

St. Nicolas Romanian Orthodox Church, 4699 Bank Street, Ottawa Noise Study Report



Prepared for:
St.Nicolas Romanian
Orthodox Church, Ottawa
By:
Arch-Nova Design Inc.
Project # N-03-13
June 2014

TABLE OF CONTENTS

1.0	INTRODUCTION AND SUMMARY	3
2.0	ENVIRONMENTAL NOISE ASSESSMENT	3
2.1	Traffic Noise Sources	3
2.1.1	Road Traffic	3
2.1.2	Rail Traffic	4
2.1.3	Air Traffic	4
2.2	Stationary Noise Sources	4
3.0	TRAFFIC NOISE IMPACT	5
3.1	Applicable Noise Guideline	5
3.2	Traffic Noise Impact Assessment	6
4.0	DISCUSSION AND RECOMMENDATION	7
4.1	Outdoor Leaving Areas (OLA)	7
4.2	Indoor Sensitive Area	7
4.3	Building Façade Construction	7
4.4	Warning Clauses	8
5.0	CONCLUSION	9

LIST OF TABLES

Table 1	Table Year 2024 Road Traffic Data Used in Analysis
Table 2	Table City of Ottawa Noise Control Guidelines – Road Traffic Noise Requirements
Table 3	Table Predicted Unmitigated Road Traffic Sound Exposures

LIST OF FIGURES

Figure 1	Proposed Development Site Plans
----------	---------------------------------

LIST OF APPENDICES

Appendix A	Proposed Church Floor and Elevation Plans
Appendix B	Land-Use Zoning Maps
Appendix C	Road Traffic Data
Appendix D	Road Traffic Modelling
Appendix E	City of Ottawa Noise Guidelines

1.0 INTRODUCTION AND SUMMARY

Arch-Nova was retained to investigate the potential impact of environmental noise impact on the proposed St. Nicholas Romanian Orthodox Church located at 4699 Bank Street in Ottawa Ontario. The assessment is based on the proposed church design, existing and future traffic noise sources, and the environmental noise guidelines of the Ministry of the Environment (“MOE”) and the City of Ottawa. A noise study is required by the municipality as part of the planning and approvals process.

This report was prepared based on a Site Plan prepared by Dreamcatcher Residential and Commercial Design architects, dated February 2013

The proposed church consists of one storey building with a basement and mezzanine levels. The ground floor contains a porch, narthex, nave, solea and sanctuary spaces. Mezzanine level contains library, priest’s office and choir spaces.

There is no communal outdoor living area (OLA) associated with the proposed church. In addition, the back yard and park associated with the church does not qualify as OLA under City of Ottawa or MOE guidelines.

The site is bounded by proposed residential to the east and south, and by mixed institutional and commercial lands to the north. Further to the west, across the road, there are mixed commercial and residential lands.

Figure 1 shows the proposed site including the surrounding area. Zoning maps for the surrounding area are attached in Appendix A.

2.0 ENVIRONMENTAL NOISE ASSESSMENT

The main environmental noise sources external to the project which were identified and have the potential to adversely affect the development are motor vehicle traffic noise along Bank Street.

2.1 Traffic Noise Sources

2.1.1 Road Traffic

Road traffic associated with Bank Street is the dominant environmental noise source in the vicinity of the proposed development. In addition, there will be access road, off Banks Street, to the proposed residential development which will be insignificant traffic noise source.

Fully developed (2024) road traffic data was used in the analysis. Current traffic data for Bank Street at White Adler Avenue was provided by City of Ottawa transportation department. As per the City of Ottawa transportation department, no traffic data was available for other smaller streets in the close proximity to the project site. Based on the physical location and residential density of the street, it was conservatively assumed the minimum traffic counts available in modeling software as recommended by the City of Ottawa “Environmental Noise Control Guidelines”. In addition, a yearly growth rate of 2.5% was used to calculate the traffic data. In order to calculate the fully developed road traffic volumes, numbers were grown to the year 2024. Traffic data was split into daytime/nighttime and autos/medium/heavy using City of Ottawa “Environmental Noise Control Guidelines.” Posted speed limits were used in the analysis. Data used in the noise modelling are found in Table 1.

Table 1: Year 2024 Road Traffic Data Used in Analysis

Street	Time of Day	Vehicles	Medium Trucks	Heavy Trucks	Total
Bank Street	0700-2300	20716	444	1044	22204
	2300-0700	2302	49	116	2467
	Total	23018	493	1160	24671

Provided road traffic data and road traffic calculations used for the study are included in Appendix B.

2.1.2 Rail Traffic

Rail line is located beyond 1000 metres from the proposed church, which is out of zone of influence as per City of Ottawa Noise Protocol. Therefore, no further assessment was performed.

2.1.3 Air Traffic

Proposed project is located just outside of Airport Vicinity Development Zone and out of the zone of influence from the Airport Operating Influence Zone (AOIZ) and NEF/NEP contours lines. Therefore, no further assessment was performed.

2.2 Stationary Noise Sources

Based on investigation of the surrounding areas, there are no potential stationary industrial sources of noise in the vicinity of the proposed development.

The MOE D-series guidelines were developed as guidance for recommended separation distances and other control measures for land use planning proposals to prevent or minimize ‘adverse effects’ from the encroachment of incompatible land uses where a facility either

exists or is proposed. Additionally, the MOE developed the noise guidelines for stationary source noise impacting residential developments called the MOE Publication NPC-300 “Stationary and Transportation Sources – Approval and Planning” Since no industrial sources are located in the vicinity of the proposed development, neither the D-series guidelines nor NPC-300 have been considered further in this study.

3.0 TRAFFIC NOISE IMPACT

3.1 Applicable Noise Guideline

City of Ottawa noise guidelines for transportation noise impacting residential developments are given in the publication “City of Ottawa Environmental Noise Control Guidelines” (Appendix C). A summary of the City of Ottawa noise requirements is provided Table 2 below.

Table 2: City of Ottawa Noise Control Guidelines – Road Traffic Noise Requirements

Receiver Category	Time Period	Road Traffic		Requirements
		Criterion Averaged over Time Period ^[1]		
		Leq (dBA)	Applies at	
Outdoor	0700-2300	55 ^[2]	OLA	None
		56 to 60		Warning Clause
		> 60		Alternative Land Use Alternative Layout Berm or barrier Possible Warning Clause
Plane of Window	0700-2300	55 to 65	Plane of Window	Provision for central air conditioning + warning clause
		> 65 ^[3]		Central air conditioning is required.
	2300-0700	50 to 60 ^[3]	Plane of Window	Provision for central air conditioning + warning clause
		> 60 ^[3]		Central air conditioning + warning clause
Indoor	0700-2300	45	Living Area	If Central AC is required, facade must be designed to meet these levels
	2300-0700	40	Sleeping Area	

Notes: [1] Cumulative Impacts

[2] The criterion may be exceeded by an amount not greater than 5 dBA, subject to justification and use of a Warning Clause.

[3] If façade levels exceed these criteria, building components must be designed to meet Indoor Criteria.

For OLAs, a design goal of 55 dBA $L_{EQ,day}$ is required. An unmitigated sound exposure due to road traffic of up to 60 dBA is considered a minor excess and is permissible, provided a warning clause advising the occupant of the potential noise levels is used. A sound exposure

greater than 60 dBA must be reduced to 60 dBA or less using physical mitigation methods such as berms or barriers, or combination of both.

A central air conditioning system as an alternative means of ventilation to open windows is required for spaces where nighttime sound levels outside sensitive space windows exceed 60 dBA or where daytime sound levels outside sensitive space windows exceed 65 dBA. Forced-air ventilation with ducts sized to accommodate the future installation of air conditioning is required when nighttime sound levels at sensitive space windows are in the range of 51 to 60 dBA or when daytime sound levels at sensitive space windows are in the range of 56 to 65 dBA.

Building components such as walls, windows and doors must be designed to achieve indoor sound level criteria when the plane of window sound level is greater than 60 dBA or the daytime sound level is greater than 65 dBA due to road traffic noise and when the plane of window sound level is greater than 55 dBA due to rail traffic noise. The use of warning clauses to notify future occupants of possible excesses is also recommended.

3.2 Traffic Noise Impact Assessment

$L_{EQ,night}$ and $L_{EQ,day}$ attributable to Bank Street was calculated using STAMSON v5.0, the computerized road, rail, and transit traffic noise prediction model of the MOE. Since the City of Ottawa requires projected sound exposures be based on ultimate traffic volumes for roadways, sound exposure levels were based on 2024 (future) road traffic predictions. Screening due to surrounding buildings and terrain was accounted for in the analysis, if applicable.

The proposed development will have one (1) floor above the ground level including mezzanine level and one (1) below ground level. It was assumed, that if the noise impact levels at the mezzanine level (library and priests's office) are acceptable (sensitive spaces with larger exposure), the sanctuary located at eastern part of church and spaces below ground residential unit will be satisfied as well.

Table 3 summarizes the predicted unmitigated daytime and nighttime sound exposures levels at predictable worst-case locations at the proposed church. Sample sound exposure calculation and analysis assumptions are included in Appendix D.

Table 3: Predicted Unmitigated Road Traffic Sound Exposures

Floor	Façade	Street	Sound Level (dBA)	
			0700-2300	2300-0700
Mezzanine	West	Bank Street	63	57

Notes: [1] The noise level at the façade at opposite side from the street is assumed to have noise level 10 dBA lower, as it is completely shielded.

4.0 DISCUSSION AND RECOMMENDATION

4.1 Outdoor Leaving Areas (OLA)

The term "Outdoor Living Area" (OLA) is used in reference to an outdoor patio, backyard, terrace, or other area where passive recreation is expected to occur, provided that it has a minimum depth of 4 m, and is outside the exterior building façade and unenclosed.

As per the site plans received from Dreamcatcher Residential and Commercial Design architects, dated February 2013 there is no OLA as part of a proposed church.

4.2 Indoor Sensitive Area

It was assumed that there will be no service or use of the church sensitive areas during the night, therefore only daytime noise impact is further discussed. However, the predicted nighttime noise levels indicated that design will follow the same recommendation.

The mezzanine level (including library and priest's office) of the proposed development have predicted daytime sound levels that are greater than 55 dBA but less than 65 dBA. To address these excesses, the City of Ottawa "Environmental Noise Control Guidelines" and MOE guidelines recommend that these dwelling units be equipped with a forced air ventilation systems with ducts sized to accommodate the future installation of air conditioning by the occupant.

Window or through-the-wall air conditioning units are not recommended for any sensitive spaces because of the noise they produce and because the units penetrate through the exterior wall which degrades the overall noise insulating properties of the envelope. The location, installation and sound ratings of the outdoor air conditioning devices should minimize noise impacts and comply with criteria of MOE publication NPC-216, Residential Air Conditioning Devices.

4.3 Building Façade Construction

The proposed church will have nighttime sound levels at the façade that are less than 60 dBA and daytime sound levels at the façade that are less than 65 dBA. Therefore, any exterior wall, and double glazed window construction meeting the minimum requirements of the Ontario Building Code (OBC) will provide adequate sound insulation for the proposed church.

4.4 Warning Clauses

The City of Ottawa “Environmental Noise Control Guidelines” and MOE guidelines recommend that warning clauses be included in the property and tenancy agreements and offers of purchase and sale for dwelling units with anticipated traffic sound level excesses. Examples are provided below.

Suggested wording for future development which have sound level excesses but do not require mitigation measures is given below.

Type A:

Purchasers/tenants are advised that sound levels due to increasing road and rail traffic may occasionally interfere with some activities of the dwelling unit occupants as the sound levels exceed the Municipality’s and the Ministry of the Environment’s noise criteria.

Suitable wording for proposed church building requiring forced air ventilation systems is given below.

Type C:

Purchasers/tenants are advised that this dwelling unit has been fitted with a forced air heating system and the ducting etc., was sized to accommodate central air conditioning. Installation of central air conditioning will allow windows and exterior doors to remain closed, thereby ensuring that the indoor sound levels are within the City’s and the Ministry of the Environment’s noise criteria. Purchasers/tenants are advised that the outdoor air cooled condenser unit itself can produce noise to interfere with outdoor recreational activities. Due consideration should be given to this noise factor when selecting the air cooled condenser units location or an alternative quieter type of unit could be selected. The condenser unit sound rating should not exceed 7.6 bels in accordance with ANSI Standard 270-84 for units 3.5 ton or less. The location and installation of the outdoor air conditioning device should be done so as to minimize the noise impacts and have due regard for compliance with criteria of MOE publication NPC-216, Residential Air Conditioning Devices.

5.0 CONCLUSION

The noise feasibility study was conducted to meet the noise guidelines developed by the City of Ottawa and the MOE under Guideline D-6 and NPC-300. Noise impacts at the proposed church have been evaluated and are predicted to meet MOE and City of Ottawa noise requirements. No noise abatement measures are recommended to mitigate potential impacts. However, warning clauses advising the future occupants of the potential noise impacts will be required.

The proposed church development is considered feasible from an environmental noise impact perspective.

Sincerely,

ARCH-Nova Design Inc.

Prepared by:

Miroslav Ubovic, P.Eng.



Managing Engineer
Zoran Mrdja, P.Eng.



Authorized by Professional Engineers of Ontario to
provide professional services to public

Figure 1

Proposed Development Site Plans

Appendix A

Proposed Development Floor and Elevation Plans

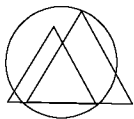
SAINT NICHOLAS ROMANIAN ORTHODOX CHURCH

4699 BANK STREET, OTTAWA, ONT



PRO-BONO DESIGN BY ARCHITECT LUMINITA SERBANESCU OF DREAMCATCHER RESIDENTIAL AND COMMERCIAL DESIGN
AND ARCHITECT GABRIELA A CONDUT, AIA, NCARB, LEED AP

DREAMCATCHER
RESIDENTIAL &
COMMERCIAL
DESIGN

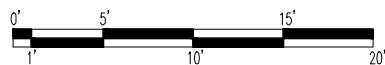
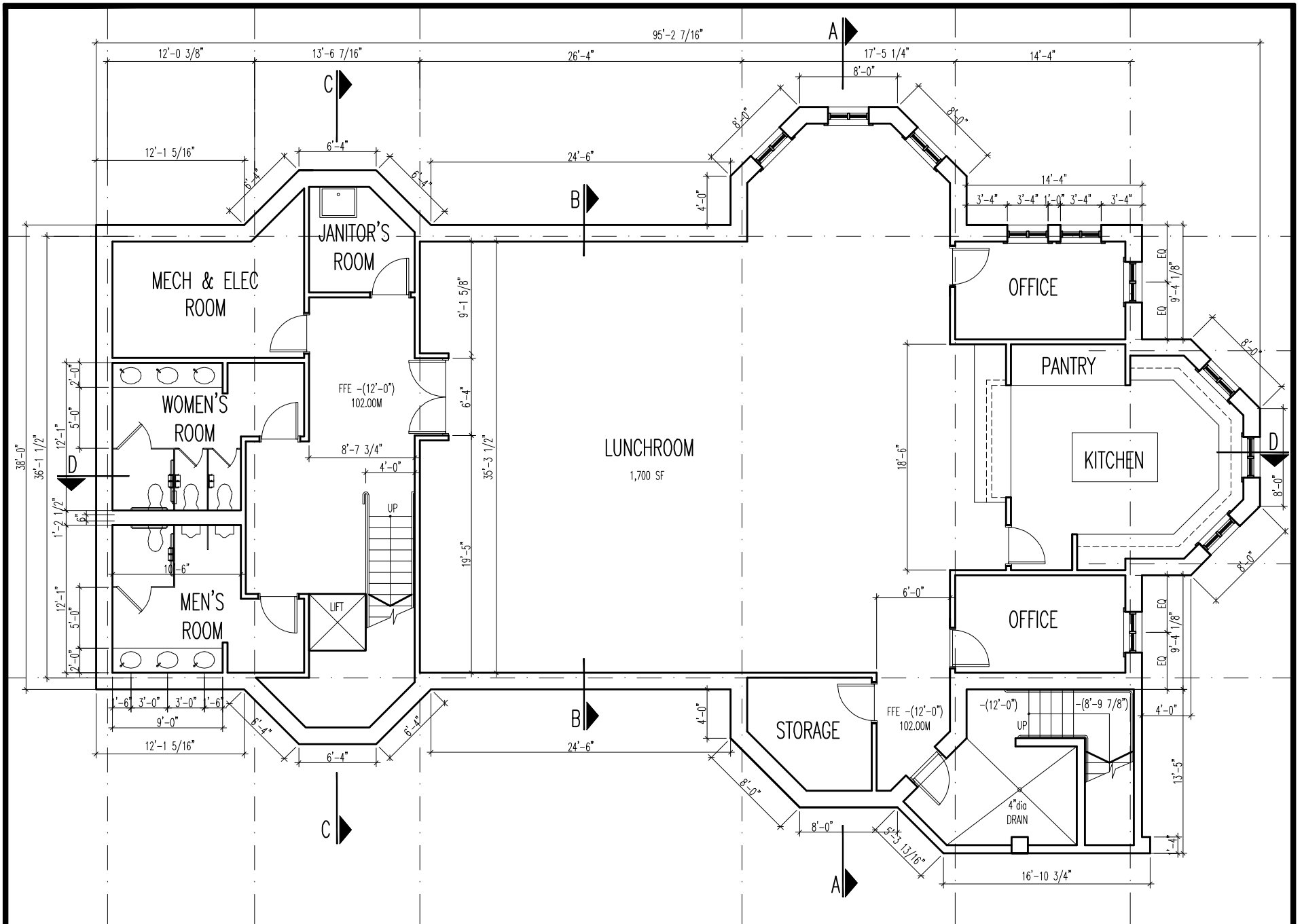


1216-2881 Richmond Road, OTT, K2B-8J5
Tel: (613) 726-8535
Fax: (613) 726-3027
e-mail: dreamcatcher@rogers.com

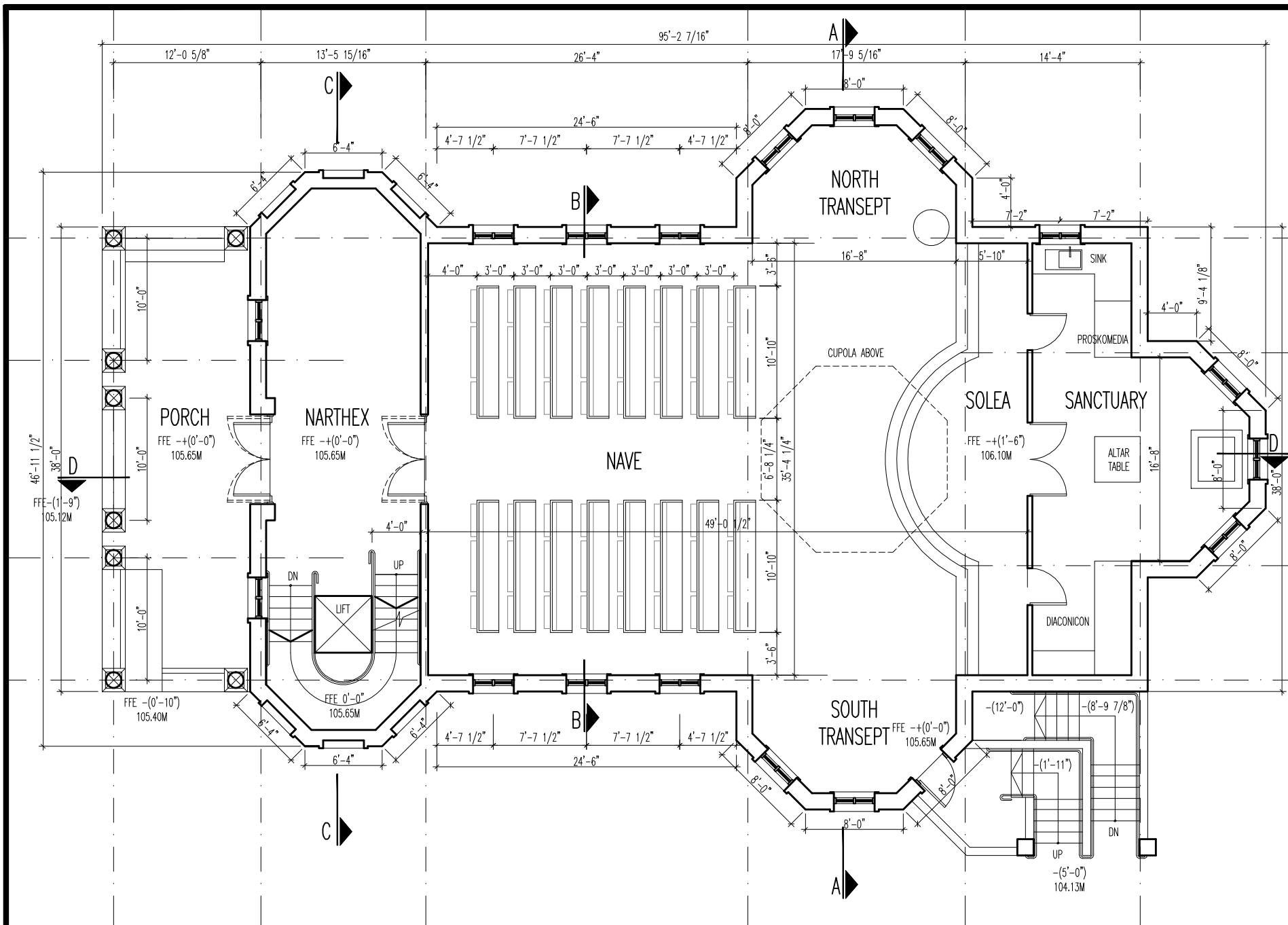
80% DESIGN DEVELOPMENT

1 of 14

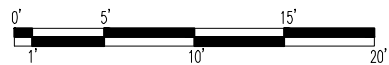
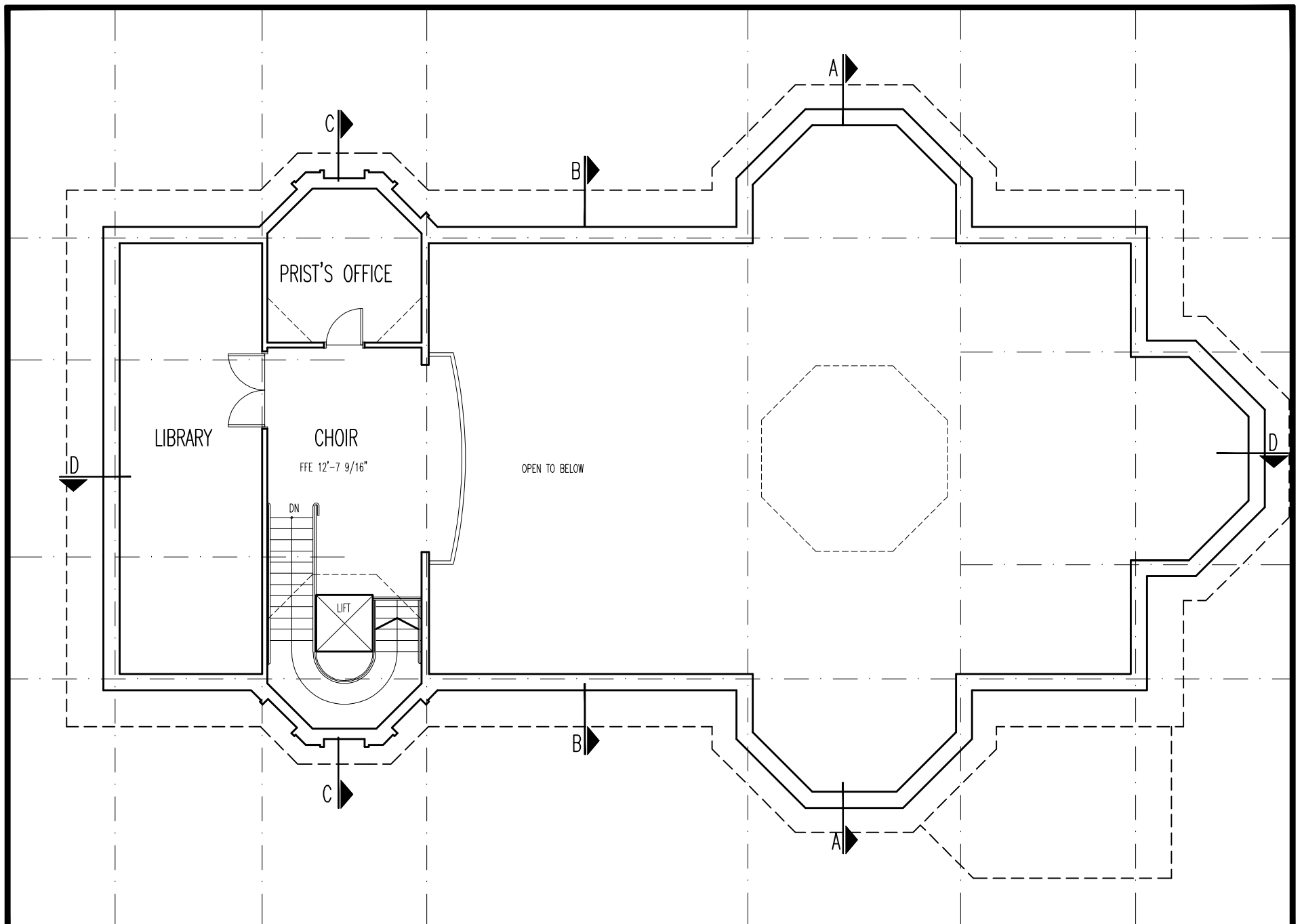
FEB 2013



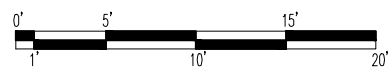
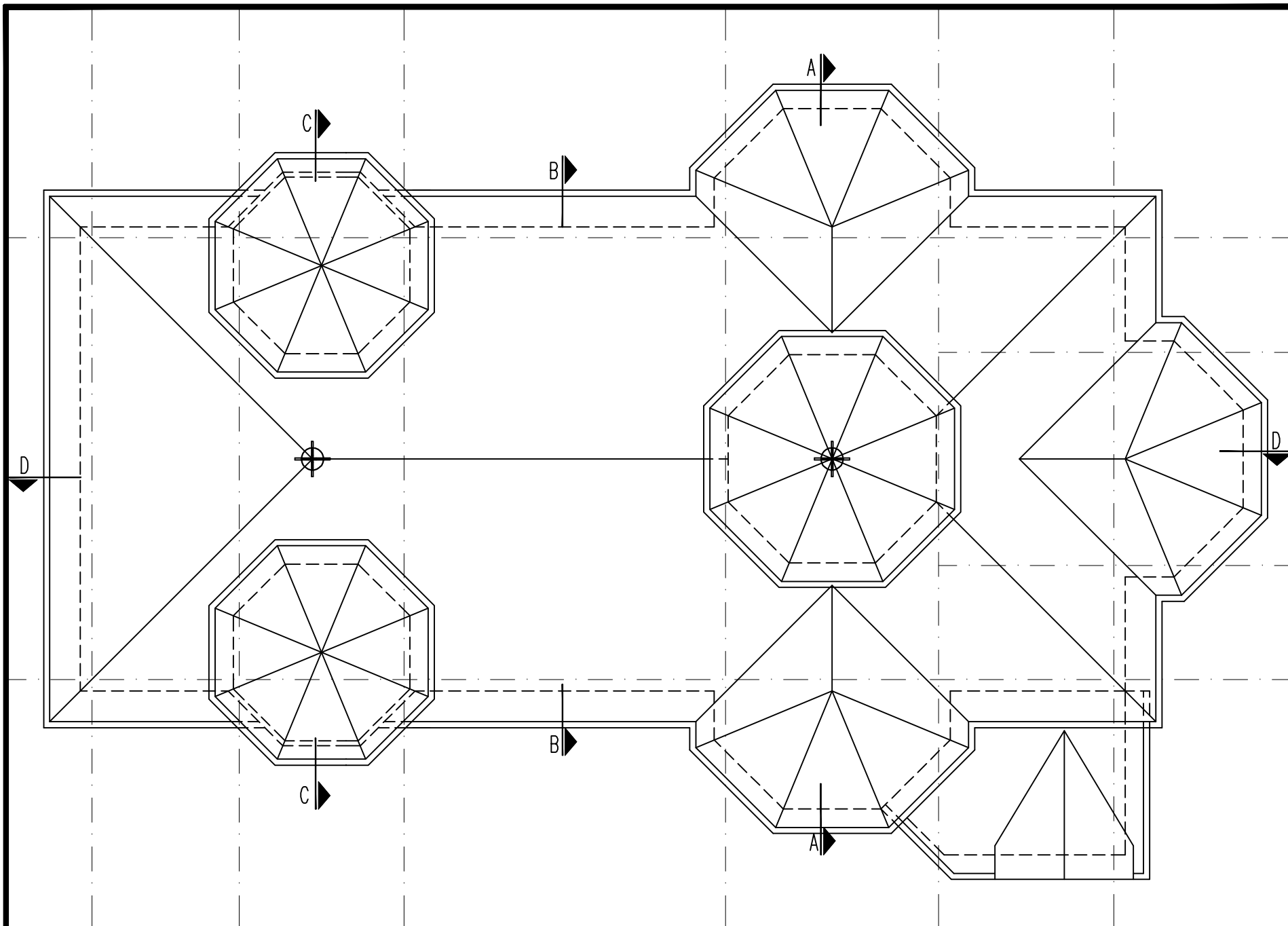
BASEMENT FLOOR PLAN
 SAINT NICHOLAS ROMANIAN ORTHODOX CHURCH 4699 BANK STREET, OTTAWA, ONT



GROUND FLOOR PLAN
 SAINT NICHOLAS ROMANIAN ORTHODOX CHURCH 4699 BANK STREET, OTTAWA, ONT



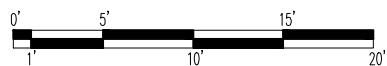
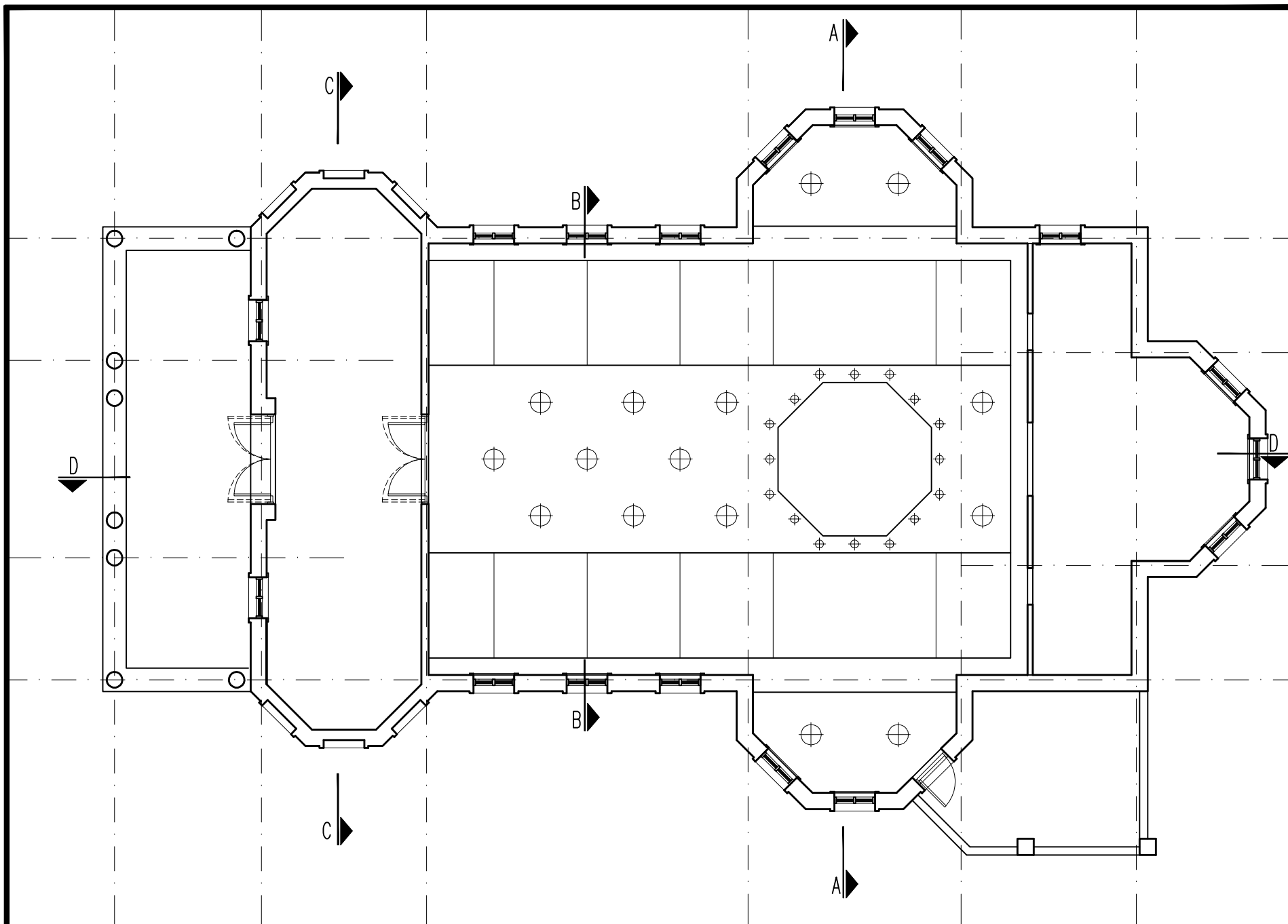
MEZZANINE FLOOR PLAN
 SAINT NICHOLAS ROMANIAN ORTHODOX CHURCH 4699 BANK STREET, OTTAWA, ONT



ROOF PLAN
 SAINT NICHOLAS ROMANIAN ORTHODOX CHURCH 4699 BANK STREET, OTTAWA, ONT

5 of 14

FEB 2013



GROUND FLOOR REFLECTED CEILING PLAN
 SAINT NICHOLAS ROMANIAN ORTHODOX CHURCH 4699 BANK STREET, OTTAWA, ONT

52'-0" TOP OF TOWER

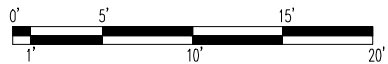
42'-8" TOP OF LOWER TOWERS

29'-5" TOP OF RIDGE MAIN ROOF

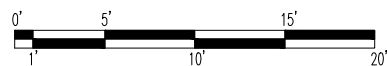
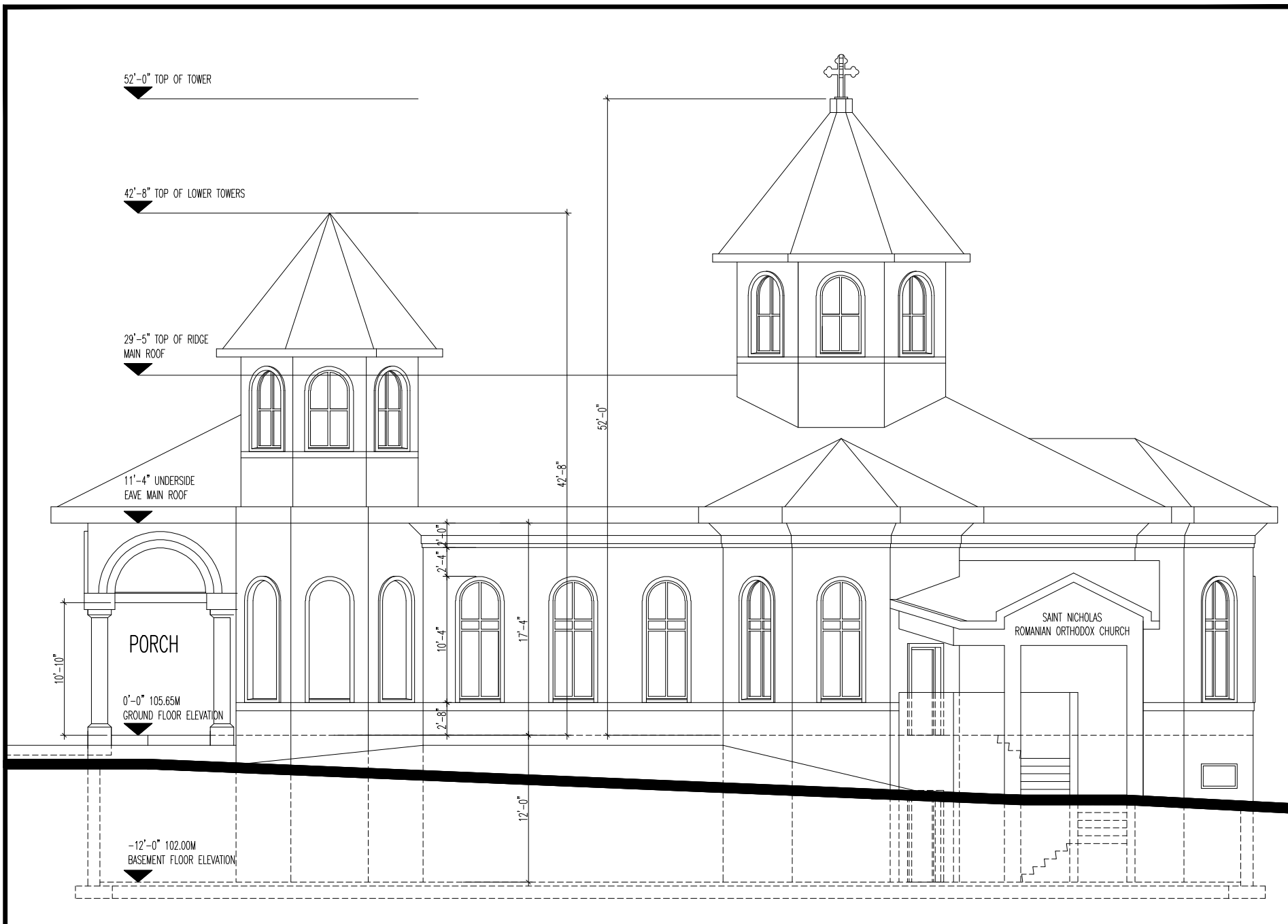
11'-4" UNDERSIDE EAVE MAIN ROOF

0'-0" 105.65M GROUND FLOOR ELEVATION

-12'-0" 102.00M BASEMENT FLOOR ELEVATION



FRONT ELEVATION (WEST)
SAINT NICHOLAS ROMANIAN ORTHODOX CHURCH 4699 BANK STREET, OTTAWA, ONT



SIDE ELEVATION (SOUTH)
SAINT NICHOLAS ROMANIAN ORTHODOX CHURCH 4699 BANK STREET, OTTAWA, ONT

52'-0" TOP OF TOWER

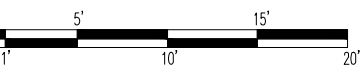
42'-8" TOP OF LOWER TOWERS

29'-5" TOP OF RIDGE MAIN ROOF

11'-4" UNDERSIDE EAVE MAIN ROOF

0'-0" 105.65M GROUND FLOOR ELEVATION

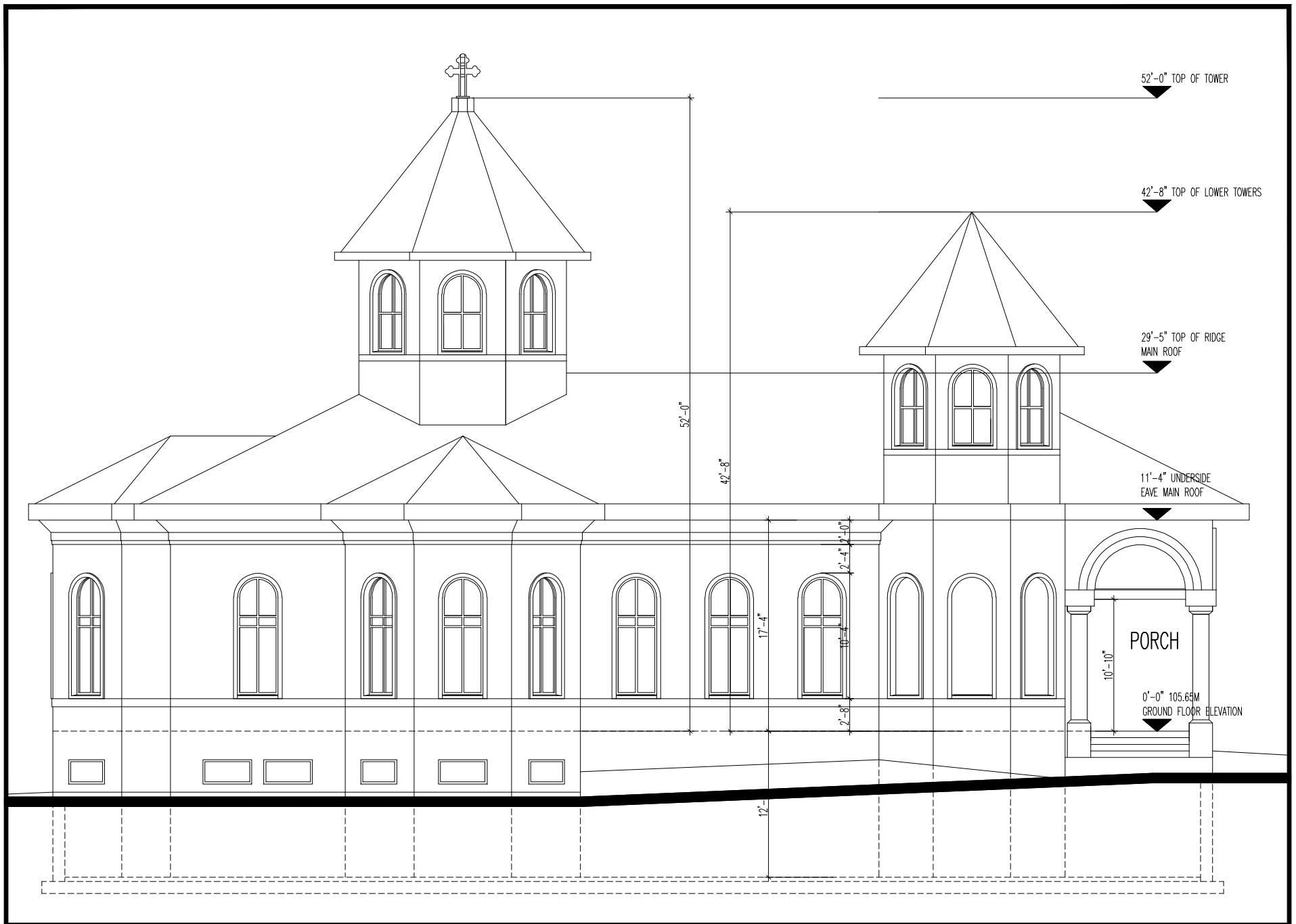
-12'-0" 102.00M BASEMENT FLOOR ELEVATION



REAR ELEVATION (EAST)
SAINT NICHOLAS ROMANIAN ORTHODOX CHURCH 4699 BANK STREET, OTTAWA, ONT

9 of 14

FEB 2013



SIDE ELEVATION (NORTH)
SAINT NICHOLAS ROMANIAN ORTHODOX CHURCH 4699 BANK STREET, OTTAWA, ONT

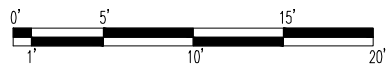
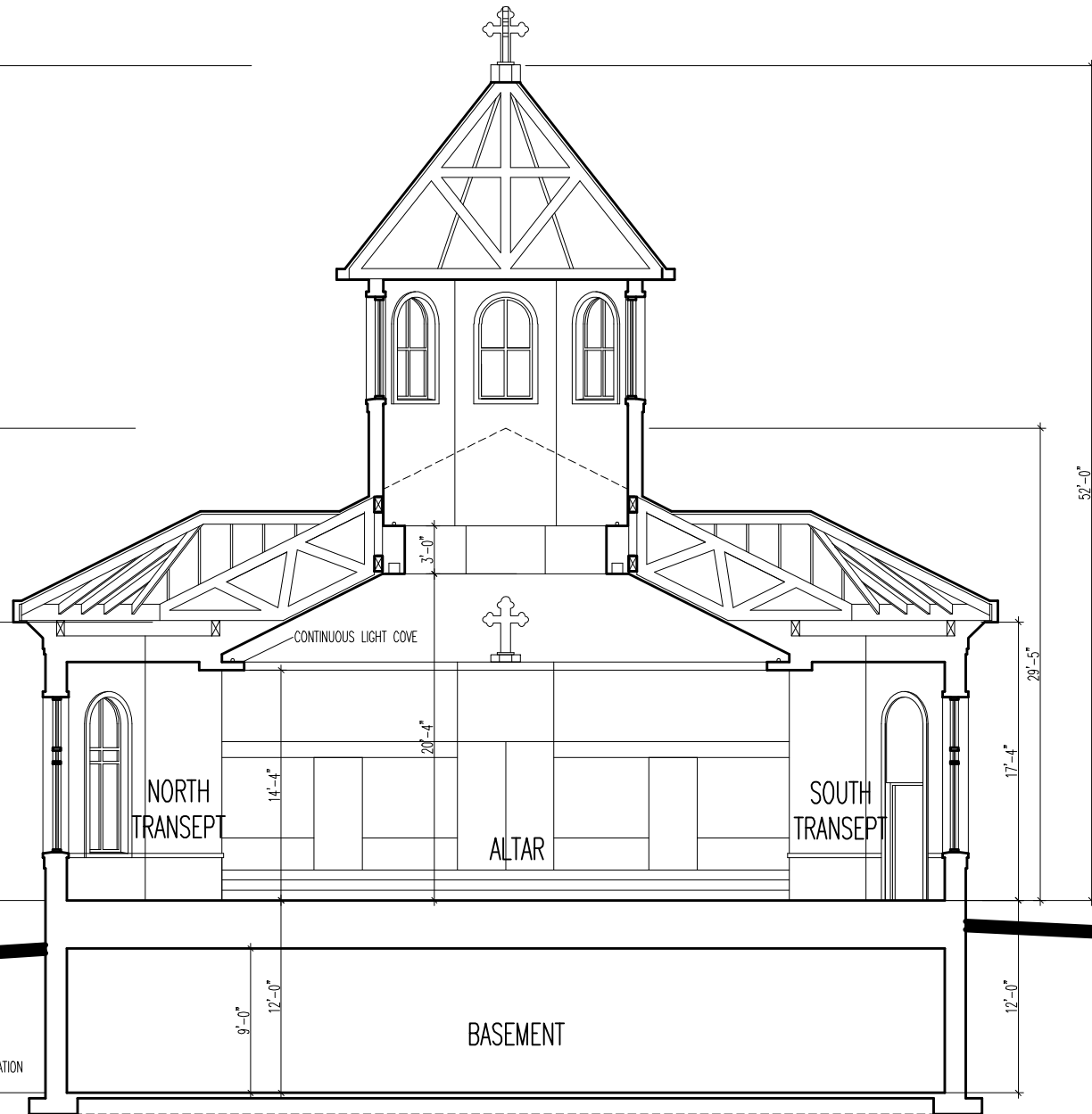
52'-0" TOP OF TOWER

29'-5" TOP OF RIDGE MAIN ROOF

11'-4" UNDERSIDE EAVE MAIN ROOF

0'-0" 105.65M GROUND FLOOR ELEVATION

-12'-0" 102.00M BASEMENT FLOOR ELEVATION



BUILDING SECTION A-A
SAINT NICHOLAS ROMANIAN ORTHODOX CHURCH 4699 BANK STREET, OTTAWA, ONT

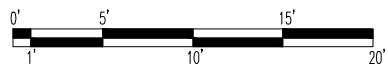
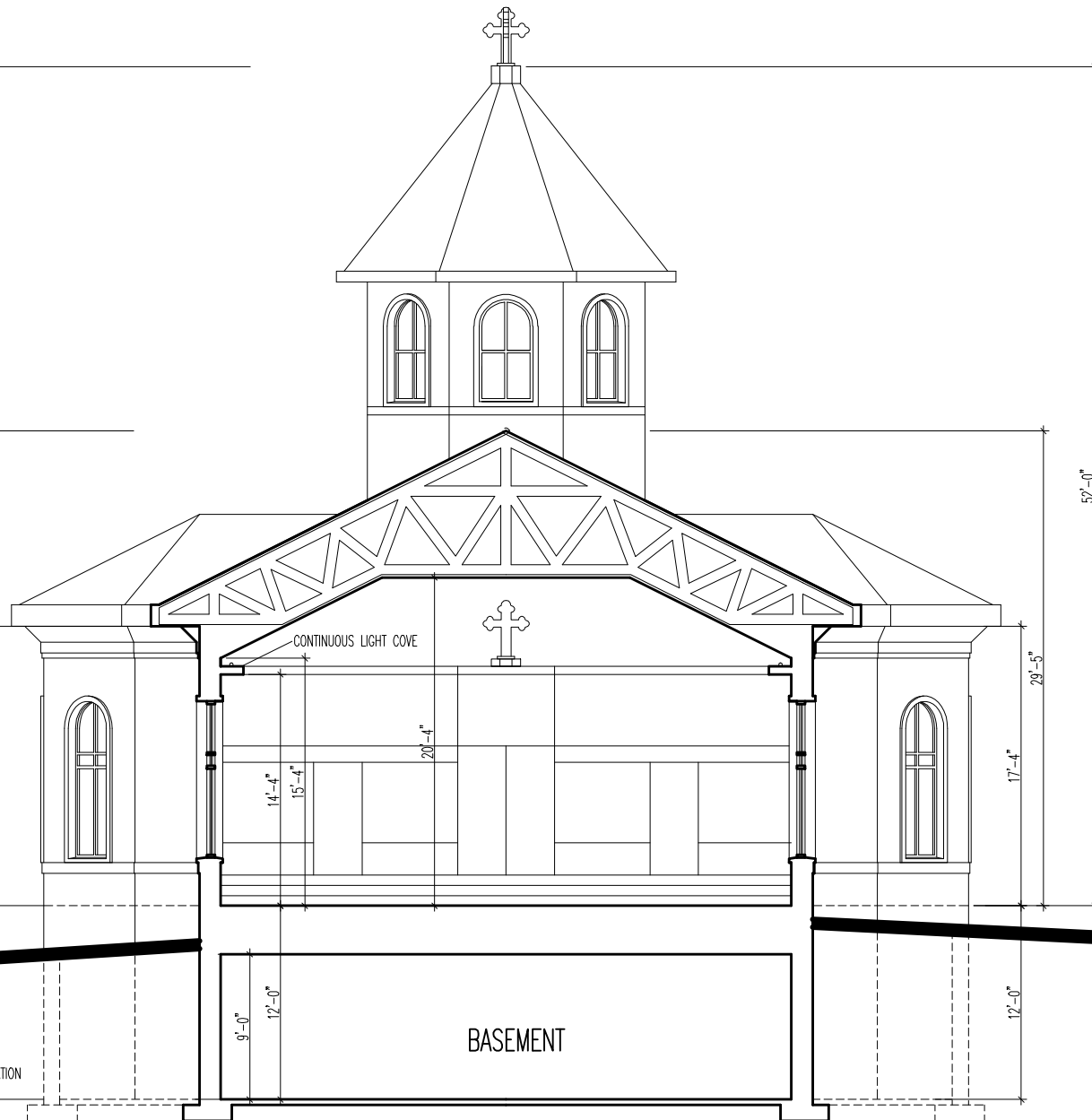
52'-0" TOP OF TOWER

29'-5" TOP OF RIDGE MAIN ROOF

11'-4" UNDERSIDE EAVE MAIN ROOF

0'-0" 105.65M GROUND FLOOR ELEVATION

-12'-0" 102.00M BASEMENT FLOOR ELEVATION



BUILDING SECTION B-B
SAINT NICHOLAS ROMANIAN ORTHODOX CHURCH 4699 BANK STREET, OTTAWA, ONT

12 of 14

FEB 2013

52'-0" TOP OF TOWER

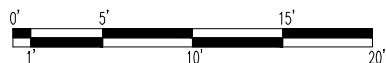
42'-8" TOP OF LOWER TOWERS

29'-5" TOP OF RIDGE MAIN ROOF

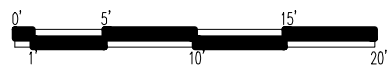
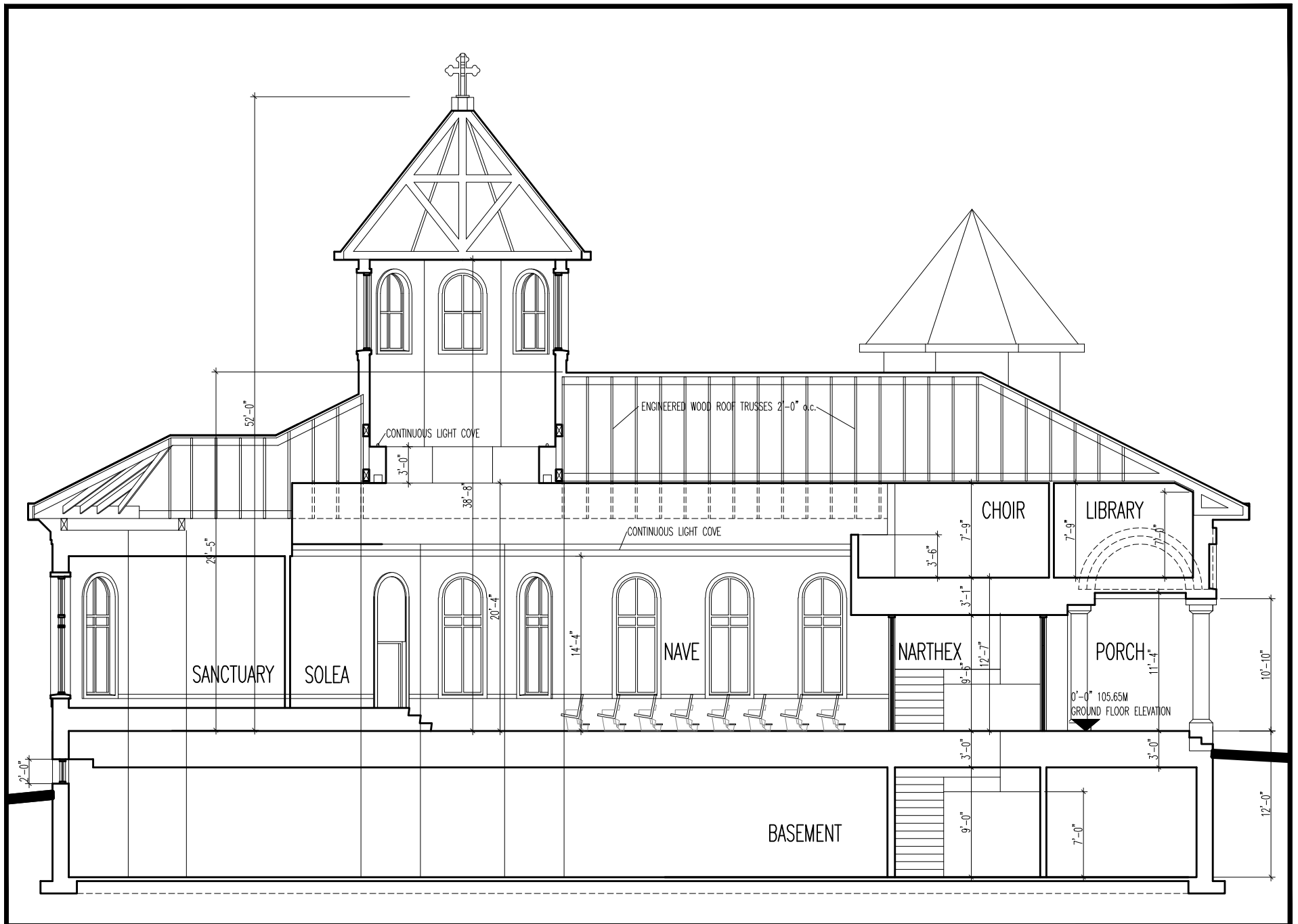
11'-4" UNDERSIDE EAVE MAIN ROOF

0'-0" 105.65M GROUND FLOOR ELEVATION

-12'-0" 102.00M BASEMENT FLOOR ELEVATION



BUILDING SECTION C-C
SAINT NICHOLAS ROMANIAN ORTHODOX CHURCH 4699 BANK STREET, OTTAWA, ONT



BUILDING SECTION D-D
 SAINT NICHOLAS ROMANIAN ORTHODOX CHURCH 4699 BANK STREET, OTTAWA, ONT

Appendix B

Land-Use Zoning Maps

4699 BANK ST

PIN: 043450023

**LEGAL DESCRIPTION /
DESCRIPTION OFFICIELLE**

CON 5RF W PT LOT 17

**PROPERTY AREA - acre /
SUPERFICIE - acre:**

1.2500

**FRONTAGE - ft /
FAÇADE - pi:**

149.00

**DEPTH - ft /
PROFONDEUR - pi :**

0.00

**WARD NUMBER /
NUMÉRO DU QUARTIER**

22

**WARD NAME /
NOM DU QUARTIER**

GLOUCESTER-SOUTH NEPEAN

**COUNCILLOR NAME /
NOM DU CONSEILLER - (ÈRE)**

Steve Desroches

**OLD WARD NUMBER /
ANCIEN NUMÉRO DU QUARTIER**

WARD 10

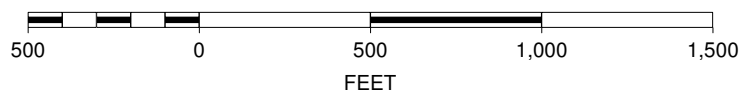
**WASTE COLLECTION PICK-UP DAY AND ZONE /
JOUR ET ZONE DE LA COLLECTE DES ORDURES**

FRIDAY - Cal. C

4699 Bank St.



SCALE 1 : 6,744



Appendix C

Road Traffic Data

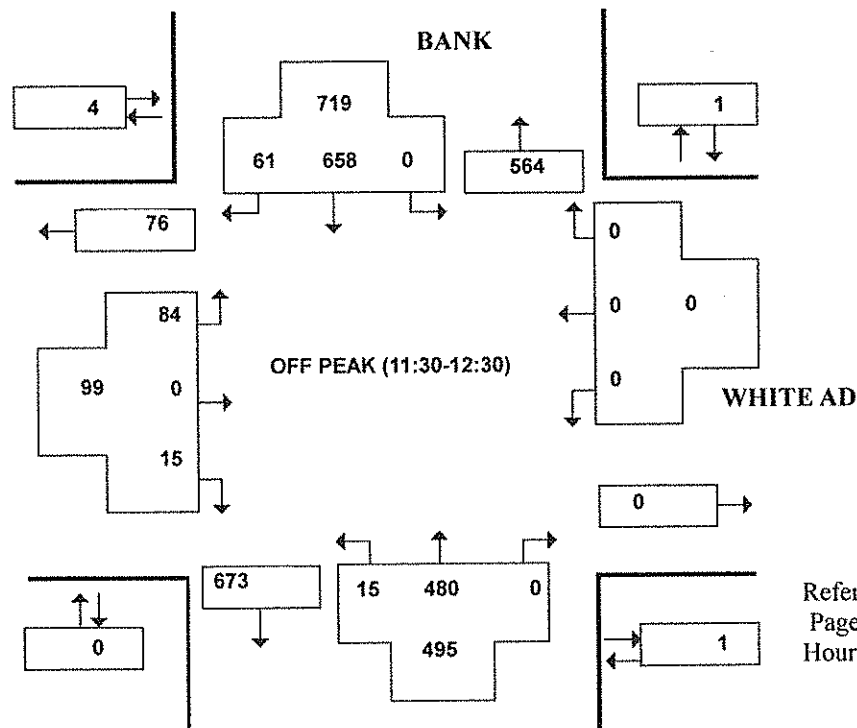
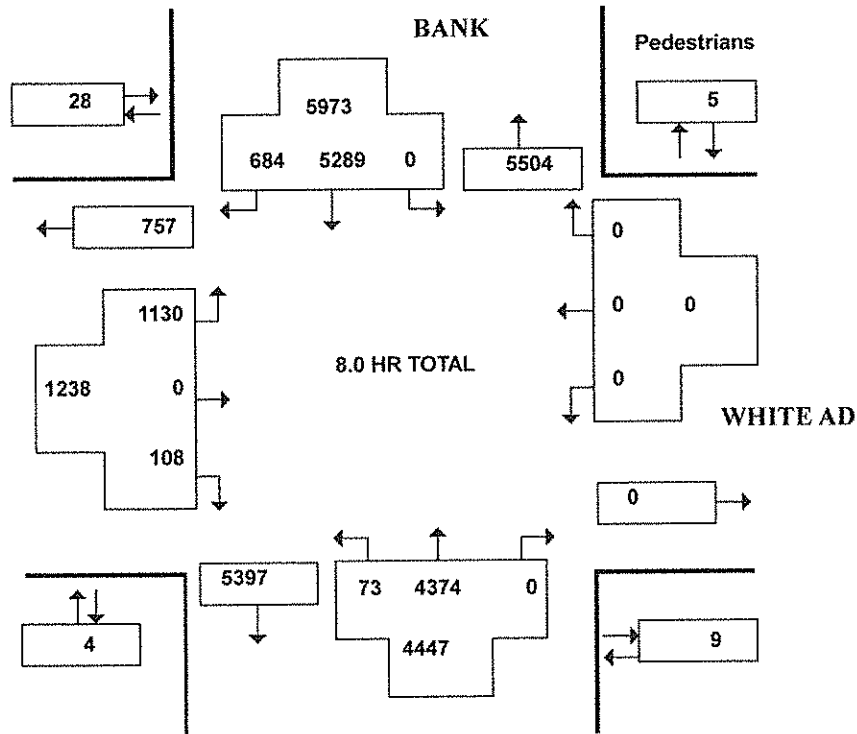
BANK ST and WHITE ADLER AVE

(ULRS Listing BANK & WHITE AD)

Survey Date: Wednesday 26 June 2013
Conditions: DRY
Start Time: 0700

Total Observed U-Turns
Northbound: 0 Southbound: 0
Eastbound: 0 Westbound: 0

AADT Factor
Wednesday in June is
0.9



Refer to Summary
Page for Survey
Hours.

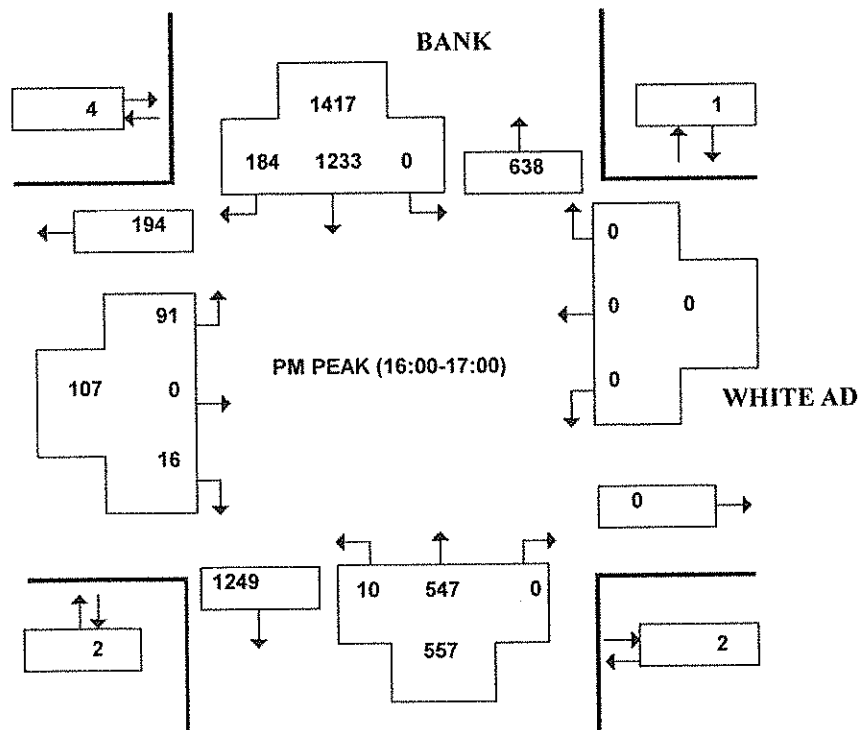
BANK ST and WHITE ADLER AVE
(ULRS Listing BANK & WHITE AD)

Survey Date: Wednesday 26 June 2013
Conditions: DRY
Start Time: 0700

Total Observed U-Turns
Northbound: 0 Southbound: 0
Eastbound: 0 Westbound: 0

AADT Factor
Wednesday in June is
0.9

BANK					Pedestrians	
5	391				0	
	21	370	0	1007		
25					0	
321					0	0
333	0	AM PEAK (07:30-08:30)			0	WHITE AD
	12					0
	382	4	686	0		
0	690				0	



Vehicular Turning Movements - Summary

BANK ST and WHITE ADLER AVE

(ULRS Listing BANK & WHITE AD)

Survey Date: Wednesday 26 June 2013

Conditions: DRY

Start Time: 0700

Total Observed U-Turns

Northbound: 0 Southbound: 0

Eastbound: 0 Westbound: 0

AADT Factor

Wednesday in June is

0.9

Time Period	BANK										WHITE AD									
	Northbound			SUB TOT	Southbound			SUB TOT	STR TOT	Eastbound			SUB TOT	Westbound			SUB TOT	STR TOT	GRAND TOT	
	LT	ST	RT		LT	ST	RT			LT	ST	RT		LT	ST	RT				
07:00-08:00	6	772	0	778	0	290	12	302	1080	290	0	16	306	0	0	0	0	306	1386	
08:00-09:00	8	625	0	633	0	406	32	438	1071	260	0	13	273	0	0	0	0	273	1344	
09:00-10:00	9	547	0	556	0	488	48	536	1092	119	0	11	130	0	0	0	0	130	1222	
11:30-12:30	15	480	0	495	0	658	61	719	1214	84	0	15	99	0	0	0	0	99	1313	
12:30-13:30	4	425	0	429	0	528	70	598	1027	97	0	17	114	0	0	0	0	114	1141	
15:00-16:00	11	474	0	485	0	829	116	945	1430	71	0	12	83	0	0	0	0	83	1513	
16:00-17:00	10	547	0	557	0	1233	184	1417	1974	91	0	16	107	0	0	0	0	107	2081	
17:00-18:00	10	504	0	514	0	857	161	1018	1532	118	0	8	126	0	0	0	0	126	1658	
8.0 HR TOTAL	73	4374	0	4447	0	5289	684	5973	10420	1130	0	108	1238	0	0	0	0	1238	11658	

EQU. 12 HR TOTAL 101 6079 0 6180 0 7351 950 8301 14481 1570 0 150 1720 0 0 0 0 1720 16201

Note: These values are calculated by multiplying the totals by the appropriate expansion factor.

AVG. 12 HR TOTAL 90 5471 0 5561 0 6615 855 7470 13031 1413 0 135 1548 0 0 0 0 1548 14579

Note: These volumes are calculated by multiplying the Equivalent 12 hr. totals by the AADT factor.

AVG. 24 HR TOTAL 117 7167 0 7284 0 8665 1120 9785 17069 1851 0 176 2027 0 0 0 0 2027 19096

Note: These volumes were calculated by multiplying the Average Daily 12 hr totals by 1.31.

AM TOTAL (0700-0900) 14 1397 0 1411 0 696 44 740 2151 550 0 29 579 0 0 0 0 579 2730

PM TOTAL (1530-1730) 21 1072 0 1093 0 2178 338 2516 3609 176 0 27 203 0 0 0 0 203 3812

Vehicular Turning Movements (15 Min. Volumes)

BANK ST and WHITE ADLER AVE

(ULRS Listing BANK & WHITE AD)

Survey Date: Wednesday 26 June 2013

Conditions: DRY

Start Time: 07:00

Total Observed U-Turns

Northbound: 0 Southbound: 0

Eastbound: 0 Westbound: 0

AADT Factor

Wednesday in June is

0.9

Time Period	BANK								WHITE AD										SUB TOT	STR TOT	GRAND TOT
	Northbound			SUB TOT	Southbound			SUB TOT	STR TOT	Eastbound			SUB TOT	Westbound							
	LT	ST	RT		LT	ST	RT			LT	ST	RT		LT	ST	RT					
07:00-07:15	2	209	0	211	0	50	1	51	262	49	0	7	56	0	0	0	0	56	318		
07:15-07:30	2	195	0	197	0	58	1	59	256	72	0	2	74	0	0	0	0	74	330		
07:30-07:45	1	215	0	216	0	78	4	82	298	82	0	3	85	0	0	0	0	85	383		
07:45-08:00	1	153	0	154	0	104	6	110	264	87	0	4	91	0	0	0	0	91	355		
08:00-08:15	1	147	0	148	0	102	6	108	256	84	0	4	88	0	0	0	0	88	344		
08:15-08:30	1	171	0	172	0	86	5	91	263	68	0	1	69	0	0	0	0	69	332		
08:30-08:45	2	161	0	163	0	119	17	136	299	59	0	3	62	0	0	0	0	62	361		
08:45-09:00	4	146	0	150	0	99	4	103	253	49	0	5	54	0	0	0	0	54	307		
09:00-09:15	5	142	0	147	0	127	9	136	283	33	0	2	35	0	0	0	0	35	318		
09:15-09:30	2	148	0	150	0	109	7	116	266	35	0	2	37	0	0	0	0	37	303		
09:30-09:45	2	134	0	136	0	123	12	135	271	29	0	3	32	0	0	0	0	32	303		
09:45-10:00	0	123	0	123	0	129	20	149	272	22	0	4	26	0	0	0	0	26	298		
11:30-11:45	4	122	0	126	0	203	14	217	343	22	0	6	28	0	0	0	0	28	371		
11:45-12:00	4	121	0	125	0	131	19	150	275	27	0	3	30	0	0	0	0	30	305		
12:00-12:15	4	123	0	127	0	173	13	186	313	16	0	1	17	0	0	0	0	17	330		
12:15-12:30	3	114	0	117	0	151	15	166	283	19	0	5	24	0	0	0	0	24	307		
12:30-12:45	1	101	0	102	0	141	23	164	266	19	0	9	28	0	0	0	0	28	294		
12:45-13:00	1	86	0	87	0	149	13	162	249	27	0	1	28	0	0	0	0	28	277		
13:00-13:15	1	118	0	119	0	116	19	135	254	31	0	5	36	0	0	0	0	36	290		
13:15-13:30	1	120	0	121	0	122	15	137	258	20	0	2	22	0	0	0	0	22	280		
15:00-15:15	2	103	0	105	0	201	29	230	335	18	0	2	20	0	0	0	0	20	355		
15:15-15:30	4	102	0	106	0	209	21	230	336	19	0	4	23	0	0	0	0	23	359		
15:30-15:45	2	142	0	144	0	215	29	244	388	18	0	2	20	0	0	0	0	20	408		
15:45-16:00	3	127	0	130	0	204	37	241	371	16	0	4	20	0	0	0	0	20	391		
16:00-16:15	3	139	0	142	0	327	41	368	510	18	0	1	19	0	0	0	0	19	529		
16:15-16:30	1	151	0	152	0	422	48	470	622	22	0	8	30	0	0	0	0	30	652		
16:30-16:45	5	150	0	155	0	261	42	303	458	26	0	2	28	0	0	0	0	28	486		
16:45-17:00	1	107	0	108	0	223	53	276	384	25	0	5	30	0	0	0	0	30	414		
17:00-17:15	4	115	0	119	0	277	35	312	431	25	0	4	29	0	0	0	0	29	460		
17:15-17:30	2	141	0	143	0	249	53	302	445	26	0	1	27	0	0	0	0	27	472		
17:30-17:45	3	127	0	130	0	196	37	233	363	28	0	3	31	0	0	0	0	31	394		
17:45-18:00	1	121	0	122	0	135	36	171	293	39	0	0	39	0	0	0	0	39	332		

Pedestrian Volume Summary Sheet - Hourly Volumes

BANK ST and WHITE ADLER AVE

(ULRS Listing BANK & WHITE AD)

Survey Date: Wednesday 26 June 2013

Conditions: DRY

Start Time: 0700

Time Period	CROSSING BANK N/B APPROACH	CROSSING BANK S/B APPROACH	STREET TOTAL	CROSSING WHITE AD E/B APPROACH	CROSSING WHITE AD W/B APPROACH	STREET TOTAL	GRAND TOTAL
07:00-08:00	1	2	3	0	0	0	3
08:00-09:00	0	3	3	0	0	0	3
09:00-10:00	1	5	6	1	0	1	7
11:30-12:30	1	4	5	0	1	1	6
12:30-13:30	0	1	1	0	1	1	2
15:00-16:00	3	5	8	1	0	1	9
16:00-17:00	2	4	6	2	1	3	9
17:00-18:00	1	4	5	0	2	2	7
8.0 HR TOTAL	9	28	37	4	5	9	46

PEAK PERIOD SUMMARIES
AM PEAK PERIOD (7:00-9:00)

07:00-07:15	1	0	1	0	0	0	1
07:15-07:30	0	0	0	0	0	0	0
07:30-07:45	0	2	2	0	0	0	2
07:45-08:00	0	0	0	0	0	0	0
08:00-08:15	0	3	3	0	0	0	3
08:15-08:30	0	0	0	0	0	0	0
08:30-08:45	0	0	0	0	0	0	0
08:45-09:00	0	0	0	0	0	0	0
TOTALS	1	5	6	0	0	0	6

OFF PEAK PERIOD (11:30-13:30)

11:30-11:45	1	3	4	0	0	0	4
11:45-12:00	0	0	0	0	0	0	0
12:00-12:15	0	1	1	0	1	1	2
12:15-12:30	0	0	0	0	0	0	0
12:30-12:45	0	0	0	0	0	0	0
12:45-13:00	0	0	0	0	0	0	0
13:00-13:15	0	0	0	0	0	0	0
13:15-13:30	0	1	1	0	1	1	2
TOTALS	1	5	6	0	2	2	8

PM PEAK PERIOD (15:30-17:30)

15:30-15:45	0	1	1	0	0	0	1
15:45-16:00	0	0	0	0	0	0	0
16:00-16:15	0	1	1	0	1	1	2
16:15-16:30	0	0	0	0	0	0	0
16:30-16:45	0	2	2	1	0	1	3
16:45-17:00	2	1	3	1	0	1	4
17:00-17:15	0	1	1	0	0	0	1
17:15-17:30	0	0	0	0	0	0	0
TOTALS	2	6	8	2	1	3	11

Approved by: AP

Printed on : 17/04/2014

Heavy Vehicle Summary Sheet - Hourly Volumes

BANK ST and WHITE ADLER AVE

(ULRS Listing BANK & WHITE AD)

Survey Date : Wednesday 26 June 2013

Conditions : DRY

Start Time : 0700

	BANK			Pedestrians	
28	395			5	
	15	380	0	445	
16				0	
24				0	0
26	0	8.0 HR TOTAL		0	
	2			0	WHITE AD
	382	1	421	0	
4		422			9

Time Period	BANK										WHITE AD									
	Northbound			SUB TOT	Southbound			SUB TOT	STR TOT	Eastbound			SUB TOT	Westbound			SUB TOT	STR TOT	GRAND TOT	
	LT	ST	RT		LT	ST	RT			LT	ST	RT		LT	ST	RT				
07:00-08:00	0	93	0	93	0	52	2	54	147	4	0	0	4	0	0	0	0	4	151	
08:00-09:00	1	68	0	69	0	41	1	42	111	6	0	1	7	0	0	0	0	7	118	
09:00-10:00	0	45	0	45	0	71	1	72	117	1	0	0	1	0	0	0	0	1	118	
11:30-12:30	0	48	0	48	0	45	0	45	93	3	0	0	3	0	0	0	0	3	96	
12:30-13:30	0	65	0	65	0	48	1	49	114	5	0	1	6	0	0	0	0	6	120	
15:00-16:00	0	42	0	42	0	59	8	67	109	2	0	0	2	0	0	0	0	2	111	
16:00-17:00	0	33	0	33	0	37	2	39	72	2	0	0	2	0	0	0	0	2	74	
17:00-18:00	0	27	0	27	0	27	0	27	54	1	0	0	1	0	0	0	0	1	55	
8.0 HR TOTAL	1	421	0	422	0	380	15	395	817	24	0	2	26	0	0	0	0	26	843	

Heavy Vehicles are vehicles having one rear axle with four or more wheels, or having two or more rear axles. These vehicles include most O.C. Transpo, school and inter-city buses. Further, they ARE included in the Turning Movement Count Summary.

Approved by: AP

Printed on: 17/04/2014

Bicycle Volume Summary Sheet - Hourly Volumes

BANK ST and WHITE ADLER AVE

(ULRS Listing BANK & WHITE AD)

Survey Date: Wednesday 26 June 2013

Conditions: DRY

Start Time: 0700

Time Period	NORTHBOUND APPROACH ON BANK	SOUTHBOUND APPROACH ON BANK	STREET TOTAL	EASTBOUND APPROACH ON WHITE AD	WESTBOUND APPROACH ON WHITE AD	STREET TOTAL	GRAND TOTAL
07:00-08:00	0	1	1	0	0	0	1
08:00-09:00	0	0	0	0	0	0	0
09:00-10:00	0	0	0	0	0	0	0
11:30-12:30	0	0	0	0	0	0	0
12:30-13:30	0	0	0	0	0	0	0
15:00-16:00	0	0	0	0	0	0	0
16:00-17:00	0	1	1	0	0	0	1
17:00-18:00	0	0	0	0	0	0	0
8.0 HR TOTAL	0	2	2	0	0	0	2

Note: These volumes consists of bicycles only (no mopeds or motorcycles) and ARE NOT included in the Turning Movement Count Summary.

Appendix D

Road Traffic Modelling

STAMSON 5.0 NORMAL REPORT Date: 05-06-2014 22:29:10
MINISTRY OF ENVIRONMENT AND ENERGY / NOISE ASSESSMENT

Filename: BankSt.te Time Period: Day/Night 16/8 hours
Description:

Road data, segment # 1: Bank St (day/night)

Car traffic volume : 20716/2302 veh/TimePeriod *
Medium truck volume : 444/49 veh/TimePeriod *
Heavy truck volume : 1044/116 veh/TimePeriod *
Posted speed limit : 60 km/h
Road gradient : 0 %
Road pavement : 1 (Typical asphalt or concrete)

* Refers to calculated road volumes based on the following input:

24 hr Traffic Volume (AADT or SADT): 18803
Percentage of Annual Growth : 2.50
Number of Years of Growth : 11.00
Medium Truck % of Total Volume : 2.00
Heavy Truck % of Total Volume : 4.70
Day (16 hrs) % of Total Volume : 90.00

Data for Segment # 1: Bank St (day/night)

Angle1 Angle2 : -90.00 deg 90.00 deg
Wood depth : 0 (No woods.)
No of house rows : 0 / 0
Surface : 1 (Absorptive ground
surface)
Receiver source distance : 40.00 / 40.00 m
Receiver height : 4.50 / 4.50 m
Topography : 1 (Flat/gentle slope; no
barrier)
Reference angle : 0.00

Results segment # 1: Bank St (day)

Source height = 1.47 m

ROAD (0.00 + 63.20 + 0.00) = 63.20 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj
--------	--------	-------	--------	-------	-------	-------	-------	-------

B.Adj	SubLeq
-------	--------

-90 90 0.57 71.20 0.00 -6.69 -1.30 0.00 0.00
0.00 63.20

Segment Leq : 63.20 dBA

Total Leq All Segments: 63.20 dBA

Results segment # 1: Bank St (night)

Source height = 1.47 m

ROAD (0.00 + 56.67 + 0.00) = 56.67 dBA

Angle1	Angle2	Alpha	RefLeq	P.Adj	D.Adj	F.Adj	W.Adj	H.Adj
--------	--------	-------	--------	-------	-------	-------	-------	-------

B.Adj	SubLeq
-------	--------

-90	90	0.57	64.66	0.00	-6.69	-1.30	0.00	0.00
0.00	56.67							

Segment Leq : 56.67 dBA

Total Leq All Segments: 56.67 dBA

TOTAL Leq FROM ALL SOURCES (DAY): 63.20
(NIGHT): 56.67

Appendix E

City of Ottawa Noise Guidelines



CITY OF OTTAWA ENVIRONMENTAL NOISE CONTROL GUIDELINES

**PLANNING AND GROWTH MANAGEMENT DEPARTMENT
CITY OF OTTAWA**

Approved by City Council on May 10, 2006

Prepared By

SS Wilson Associates
Consulting Engineers