORK SHALL BE PERMITTED WITH TEMPERATURE BELOW 5 DEGREES CELSIUS UNLESS PROVISIONS ARE MADE FOR HEATING THE MATERIALS.
- CONCRETE BLOCKS SHALL BE REGULAR WEIGHT, 50% SOLID, WITH A MINIMUM 15 MPa COMPRESSIVE STRENGTH, UNLESS OTHERWISE NOTED.
- MORTAR SHALL CONFORM TO CAN/CSA-A179. MORTAR SHALL BE TYPE 'S', WITH A MINIMUM 28 DAY COMPRESSIVE STRENGTH OF 8.5 MPa.
- GROUT SHALL CONFORM TO CAN/CSA-A179. 28 DAY GROUT STRENGTH SHALL BE 10 MPa (MINIMUM) FOR FINE GROUT AND 12.5 MPa (MINIMUM) FOR COARSE GROUT UNLESS NOTED.
- AGGREGATE FOR MORTAR AND GROUT MIXES SHALL BE PROPORTIONED (MEASURED) IN A DAMP, LOOSE STATE.
- TESTING FOR MASONRY UNITS, MORTAR, AND GROUT SHALL BE PERFORMED IN ACCORDANCE WITH CAN/CSA S304.1.
- VERTICAL CONTROL JOINTS SHALL BE INSTALLED IN ALL WALLS AT 7.6m (25'-0") O.C. MAXIMUM, UNLESS NOTED OTHERWISE. REINFORCING SHALL NOT CROSS A CONSTRUCTION JOINT. CAREFULLY LOCATE ALL CONTROL JOINTS.
- INSTALL SUITABLE DAMP COURSE FLASHING WITH WEEPHOLES AT 800mm (32") O.C. REPAIR ALL DAMAGE TO FLASHING.
- REINFORCE ALL MASONRY WITH "W" TYPE WIRE REINFORCING AT 600mm (24") O.C. EXCEPT WHERE NOTED OTHERWISE. FULL OVERLAP AT ALL WALL INTERSECTIONS AND CORNERS.
- BEAMS AND LINTELS SHALL HAVE A MINIMUM BEARING LENGTH OF 200mm. BUILD MASONRY TIGHT INTO WEBS AT THE BEARING POINTS.
- GROUT MASONRY SOLID BELOW ALL LINTEL ENDS AND POINT LOADS FOR ALL CORES BENEATH BEARING POINTS. GROUT 1 ADDITIONAL CORE FULL HEIGHT ADJACENT TO ALL BEARING POINTS.
- FILLING OF BLOCK UNITS WITH MORTAR IS NOT ACCEPTABLE.
- INSTALL 1-15M VERTICAL BAR IN ONE CORE BESIDE OPENINGS EXCEEDING 500mm (20"), FULL HEIGHT AND GROUTED SOLID.
- WHERE MASONRY WALLS ARE NOTED AS BEING REINFORCED WITH VERTICAL BARS, THE MINIMUM LAP LENGTH SHALL BE 600mm (24"), AND THE CORES CONTAINING THE VERTICAL BARS SHALL BE FILLED WITH GROUT.
- WHERE NOTE IS MADE TO FILL MASONRY SOLID, ALL CORES SHALL BE FILLED SOLID FROM THE BEARING POINT DOWN TO THE FOOTINGS WITH GROUT.
- WHERE ROOF TRUSSES OR OPEN WEB STEEL JOISTS BEAR ON UNREINFORCED MASONRY WALLS, INSTALL 1800mm (72") LONG UPLIFT ANCHORS IN THE WALL AT 1200mm (48") O.C. OR DIRECTLY BELOW EACH BEARING PLATE. ALL BEARING PLATES SHALL HAVE A 15M, 600 LONG (24") WELDABLE STRAIGHT REBAR DOWEL.
- WHERE MASONRY BEARS ON STEEL BEAMS, WELD 15M x 300mm (12") LONG DOWELS AT 1200mm (48") O.C. TO BEAMS.
- ALL MASONRY INSTALLED ABOVE ROOF DECK ELEVATION OR BELOW GRADE SHALL BE GROUTED 100% SOLID.
- PROVIDE BRACING AT MAX. 2000mm (6'-8") O.C. FOR BOTH SIDES OF THE TOP OF ALL NON-LOAD BEARING MASONRY WALLS.
- USE RUNNING BOND BLOCK CONSTRUCTION. KEY ALL MASONRY JOINTS AT WALL CORNERS AND INTERSECTIONS. RAKE BACK WALL CONSTRUCTION WHEN TURNING WALL CORNERS. PROVIDE 38x4.8 (1 1/2" x 3/16") MASONRY STRAP AT EVERY SECOND COURSE TIEING BLOCK WALLS TO ADJOINING CONCRETE WALLS AND STRUCTURAL STEEL.

MASONRY VENEER (BRICK, STONE AND CONCRETE BLOCK):

- MASONRY SHALL CONFORM TO CSA S304.1 "DESIGN OF MASONRY STRUCTURES" AND CAN/CSA-A371 "MASONRY CONSTRUCTION FOR BUILDINGS".
- PROTECT ALL WORK FROM FROST DAMAGE IN ACCORDANCE WITH RECOMMENDED PRACTICES AS PUBLISHED BY THE INTERNATIONAL MASONRY ALL WEATHER COUNCIL.
- MASONRY UNITS USED AS AN EXTERIOR VENEER SHALL BE NON-LOAD BEARING AND INSTALLED WITH A FULL BED OF TYPE "N" MORTAR, WITH A MINIMUM 28 DAY COMPRESSIVE STRENGTH OF 3.5 MPa.
- MINIMUM BRICK STRENGTH SHALL BE 55 MPa (CLAY), 20 MPa (CONCRETE).
- VERTICAL CONTROL JOINTS SHALL BE INSTALLED IN ALL WALLS AT 7.6m (25'-0") O.C. MAXIMUM, UNLESS NOTED OTHERWISE. LOCATE JOINTS AT CORNERS OF WALLS, EDGES OF LARGE OPENINGS AND OTHER PLACES WHERE MOVEMENT IS REQUIRED AND CRACKING IS LIKELY TO OCCUR.
- INSTALL SUITABLE DAMP COURSE FLASHING WITH WEEPHOLES AT 800mm (32") O.C. REPAIR ANY AND ALL DAMAGE TO FLASHING.
- MASONRY TIES SHALL CONFORM TO CAN/CSA-A370 "CONNECTORS FOR MASONRY". WHERE STAINLESS STEEL TIES ARE REQUIRED ON A TALL BUILDING THEY SHALL EXTEND FULL HEIGHT OF MASONRY, DOWN TO THE LOWEST LEVEL.
- MASONRY TIES SHALL BE SPACED NO MORE THAN 600mm (24") VERTICALLY AND AT THE LESSER OF 800mm (32") HORIZONTALLY (BLOCK OR CONCRETE) OR AT EVERY STUD (WOOD AND STEEL STUDS). MASONRY TIES SHALL ALLOW INDEPENDENT VERTICAL MOVEMENT OF VENEER AND SUPPORTING STRUCTURE AND SHALL BE APPROVED BY TACOMA ENGINEERS.
- MASONRY TIES CONNECTING TO STEEL OR WOOD STUDS SHALL BE SIDE MOUNTING. FACE MOUNTING TIES ARE NOT ACCEPTABLE.



- NO CLEANOUTS (CO) REQUIRED
- WALL BUILT IN 1500mm (5'-0") HIGH LIFTS (MAX.)
- BARS SPLICED AT POUR HEIGHT

- CLEANOUTS (CO) REQUIRED AT EACH BAR LOCATION. FULLY GROUTED WALLS WITHOUT BARS REQUIRE CLEANOUTS AT 800mm (32") O.C.
- WALL BUILT FULL HEIGHT
- BARS INSTALLED FULL LENGTH
- GROUT LIFTS EVERY 2000mm (6'-6") IF WALL HEIGHT EXCEEDS 3000mm (10'-0")
- GROUT SHALL BE CONSOLIDATED BY PUDDLING OR VIBRATING DURING POURING

MASONRY WALL GROUTING TECHNIQUES

NOTES:

- CONTRACTOR SHALL CONSTRUCT ALL REINFORCED AND GROUTED WALL SYSTEMS IN ACCORDANCE TO ONE OF THE TWO GROUTING METHODS IDENTIFIED ABOVE (ref. 1). A 3RD OPTION IS PERMITTED IF THE WALL IS CONSTRUCTED IN ACCORDANCE TO MSJC (2005) (ref. 3) OR CONSTRUCTED WITH THE USE OF DEMONSTRATION PANELS IN ACCORDANCE WITH NCMA TEK 3-2A. IF THE 3RD OPTION IS PREFERRED BY THE CONTRACTOR, INFORM PROJECT ENGINEER PRIOR TO CONSTRUCTION AND AN ENGINEERS SIGN-OFF WILL BE REQUIRED ON THE DEMONSTRATION PIECE.
- MASONRY SHALL NOT BE CARRIED UP TO A HEIGHT GREATER THAN THAT REQUIRED TO ACCOMMODATE THE GROUT POUR (ref. 2). THE MASONRY SHALL BE SUFFICIENTLY CURED TO PREVENT BLOWOUTS OF THE MORTAR JOINTS FROM CONSOLIDATION METHODS OR HYDROSTATIC PRESSURE OF THE GROUT (ref.2).
- AT EACH LOCATION, THE GROUT POUR SHALL BE COMPLETED WITHIN 2 HOURS OF THE START OF THE POUR (ref.2).
- MASONRY CONTRACTOR SHALL CONTACT TACOMA ENGINEERS (519-763-2000) TO COORDINATE A START-UP MEETING OR SITE REVIEW WITH THE MASON, GENERAL CONTRACTOR AND TACOMA REP. TO DISCUSS GROUTING TECHNIQUES & PROJECT EXPECTATIONS. THIS MEETING SHALL TAKE PLACE PRIOR TO ANY WALLS BEING GROUTED.

DEFINITIONS:

- GROUT LIFT THE AMOUNT OF GROUT PLACED IN A SINGLE CONTINUOUS OPERATION
- GROUT POUR THE ENTIRE HEIGHT OF MASONRY TO BE GROUTED PRIOR TO THE CONSTRUCTION OF ADDITIONAL MASONRY. A POUR MAY BE COMPRISED OF ONE LIFT OR A NUMBER OF SUCCESSIVELY PLACED GROUT LIFTS.
- CLEANOUTS OPENINGS IN THE BOTTOM COURSE OF MASONRY FOR EACH GROUT POUR, WHEN THE GROUT POUR EXCEEDS 1500mm (5'-0")
- CONSTRUCT CLEANOUTS SO THAT THE SPACE TO BE GROUTED CAN BE CLEANED AND INSPECTED. IN SOLID GROUTED MASONRY, SPACE CLEANOUTS HORIZONTALLY AT A MIN. OF 32" (815mm) O.C.
  - CONSTRUCT CLEANOUTS WITH AN OPENING OF SUFFICIENT SIZE TO PERMIT REMOVAL OF DEBRIS. THE MINIMUM OPENING DIMENSION SHALL BE 3175mm
  - AFTER TYING BAR, CLEANED AND INSPECTED. CLOSE CLEANOUTS WITH CLOSURES BRACED OR SCREWED TO RESIST GROUT PRESSURE.
- STANDARD GROUT MIXTURES: FINE (GROUT SPACES 50mm OR LESS)
- 1 PART PORTLAND CEMENT
  - 3 PARTS SAND
- COARSE (LARGER GROUT SPACES)
- 1 PART PORTLAND CEMENT
  - 3 PARTS SAND
  - 1 - 2 PARTS COARSE AGGREGATE
- GROUT COMPRESSIVE STRENGTH: FINE GROUT - 10 MPa (28 days) COARSE GROUT - 12.5 MPa (28 days)
- NOTES: - WATER IS ADDED TO THE ABOVE MIXTURES TO ACHIEVE A SLUMP OF 8" (200mm) - 10" (250mm) - ALTERNATE MIXTURE DESIGNS WILL BE ACCEPTED PROVIDED THEY MEET THE STRENGTH AND SLUMP REQUIREMENTS - MORTAR / MASONRY CEMENT MAY NOT BE USED IN GROUT OR AS A SUBSTITUTE FOR GROUT

REFERENCES:

- GROUTING CONCRETE MASONRY WALLS, NCMA TEK 3-2A, NATIONAL CONCRETE MASONRY ASSOCIATION, 2005
- MASONRY CONSTRUCTION FOR BUILDINGS, CAN/CSA-A371-04, CANADIAN STANDARDS ASSOCIATION, REAFFIRMED 2009
- SPECIFICATION FOR MASONRY STRUCTURES, ACI 530.1-03/ASCE 6-05/TMS 602-05, REPORTED BY THE MASONRY STANDARDS JOINT COMMITTEE, 2005

STRUCTURAL STEEL:

- ALL STRUCTURAL STEEL ELEMENTS ARE DESIGNED USING THE LIMIT STATES DESIGN METHOD IN ACCORDANCE WITH CAN/CSA-S16.
- ALL STRUCTURAL STEEL SHALL BE COMPLETED BY A FABRICATOR WHO IS A CURRENT MEMBER OF THE CANADIAN INSTITUTE OF STEEL CONSTRUCTION.
- STRUCTURAL STEEL BEAMS AND COLUMNS SHALL CONFORM TO CAN/CSA 040.21 GRADE 350W UNLESS NOTED.
- STRUCTURAL STEEL CHANNELS AND ANGLES SHALL CONFORM TO CAN/CSA 040.21 GRADE 300W UNLESS NOTED.
- ALL H.S.S. SHALL CONFORM TO CAN/CSA 040.21 GRADE 350W (CLASS C) UNLESS NOTED.
- ALL STEEL PLATE TO BE A36 (250W MPa) MATERIAL (MINIMUM).
- WELDING SHALL CONFORM TO CSA W47.1 AND CSA W59, BY THE CANADIAN WELDING BUREAU. ALL WELDING SHALL BE COMPLETED BY CWB CERTIFIED WELDERS. THIRD PARTY WELDING INSPECTION SHALL BE PERFORMED BY FIRMS CERTIFIED TO CSA W178.1 AND W178.2.
- BOLTED CONNECTIONS SHALL BE MADE USING GRADE A325 BOLTS, UNLESS NOTED OTHERWISE. ANCHOR BOLTS SHALL CONFORM TO ASTM A307.
- GALVANIZING FOR METALS SHALL CONFORM TO CSA-G164 UNLESS NOTED. TOUCH-UP ON SITE BY GRINDING THE SURFACE TO BRIGHT METAL AND APPLYING ZINC RICH PAINT CONFORMING TO CAN/CSSB-1.181 (OR ASTM A780).
- COLUMN BEARING GROUT SHALL BE 35 MPa (MINIMUM), NON-SHRINK, AND 38mm (1-1/2") THICK (MINIMUM).
- ALL STRUCTURAL STEEL SHALL BE NEW MATERIAL APPROVED BY TACOMA ENGINEERS.
- ALL STRUCTURAL STEEL SHALL RECEIVE A MINIMUM OF ONE COAT OF APPROVED SHOP PRIMER, TOUCHED UP AS REQUIRED ON SITE, EXCEPT THAT STEEL WHICH IS TO RECEIVE SPRAY-ON FIREPROOFING SHALL NOT BE PRIMED.
- STRUCTURAL STEEL MEMBERS SHALL NOT BE SPLICED WITHOUT THE APPROVAL OF THE ENGINEER.
- DO CO-ORDINATE WITH MECHANICAL, ELECTRICAL AND ALL OTHER SUBTRADES WHOSE WORK AFFECTS THE DETAILING, FABRICATION AND ERECTION OF THE STRUCTURAL STEEL.
- DO NOT CUT OPENINGS IN STRUCTURAL STEEL MEMBERS WITHOUT ENGINEERS APPROVAL.
- EXTERIOR STRUCTURAL STEEL SHALL BE PROTECTED FROM CORROSION BY PRIMING + PAINTING WITH TWO COATS OF SUITABLE EXTERIOR GRADE PAINT.

WOOD CONSTRUCTION

- WOOD FRAMING DESIGN AND CONSTRUCTION SHALL CONFORM TO CAN/CSA-086 "ENGINEERING DESIGN IN WOOD".
- WOOD TRUSSES AND MANUFACTURED FRAMING MEMBERS ARE TO BE DESIGNED & CERTIFIED BY A PROFESSIONAL ENGINEER FOR THE LOADS AND CONDITIONS INDICATED ON THE DRAWINGS.
- PROVIDE ADEQUATE BEARING SURFACE FOR THE TRUSS BEARING LOADS.
- FRAMED WALLS ARE TO BE WIND BRACED AT ALL CORNERS IN BOTH DIRECTIONS.
- LUMBER SHALL BE SPT No. 1/2 OR BETTER UNLESS NOTED OTHERWISE. MOISTURE CONTENT SHALL BE 19% OR LESS.
- LUMBER SHALL NOT BE NOTCHED OR DRILLED IN THE FIELD WITHOUT PERMISSION OF THE CONSULTANT.
- ROOF SHEATHING SHALL BE 12.5mm (1/2") PLYWOOD CONFORMING TO CSA 0151 "CANADIAN SOFTWOOD PLYWOOD", U.N.O.
- WALL SHEATHING SHALL BE 9.5mm (3/8") PLYWOOD TO CSA 0151 "CANADIAN SOFTWOOD PLYWOOD" OR 11mm (7/16") O-2 OSB TO CSA 0452 "DESIGN RATED OSB", U.N.O.
- FLOOR SHEATHING SHALL BE 15.5mm (5/8") T&G PLYWOOD TO CSA 0151 "CANADIAN SOFTWOOD PLYWOOD". SUBFLOOR IS TO BE GLED AND NAILED / SCREWED SECURELY TO EVERY SUPPORTING MEMBER.
- BOLTED CONNECTIONS SHALL BE MADE USING GRADE A307 BOLTS, UNLESS NOTED OTHERWISE.
- USE PRESSURE TREATED LUMBER (CWPB APPROVED) OR APPLY SUITABLE WOOD PRESERVATIVE TO ALL WOOD IN CONTACT WITH SOIL.
- WOOD IS NOT PERMITTED TO BEAR DIRECTLY ON MASONRY OR CONCRETE WITHOUT PROTECTION. PROVIDE EITHER PRESSURE TREATED LUMBER, SUITABLE WOOD PRESERVATIVE OR 6 MIL (0.152mm) POLYETHYLENE SHEET.
- SOLID HORIZONTAL BRIDGING SHALL BE PROVIDED AT 1200mm (4'-0") O.C. IN THE FIRST TWO JOIST SPACES ADJACENT TO THE EXTERIOR WALLS. BRIDGING SHALL BE ATTACHED TO THE EXTERIOR WALL TO PROVIDE LATERAL STABILITY.
- PROVIDE 38mm x 38mm (2x2) DIAGONAL CROSS BRIDGING AT MAXIMUM 2.4m (8ft) O.C. FOR ALL SAWN JOIST LOCATIONS. PROVIDE SOLID WOOD HORIZONTAL BLOCKING AT MAXIMUM 1.2m (48") O.C. FOR ALL FRAMED WALLS.
- ALL NAILS USED SHALL CONFORM TO STEEL WIRE NAILS AND SPIKES AS DEFINED IN CSA STANDARD B111 "WIRE NAILS, SPIKES AND STAPLES" UNLESS NOTED OTHERWISE.
- LATERALLY SUPPORT ALL STEEL BEAMS BY PRE-DRILLING FLANGES FOR 13mm (1/2") BOLTED ATTACHMENTS OF WOOD NAILERS WITH 15mm (9/16") HOLES STAGGERED AT 600mm (24") O.C.
- USE JOIST HANGERS WHERE FRAMING MEMBERS CONNECT INTO THE SIDES OF SUPPORTING MEMBERS.
- ALL STEEL CONNECTORS (UPLIFT CLIPS, BRACKETS, JOIST HANGERS etc.) SHALL BE SIMPSON STRONG TIE CONNECTORS UNLESS NOTED OTHERWISE.
- ALL NAILS AND FASTENERS IN CONTACT WITH PRESSURE TREATED WOOD ARE TO BE HOT DIP GALVANIZED (TO CSA-G164) OR GALVANNEAL.
- FOR ALL BUILT UP MEMBERS (TRUSSES, BEAMS, LINTELS) PROVIDE A BUILT UP POST WITH AN EQUAL OR GREATER THICKNESS UNLESS NOTED OTHERWISE. ALL BUILT UP POSTS TO BE CONTINUOUS (INCLUDING TRANSFER BLOCKING AT FLOORS) DOWN TO THE FOUNDATIONS.
- ALL BUILT UP MEMBERS TO BE FASTENED TOGETHER WITH TWO 75mm (3") SPIRAL NAILS AT 300mm (12") O.C. FOR EVERY PLY UNLESS NOTED OTHERWISE.

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Date	Issue
SEPT 18 2012	ISSUED FOR OWNER REVIEW
SEPT 26 2012	ISSUED FOR OWNER REVIEW # 2
OCT 3 2012	ISSUED FOR FINAL APPROVAL

No.	Date	Revision

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Project Title

**PUMP HOUSE**  
MISSISSAUGA, ONTARIO

Drawing

**STRUCTURAL NOTES**

Scale	AS NOTED	Dwg. #
Date	SEPT, 2012	
Drawn By	S.KOLKMAN	
Project No.	TE-21472-12	

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