toronto zoo

361A Old Finch Ave.
Toronto, ON M1B 5K7
www.torontozoo.com

Tel: 416-392-5900
Fax: 416-392-5934

2020-03-16

REQUEST FOR TENDER
ORANGUTAN OUTDOOR EXHIBIT CONSTRUCTION
RFT#: TZC T 10-2020-02
ADDENDUM # 2

This addendum shall be incorporated into, and form part of TZC T 10-2020-02 and take precedence over all requirements of the previously issued bid documents including plans. This addendum must be signed by the bidder (signing officer) in the appropriate space and must be attached to the Form for submission by the bidder. This Addendum consists of one (1) page and attached documents.

1. **Submission:**

   In view of the current situation with COVID 19 and to limit personal interaction, submissions for this Request for Tender can be submitted electronically to the following email address
   purchasing@torontozoo.ca

2. Submission Deadline**:**
   Friday, 2020-03-20 at 12:00 p.m. local time

3. Attached Addendum ADD #A002 from Zeidler dated 2020 March 13.

Receipt of the Addendum shall be acknowledged as part of your submission.

The Board of Management of the Toronto Zoo reserves the right to reject any or all Quotations or to accept any quotation, should it deem such action to be in its interests.

If you have any queries regarding this matter, please contact Mr. Peter Vasilopoulos, Supervisor, Purchasing & Supply, at 416-392-5916.

Yours truly,

Peter Vasilopoulos
Supervisor, Purchasing & Supply

I/we hereby acknowledge receipt of this addendum and make allowance in my bid.

_____
Signed (Must be Signing Officer of Firm)

_____
Name of Firm

_____
Date:

zeidler

Date Issued:	2020 March 13
Project Name:	**Toronto Zoo Orangutan Outdoor Exhibits**
To:	Ben Knoop Toronto Zoo 361A Old Finch Avenue Toronto, ON M1B 5K7
Project Number:	18-1-086
RFT Reference No.:	TZC-T-10-2020-02 (issued 2020-02-18)

Addendum ADD #A002

Note: *This addendum is issued prior to closing of tender to provide for certain revisions to or clarifications in the work. The revisions covered by this addendum shall be carried out in accordance with the requirements of the specifications. The following addendum items are included and shall become part of the contract.*

1. **General:**
   - **1.1 Site Access Map**
   - **1.2 Gaur 1 Pavilion As built drawing scans**

2. **Answers to bidder's RFIs- refer to attached.**

3. **Architectural – prepared by Zeidler**
   - **3.1 Drawings issued for #A002 dated March 13, 2020:**
     - 3.1.1 Refer to enclosed Architectural drawing revision List
     - 3.1.2 See attached architectural drawings

4. **Structural – prepared by RJC**
   - 4.1 Drawings issued for Structural Addendum No.2 dated March 13, 2020 – see attached.

5. **Arborist report & drawings**
   - 5.1 Drawings prepared by Kuntz Forestry

END OF ADD #A002

Sincerely,
ZEIDLER ARCHITECTURE INC.

Lena Chow, Associates
cc: Zeidler Architecture Inc.

TZC-T-10-2020-02
ADDENDUM - A001
Access To Site

BRIDGE
- 140,500 LB
CAPACITY

BRIDGE
- 10'6" CLEARANCE BELOW
- 68,000lb MAX CAP.
LOAD ABOVE

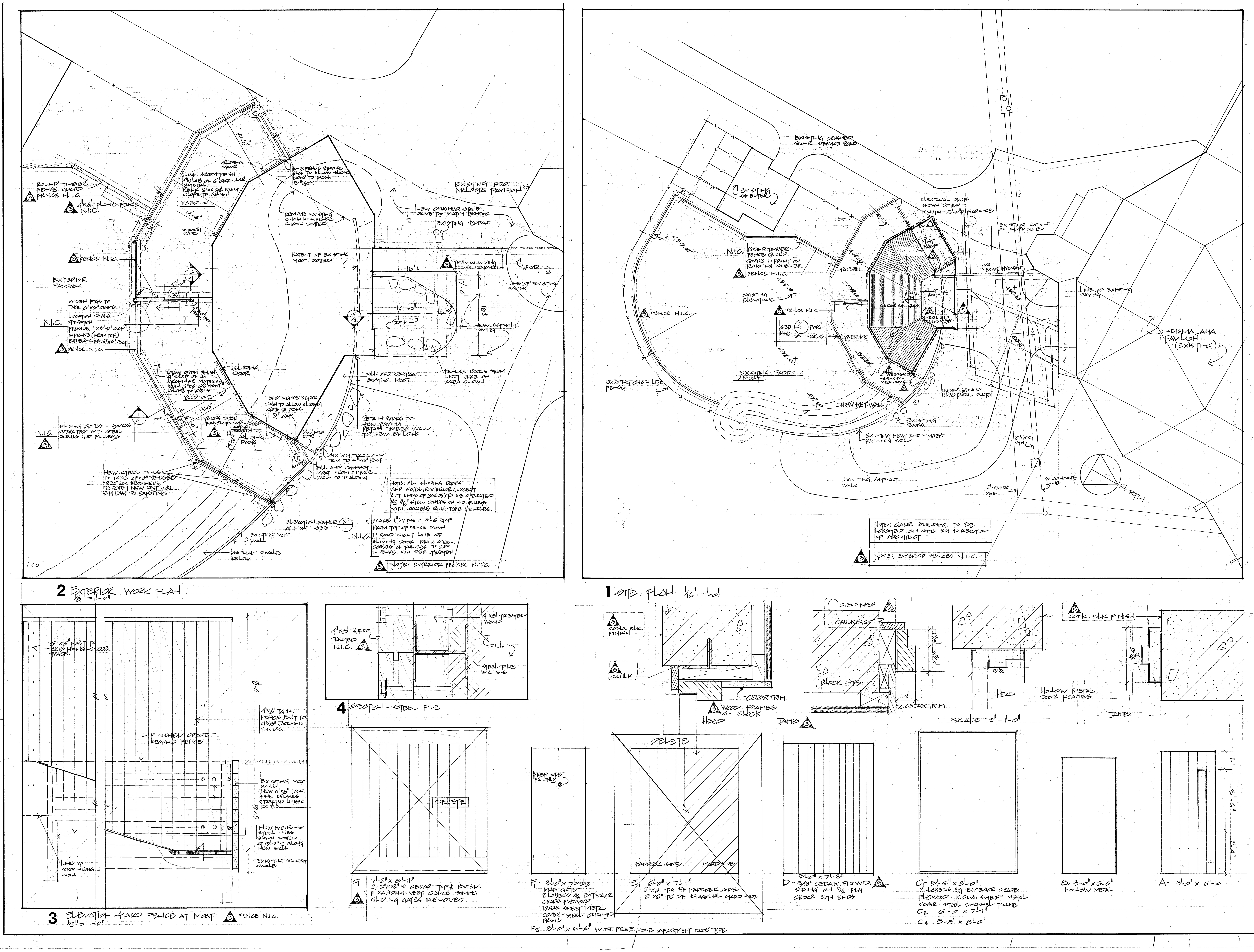
BOARDWALK
- 2200 LB
CAPACITY

P8

P7

HABITAT #2

HABITAT #1



NOTES:
- THE CONTRACTOR SHALL VERIFY ALL JOB AND DRAWING DIMENSIONS
- DO NOT SCALE DRAWINGS
- (10/2) INDICATES DETAIL NO. / INDICATES DRAWING NO.

REVISIONS
NOV. 7. 78
(1) - ADDENDUM # 1
- EXTENT MECHANICAL SCREEN
- 4" WEEPING TILE NOTED ON SITE PLAN

(2) YARD REVISED TO MATCH 1/8th" SCALE PLAN.

REVISIONS
MARCH 22. 79
(3)
- REMOVAL OF TRELLIS & SLIDING GATES.
- MECH. UNIT RELOCATED.
- PADDOCK FENCES NOTED N.I.C.
- CAULKING @ DOOR FRAMES
- CONC. BLK. FINISH @ WALLS AT DOORS.
- YARDS TO BE GRADED TO CATCH BASIN
- 5/8" FLYWD. INT. FINISH WHERE NOTED.

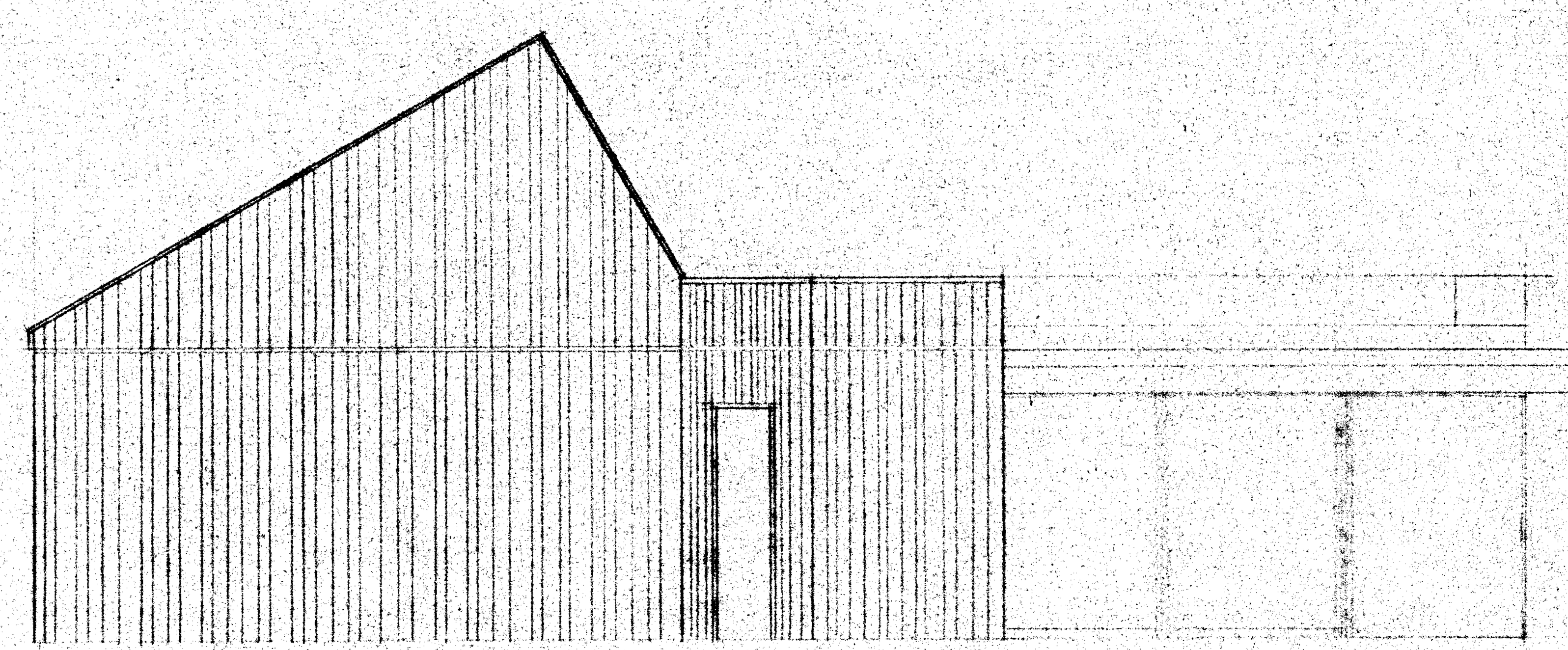
clifford
lawrie
bolton
ritchie
architects
153 st. clair avenue west, toronto

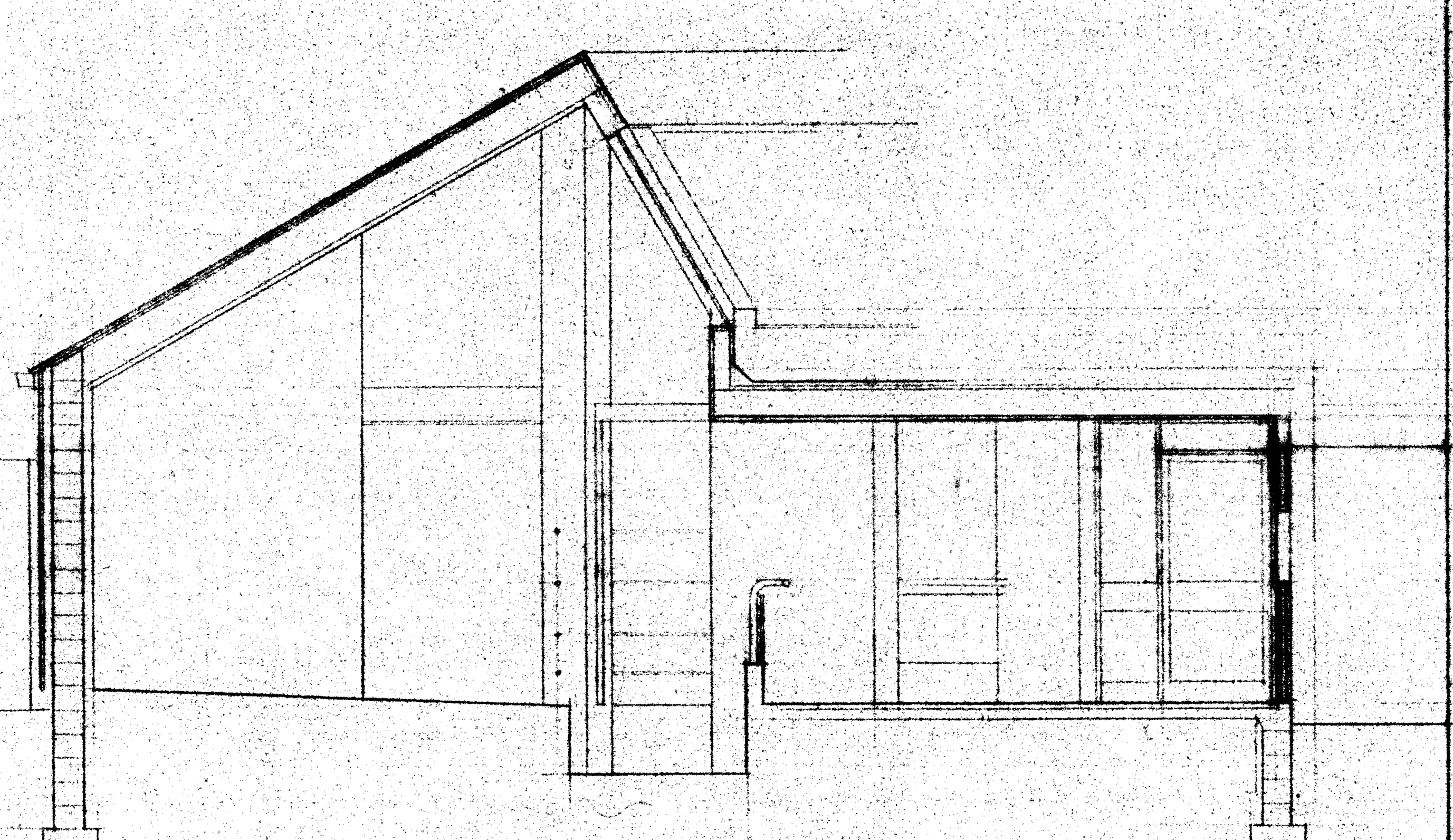
GAUR EXHIBIT & SHELTER - SITE PLAN & DETAILS

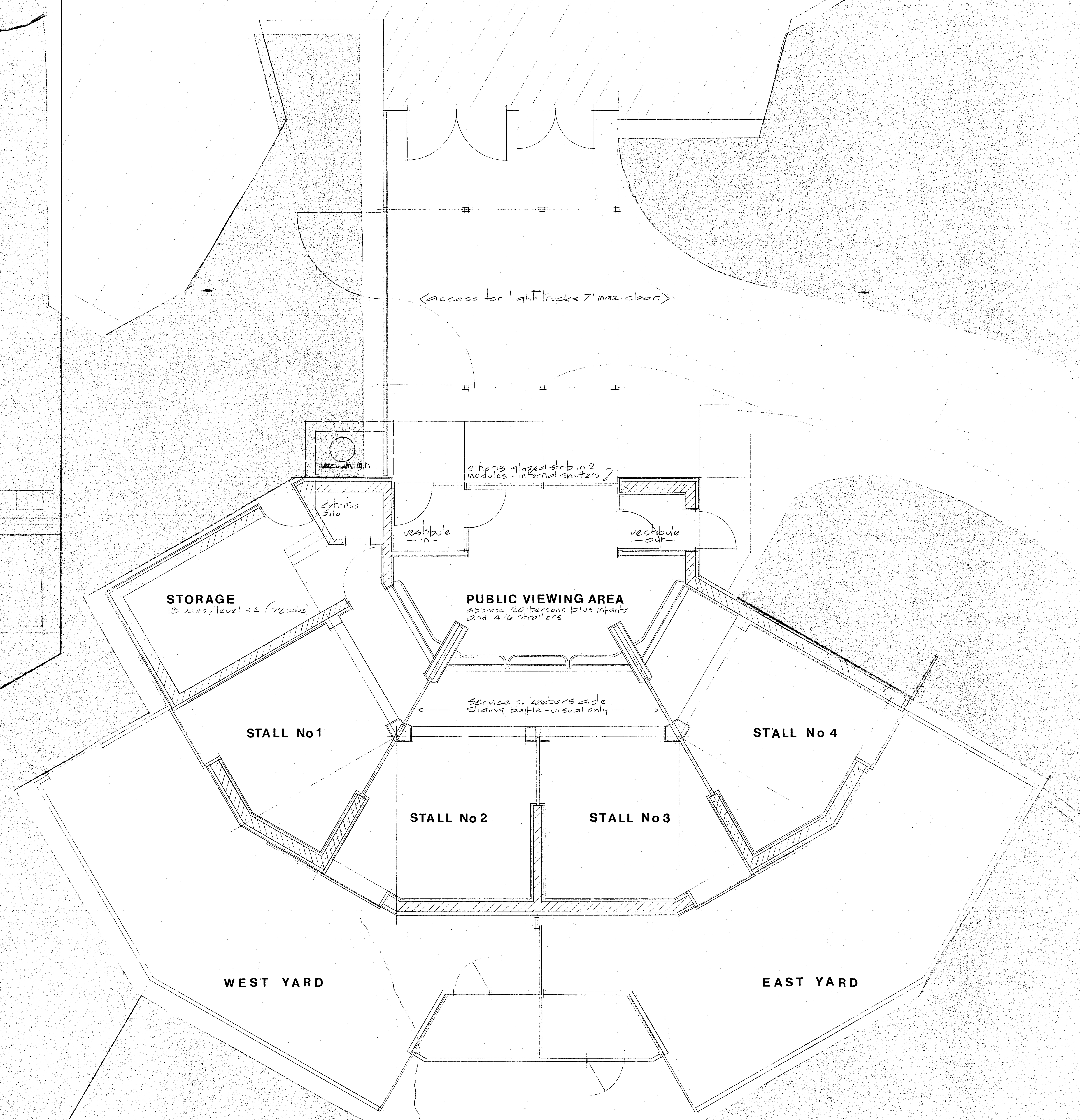
scale	drawn
AS SHOWN	H.T.
date	checked
OCT. 1978.	

project no.

drawing no. 1







r.j. thom
clifford & lawrie
crang & boake

JOINT
VENTURE
ARCHITECTS

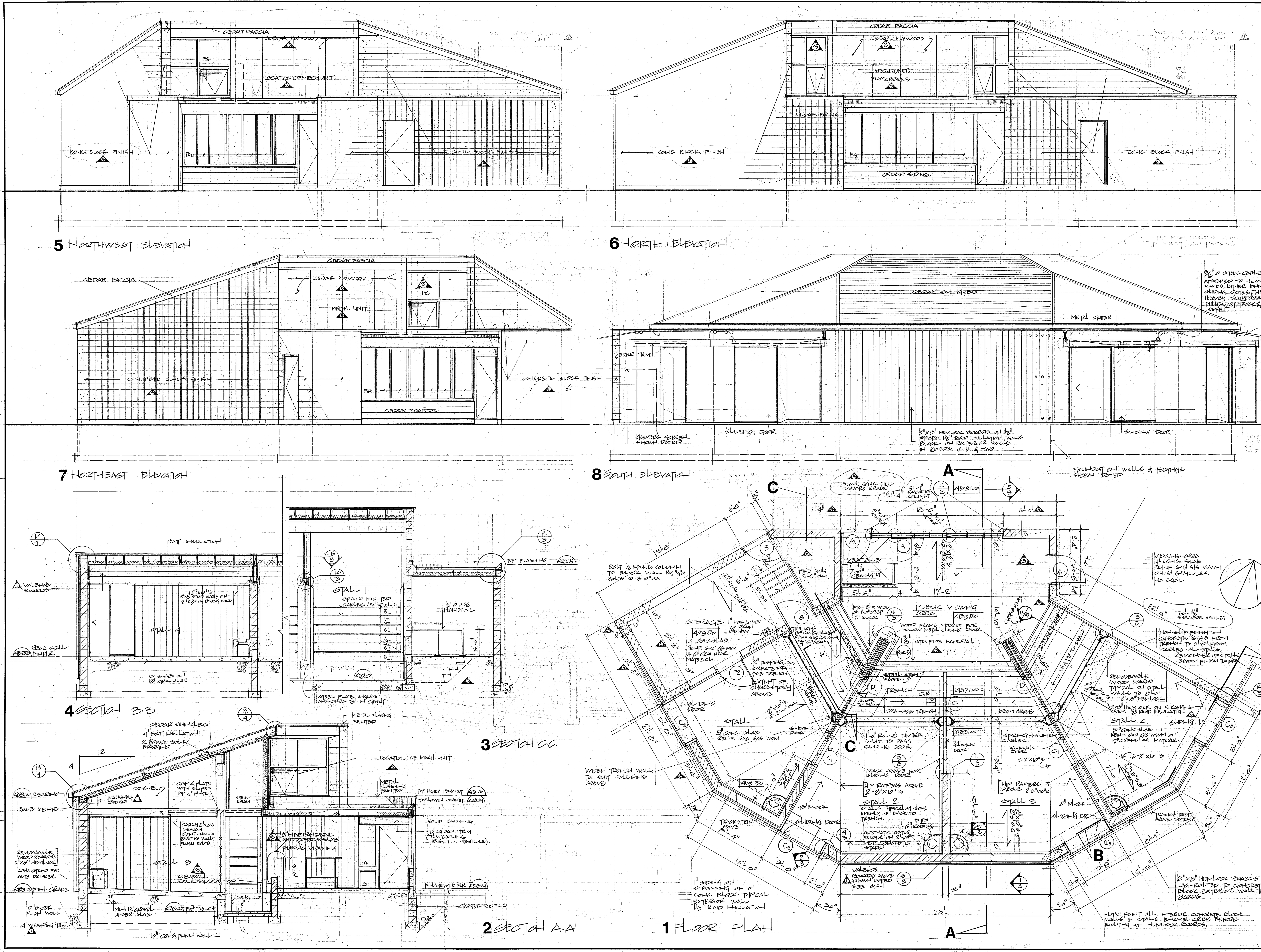
clifford
lawrie
bolton
ritchie
architects
153 st. clair avenue west, toronto

METRO
TORONTO
ZOO

gaur exhibit
& shelter

scale 1/4" = 1'0"
drawn WM
date September 1970
checked -

project no.
drawing no. A1 p



REVISIONS

NOV. 7.78
ADDENDUM #1
- EXTENT WOOD SCREEN REVISED
- 4" WEEPING TILES SHOWN ON SECTIONS
- VALENCE BOARDS SHOWN AS PER AD-1.

MARCH 22/79
- CONC BLOCK FINISH SHOWN ON ELEVATIONS - EXTERIOR
- LOCATION OF MECH. UNIT CHANGED ON ELEVATIONS & SECTIONS
- CLERESTORY WINDOWS REDUCED
- DETRITUS SILO REMOVED
- CEDAR PLYWOOD FINISH AS SHOWN ON ELEVATIONS
- BLOCK DIMENSIONS ALTERED ON PLAN
- EXTERIOR TRELLIS DELETED
- BULKHEAD OVER CLERESTORY DELETED
- HANDRAIL & SPANDREL WALL IN PUBLIC AREA SIMPLIFIED
- INTERIOR PAVING DELETED
- VESTIBULE DELETED
- EXPOSED CONC. BLOCK ABOVE 9'0" IN ANIMAL AREAS

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lawrie
bolton
ritchie
architects
153 st.clair avenue west, toronto

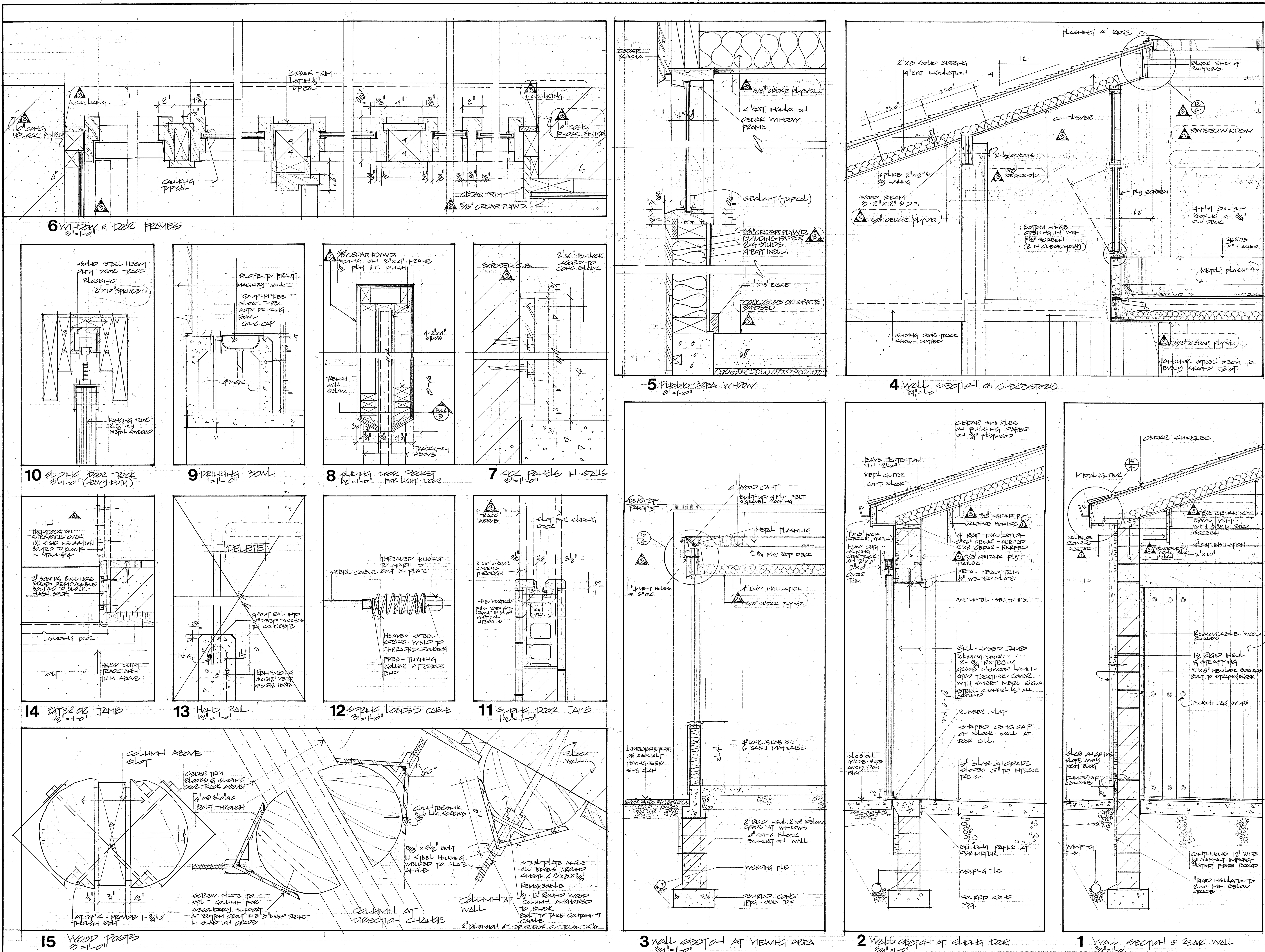
R.J. Thom
Clifford & Lawrie
Craig & Boake
Architects for the
Metropolitan Toronto Zoo

GAUR EXHIBIT & SHELTER - PLAN SECTIONS · ELEVATIONS

scale 1/4" = 1'-0"
drawn H W.M.
date OCT. 1978
checked

R.J. THOM · CLIFFORD & LAWRIE · CRAIG & BOAKE
ASSOCIATED ARCHITECTS
ARCHITECTS FOR THE METROPOLITAN TORONTO ZOO
ONTARIO ASSOCIATION ARCHITECTS
MEMBERS

project no.
drawing no.
2



REVISIONS
NOV. 7. 73
ADDENDUM #1
- VALENCE BOARDS SHOWN SEE AD-1
- AWNING WINDOW TOP HINGE
MARCH 22 - 79
- REVISED CLERESTORY WINDOW
- 5/8 CEDAR PLY CEILING
- 5/8 CEDAR PLY @ CLERESTORY WALL
- EXPOSED CONC. BLK FINISH ABOVE 2"x10" @ ANIMAL ENCLOSURE
- CONC. BLK FINISH @ EXTERIOR WALLS
- 5/8 CEDAR PLY INTERIOR FINISH
- REVISED FASCIA
- STANDARD TYPE HANDRAIL AT VIEWING AREA
- ELIM. BULKHEAD OVER WINDOWS
- ELIM. EXTERIOR TRELLIS
- DELETE INTERIOR PAVING
- DELETE ONE VESTIBULE
- 2x10 CEDAR TRIM CHANGED TO 2x10 SPRUCE

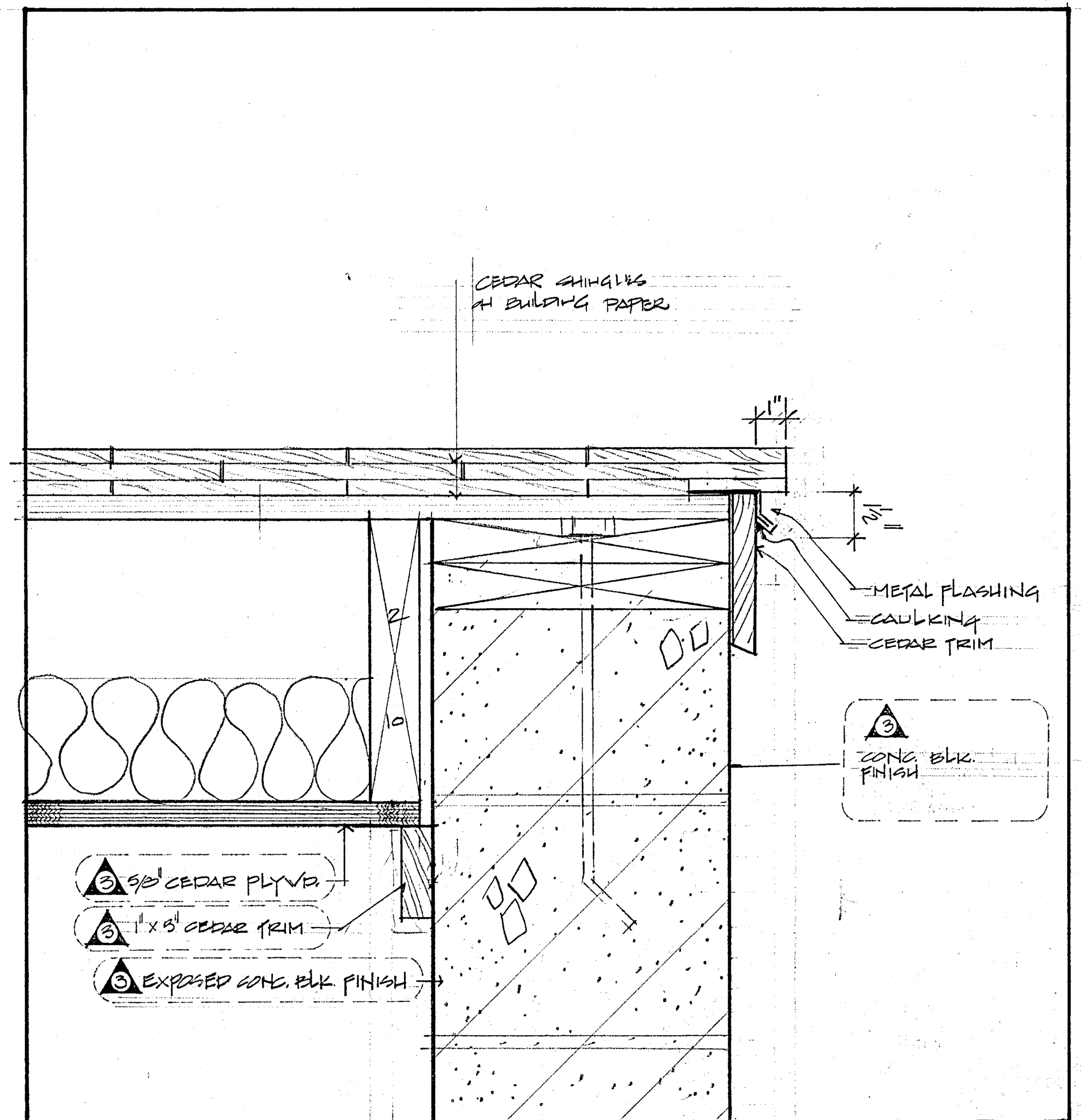
clifford lawrie bolton ritchie architects
153 st.clair avenue west, toronto

GAUR EXHIBIT AND SHELTER DETAILS

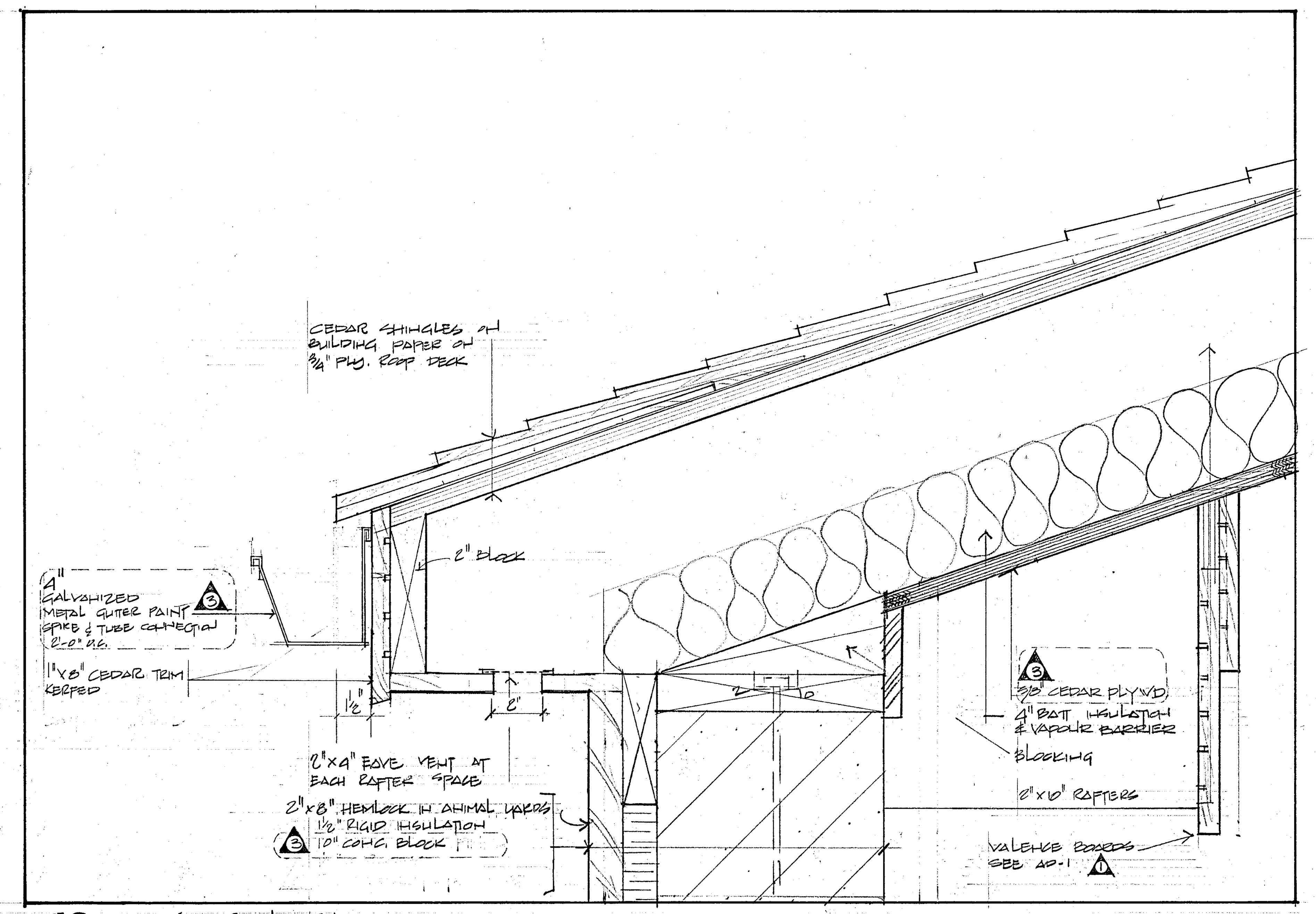
scale	drawn
AS SHOWN	H.
date	checked
OCT. 73	

project no.

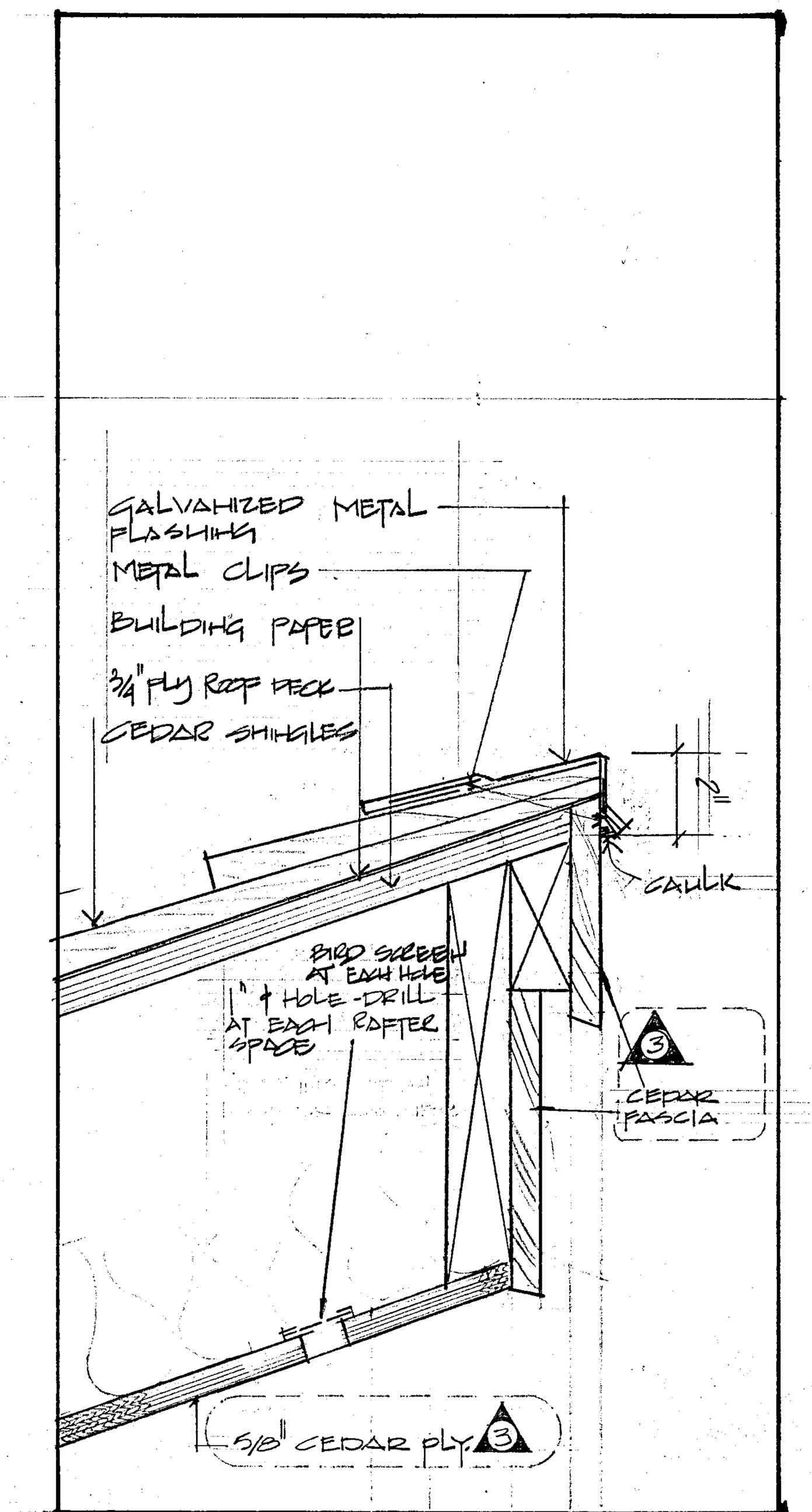
drawing no. 3



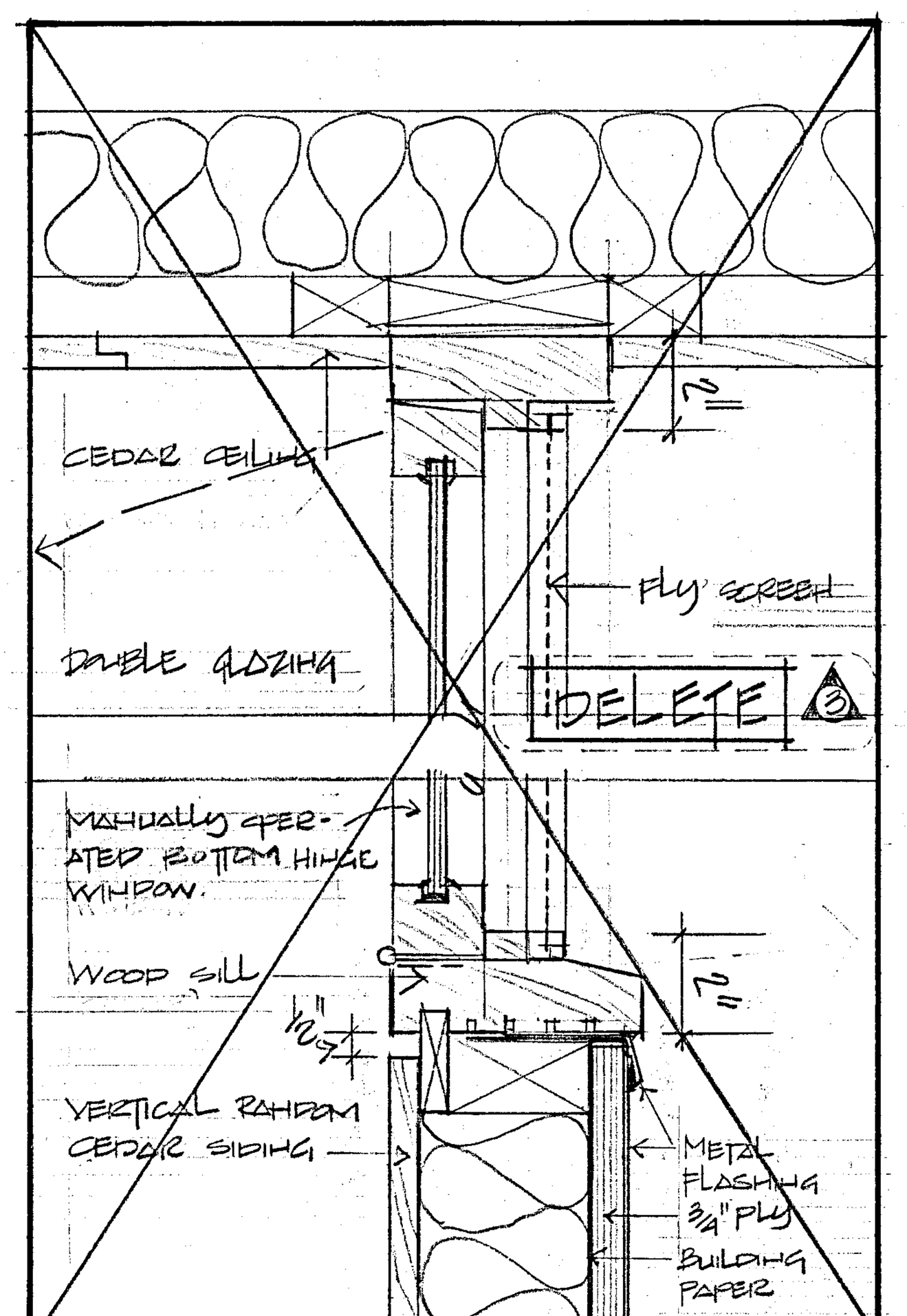
14 SECTION - EDGE PITCHED ROOF 3"=1'-0"



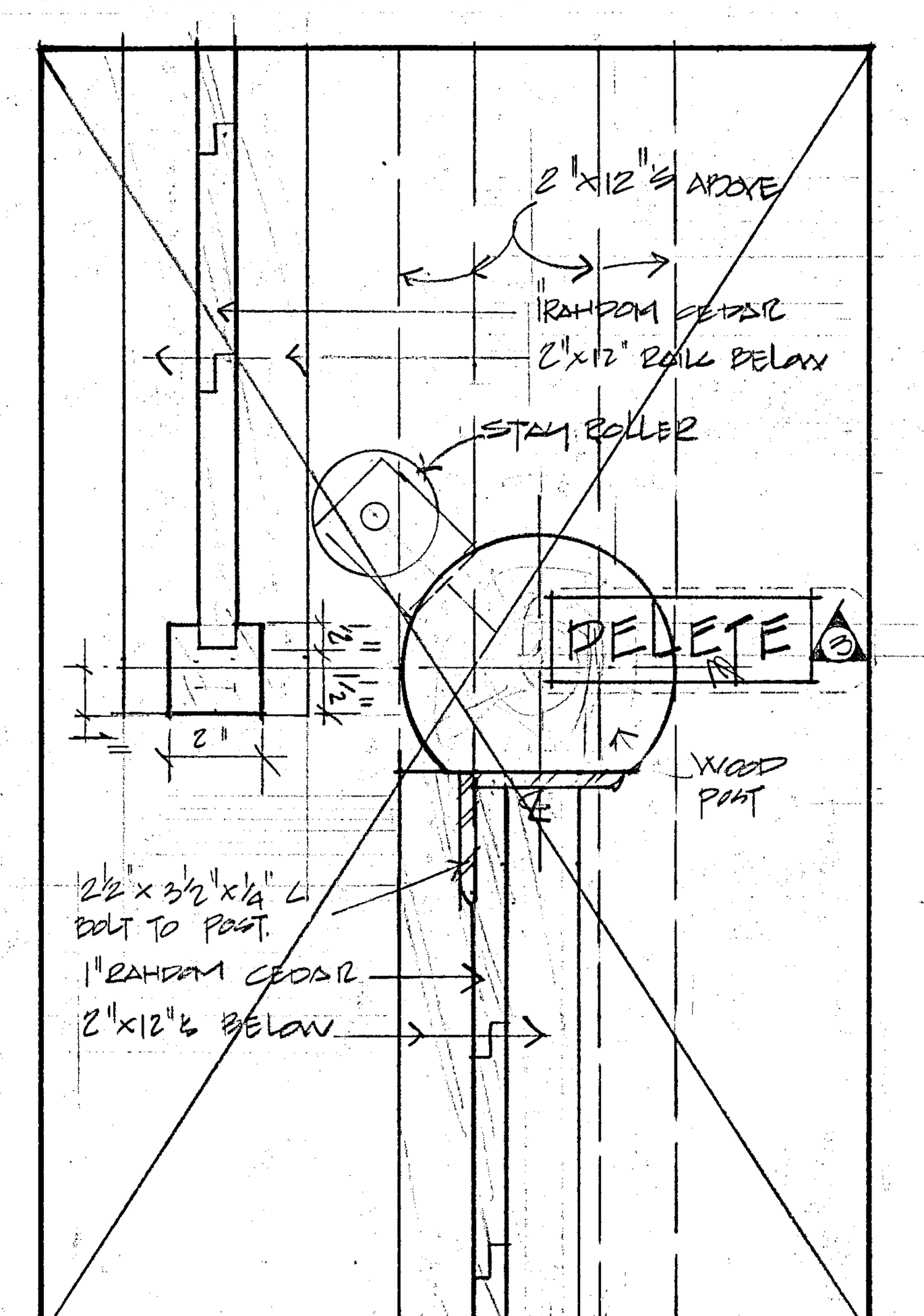
13 SECTION - EAVE 3"=1'-0"



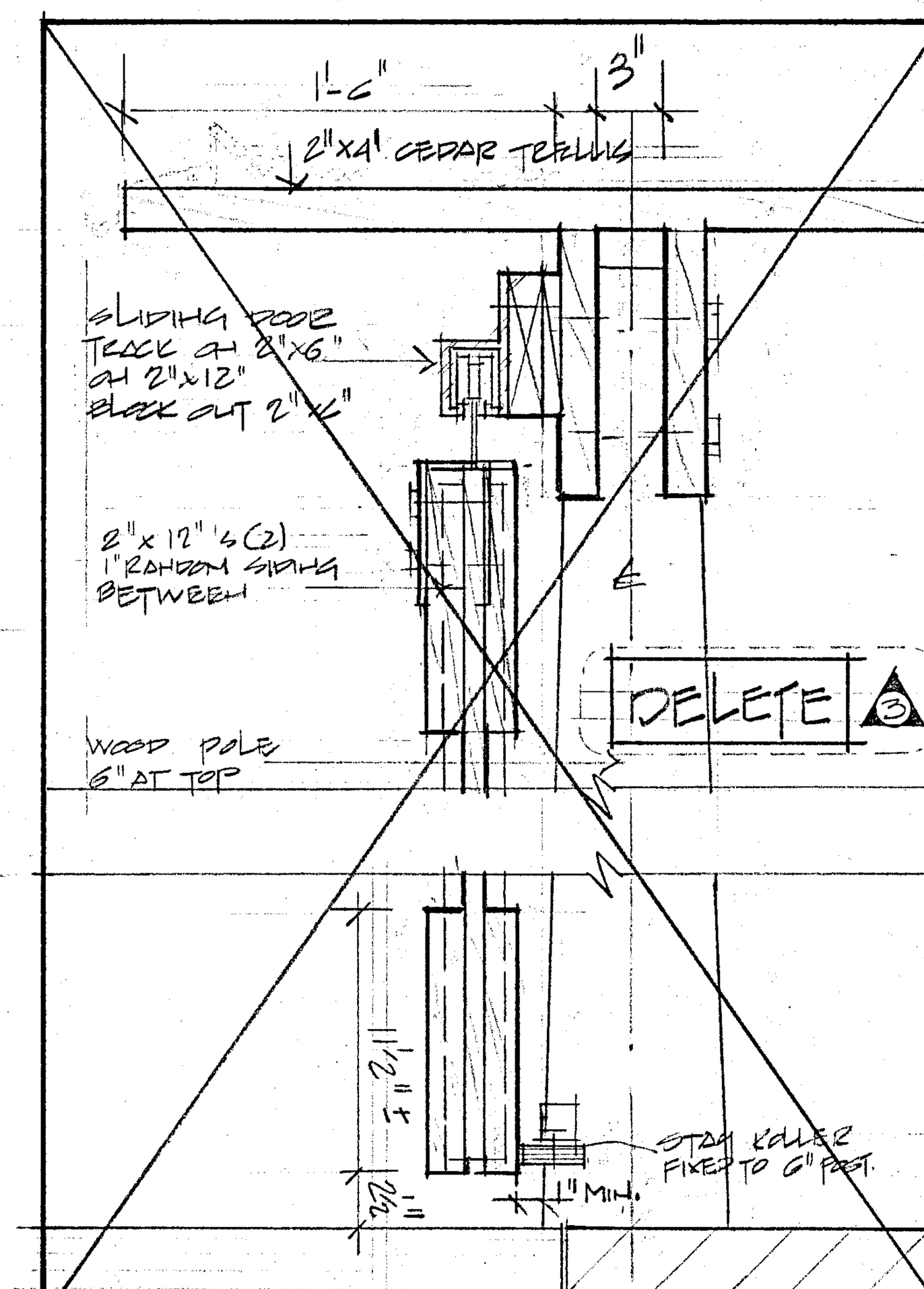
12 ROOF RIDGE 3"=1'-0"



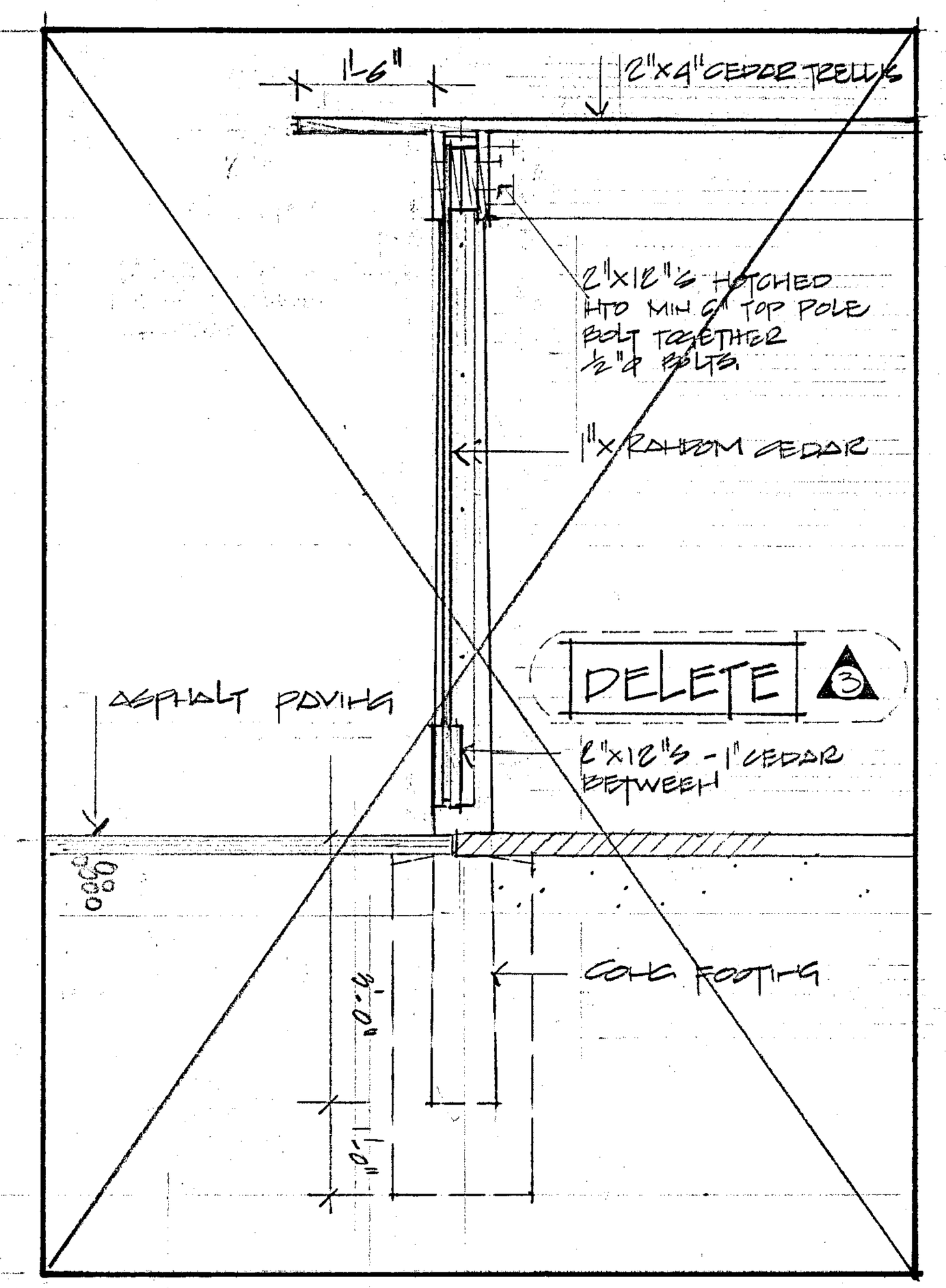
11 OPENING VENTS @ CLERESTORY 3"=1'-0"



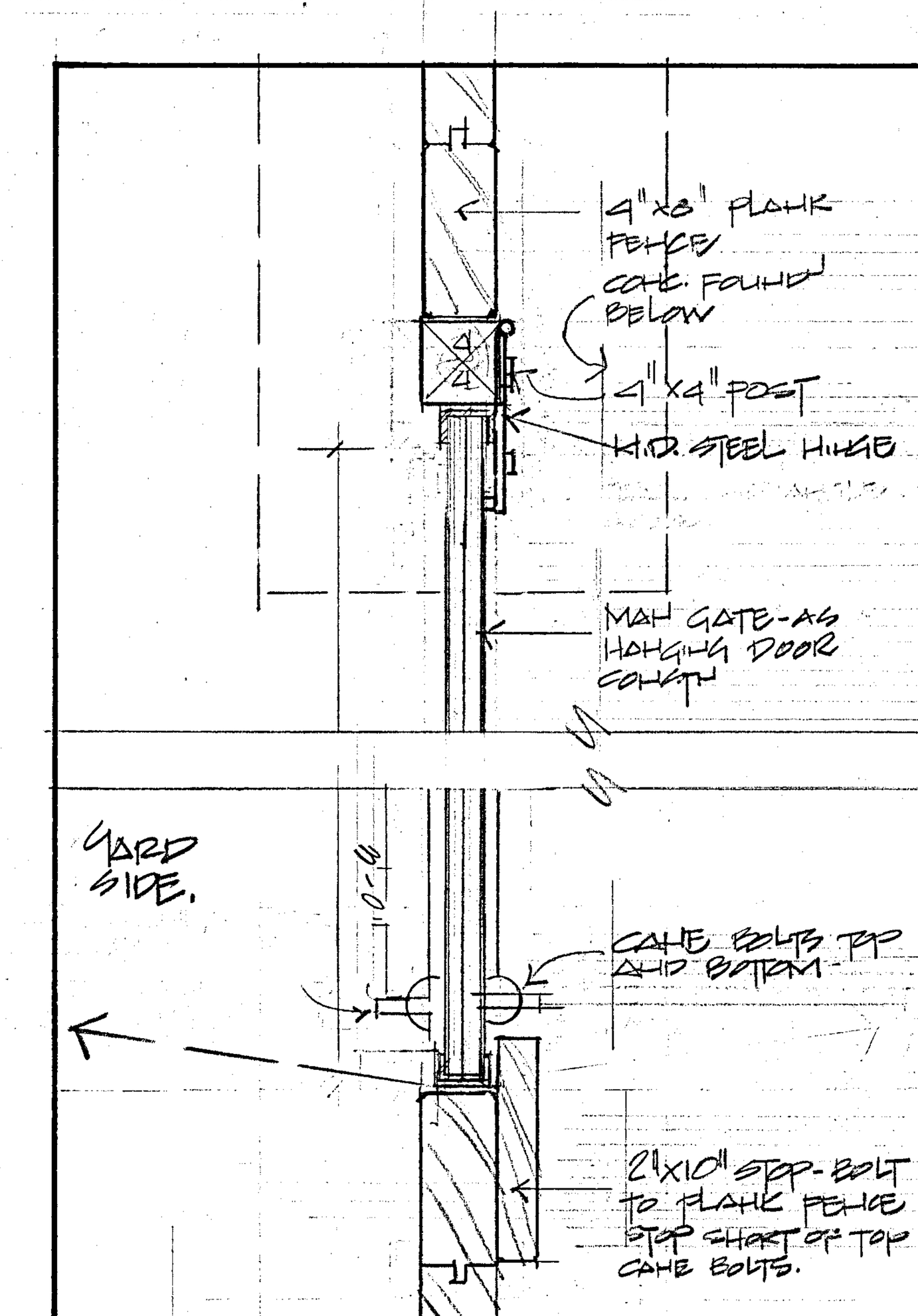
10 GATE AT FENCE 3"=1'-0"



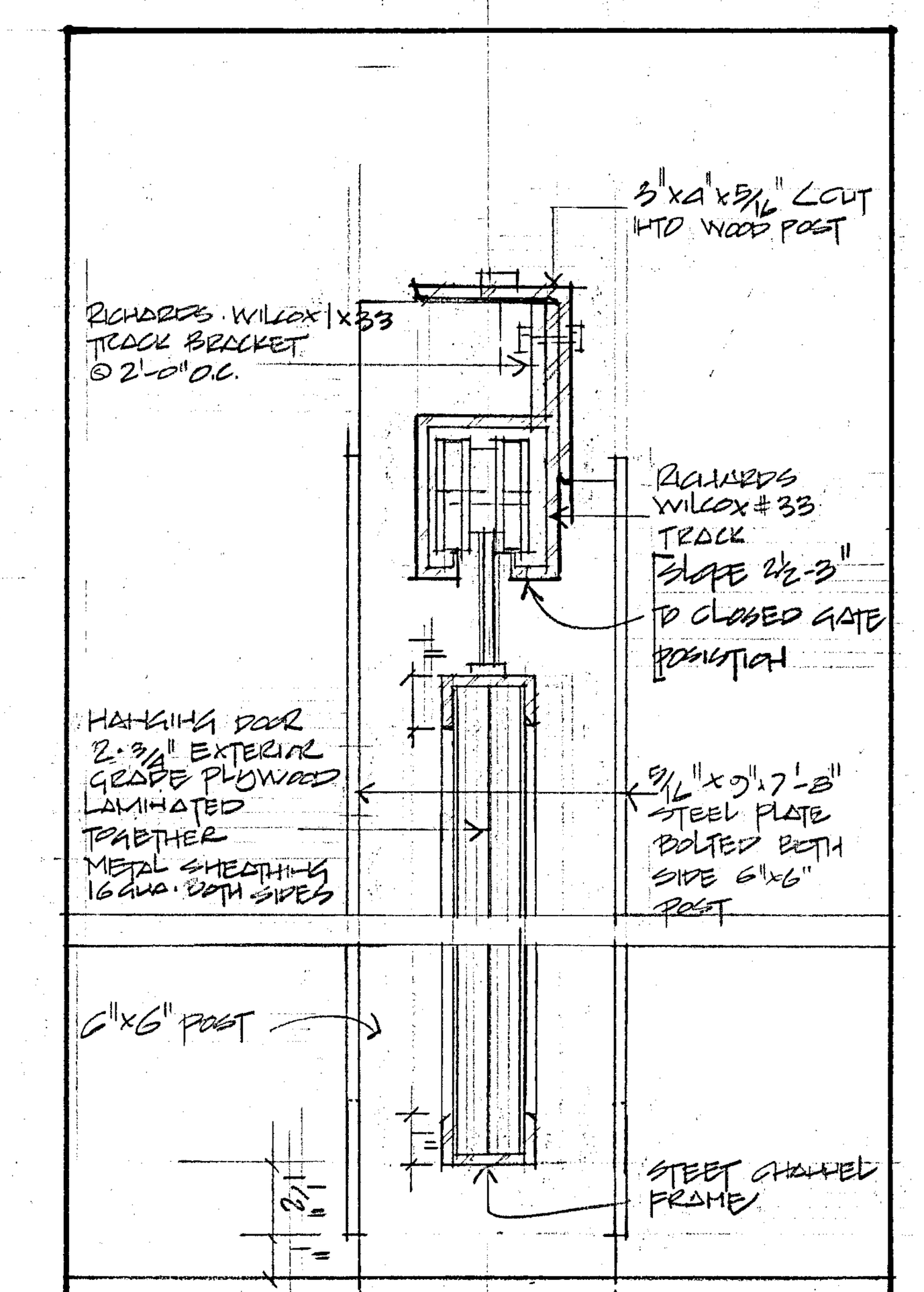
9 SERVICE GATE 1½"=1'-0"



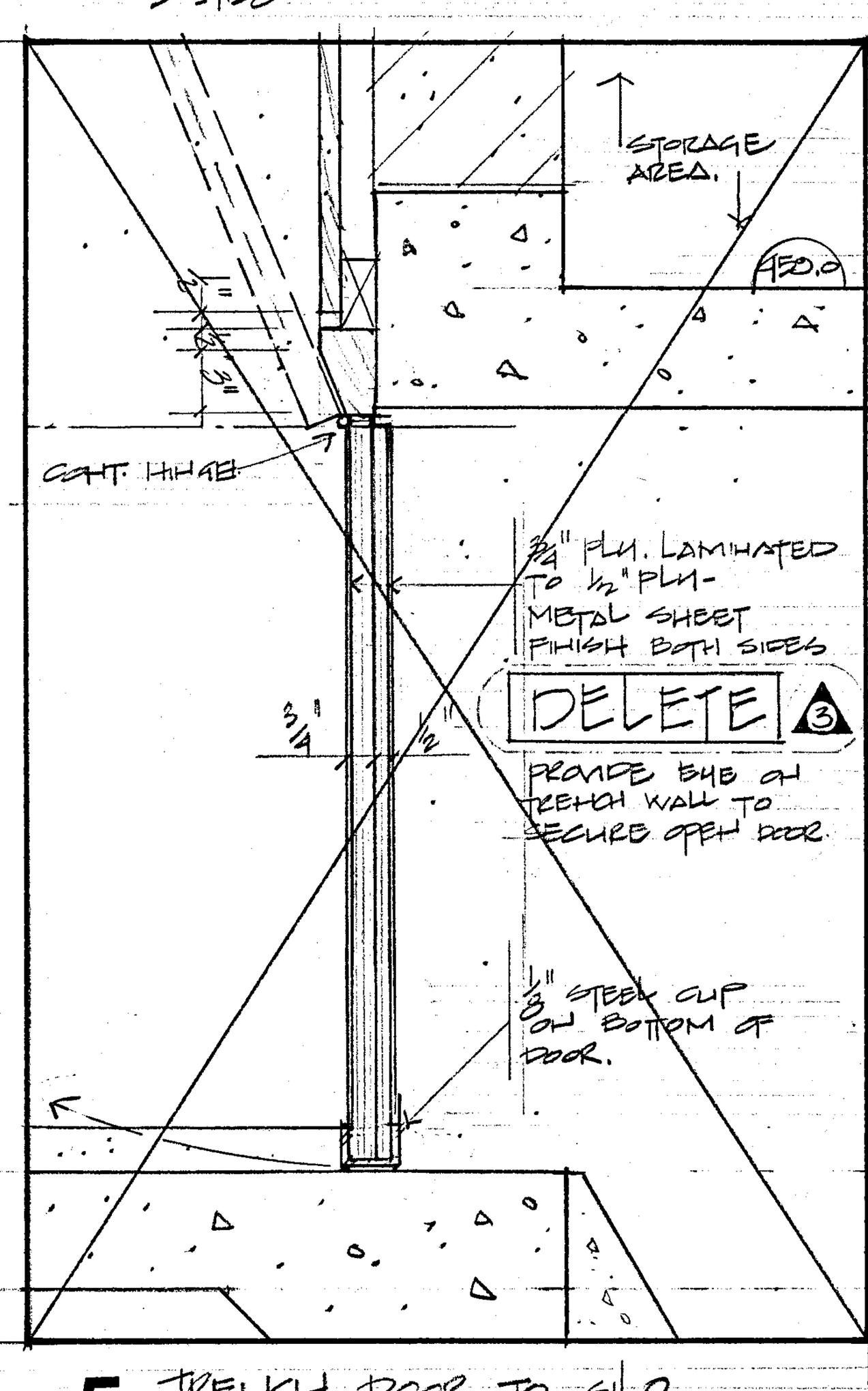
8 FENCE AT SERVICE AREA ½"=1'-0"



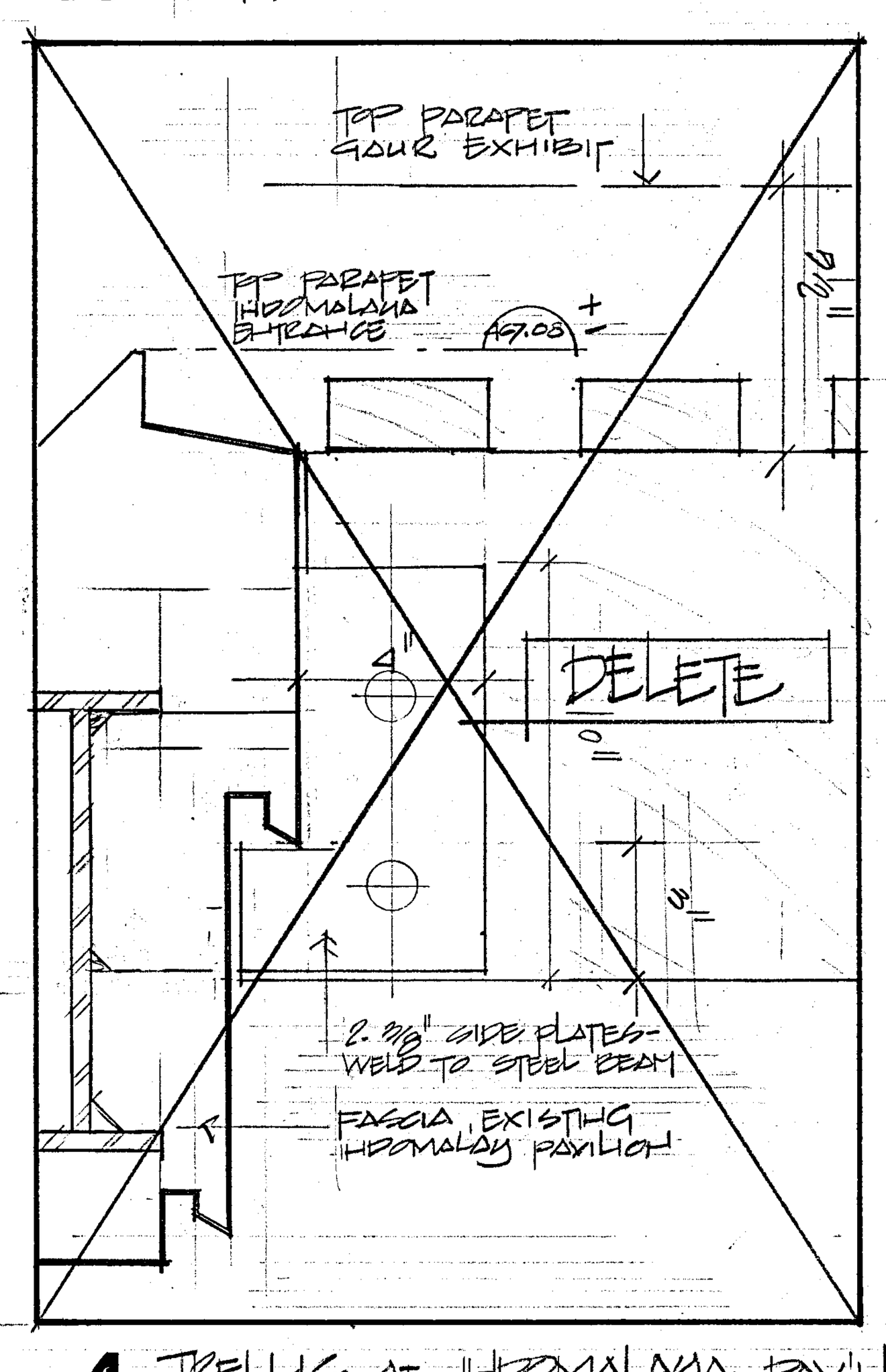
7 KEEPER'S GATE 1½"=1'-0" (N.I.C.)



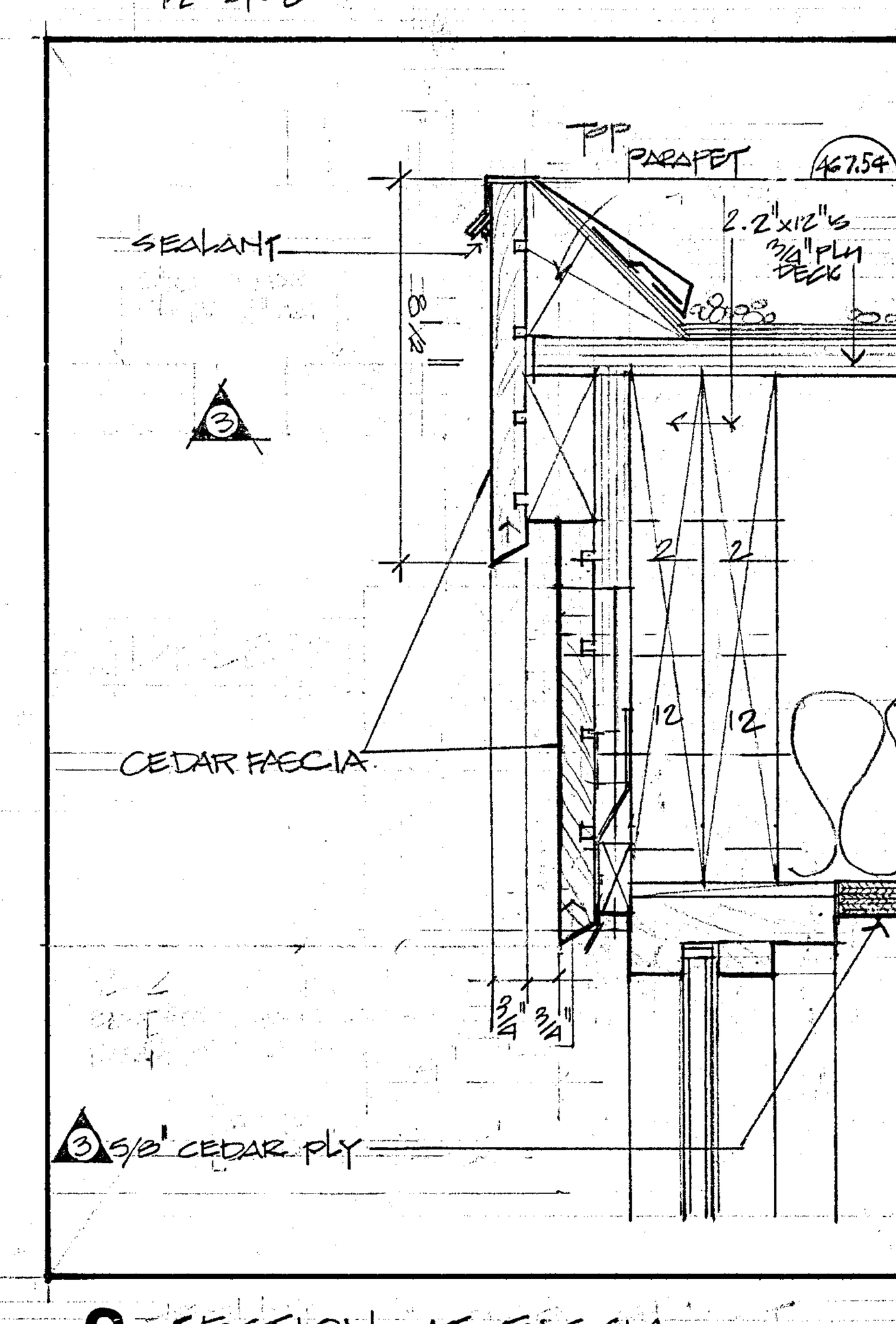
6 SECTION SLIDING GATE 3"=1'-0" (N.I.C.)



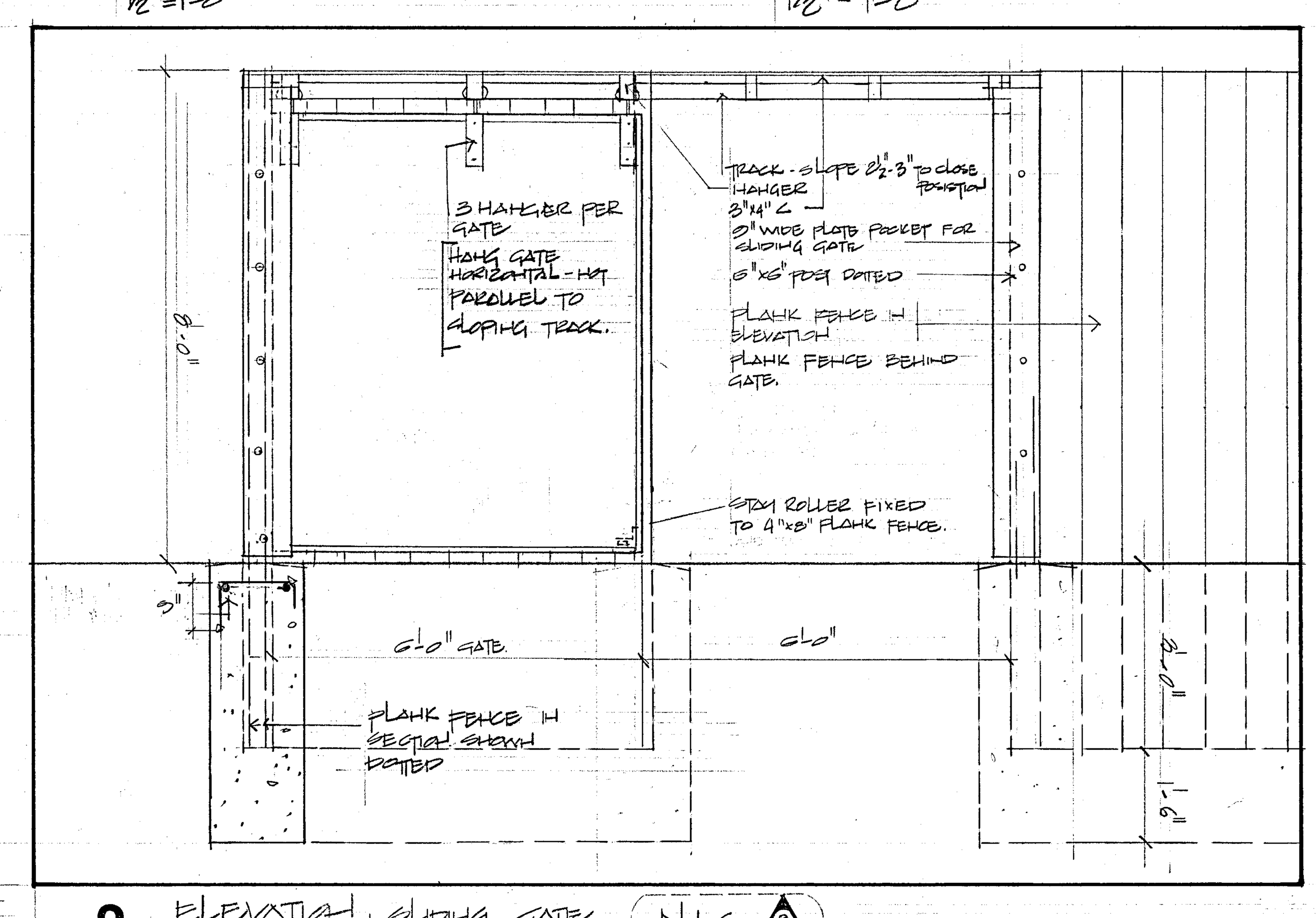
5 TRENCH DOOR TO SILO ½"=1'-0"



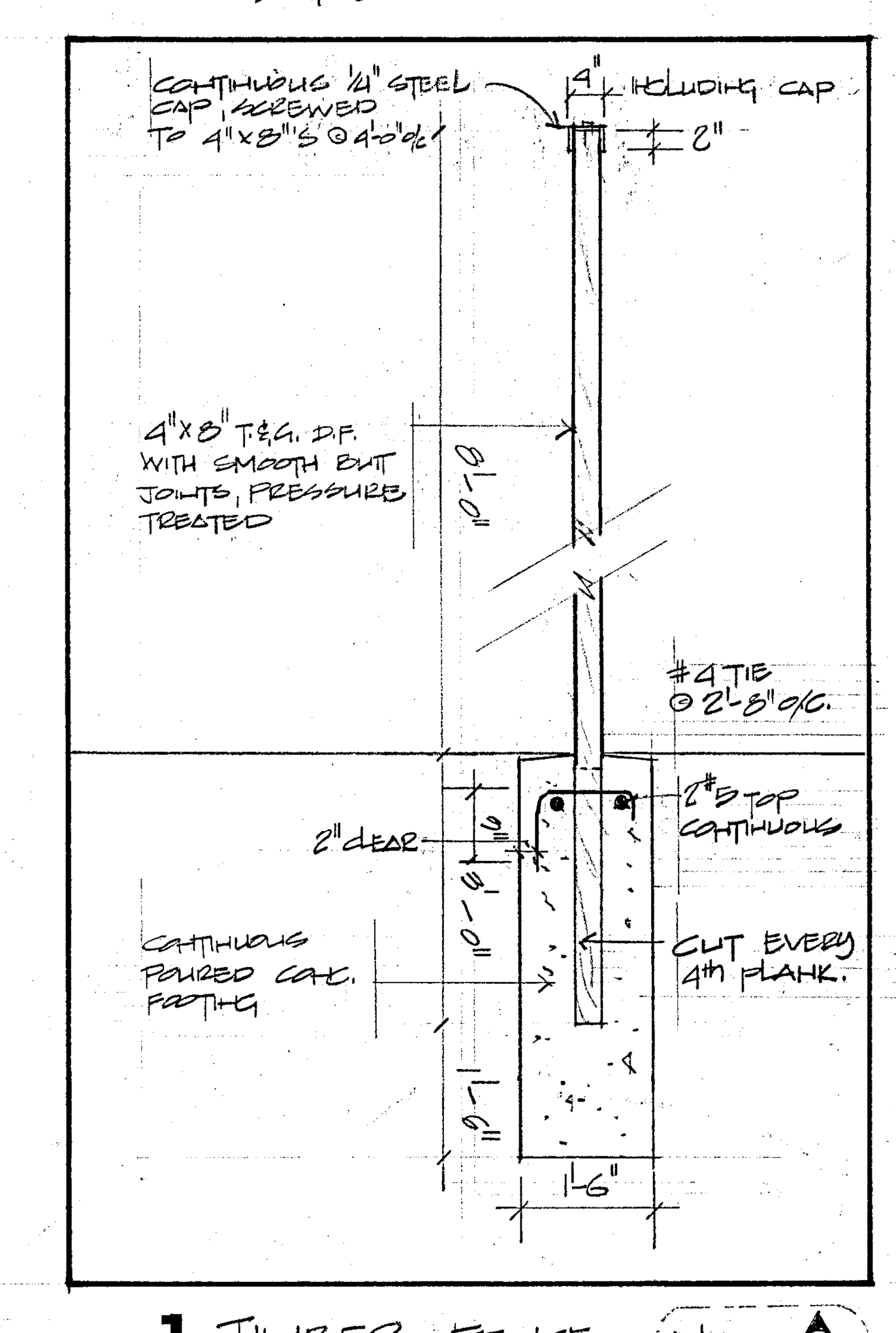
4 TRELLIS AT HIMALAYA PAV'N 3"=1'-0"



3 SECTION AT FASCIA 3"=1'-0"



2 ELEVATION SLIDING GATE ½"=1'-0" (N.I.C.)



1 TIMBER FENCE ½"=1'-0" (N.I.C.)

REVISIONS

NOV. 7.1978
1 ADDENDUM NO. 1.
- VALENCE BOARDS SHOWN SEE AD-1.

MARCH 26/79
2 - 5/8" CEDAR PLYWD @ CEILING.
- EXPOSED CONC. BLK. FINISH ABOVE 2'x10' @ INTERIOR STALL WALLS
- 4" GALV. METAL GUTTER PAINTED.
- EXTERIOR FENCES & GATES N.I.C.
- REVISE FASCIA AT CLERESTORY (BULKHEAD ELIMINATED)
- EXTERIOR SIDING DELETED, C.B. FINISH
- INTERIOR FINISH & CEILING TO 5/8" PLYWD. WHERE SHOWN
- EXTERIOR TRELLIS DELETED

clifford lawrie bolton ritchie architects
153 st.clair avenue west, toronto

Clifford & Lawrie
Craig, Zeidler
Architects for the Metropolitan Toronto Zoo

GAUR EXHIBIT & SHELTER DETAILS

scale	drawn
AS SHOWN	
date	checked
OCT 1978	

project no.

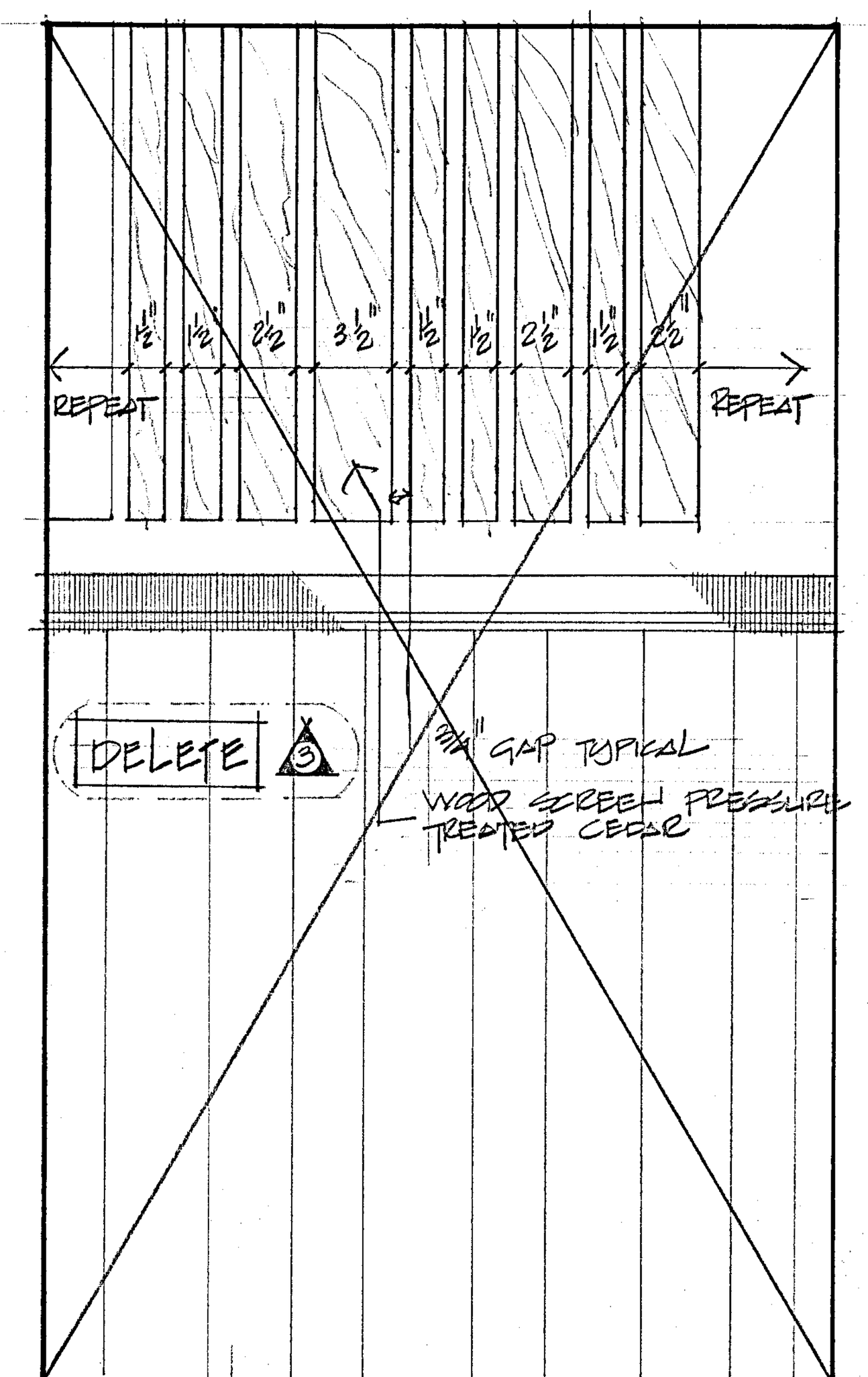
drawing no. 4

ONTARIO ASSOCIATION OF ARCHITECTS — MEMBERS

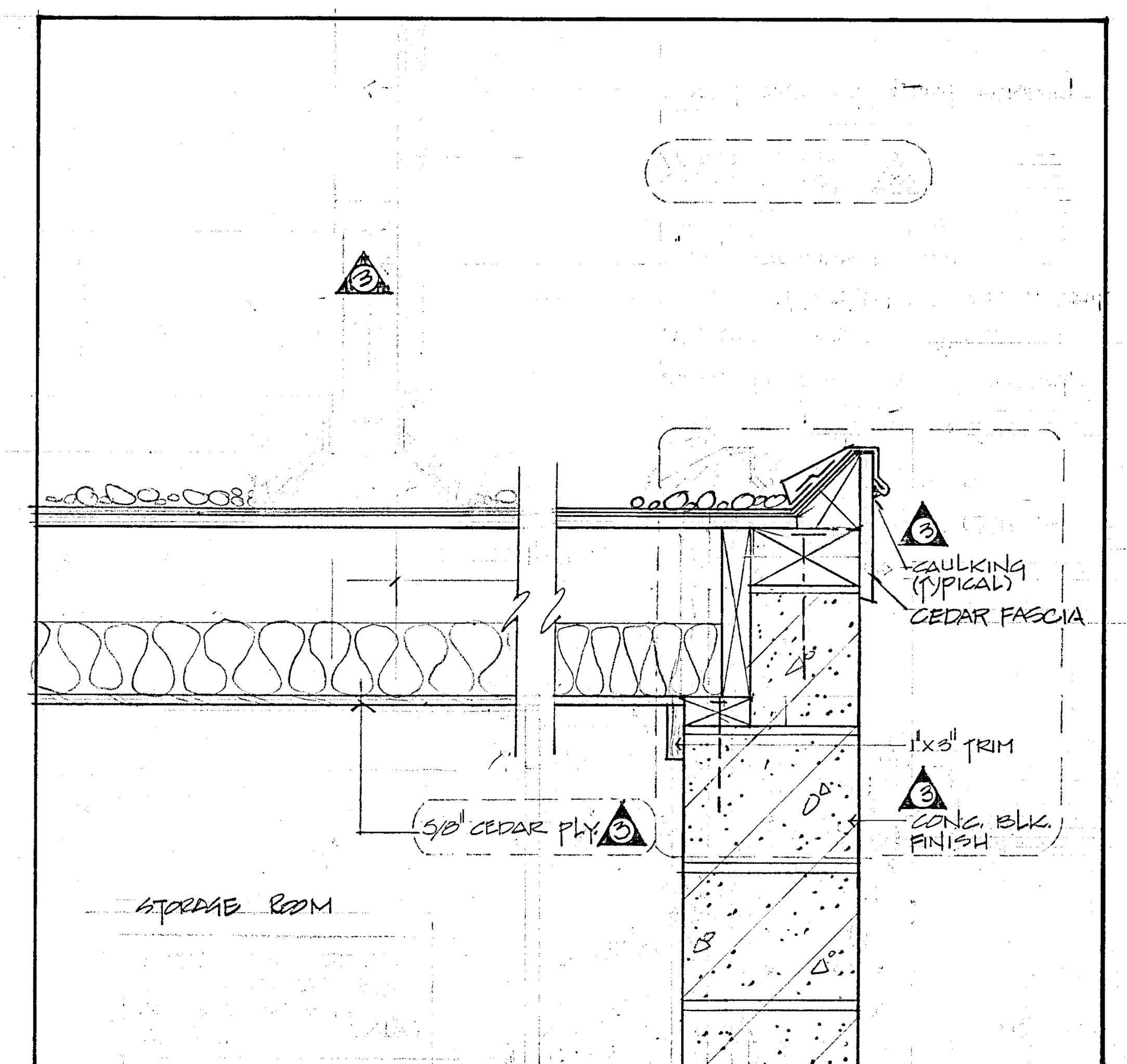
REVISIONS

NOV. 7.78
① ADDENDUM # 1

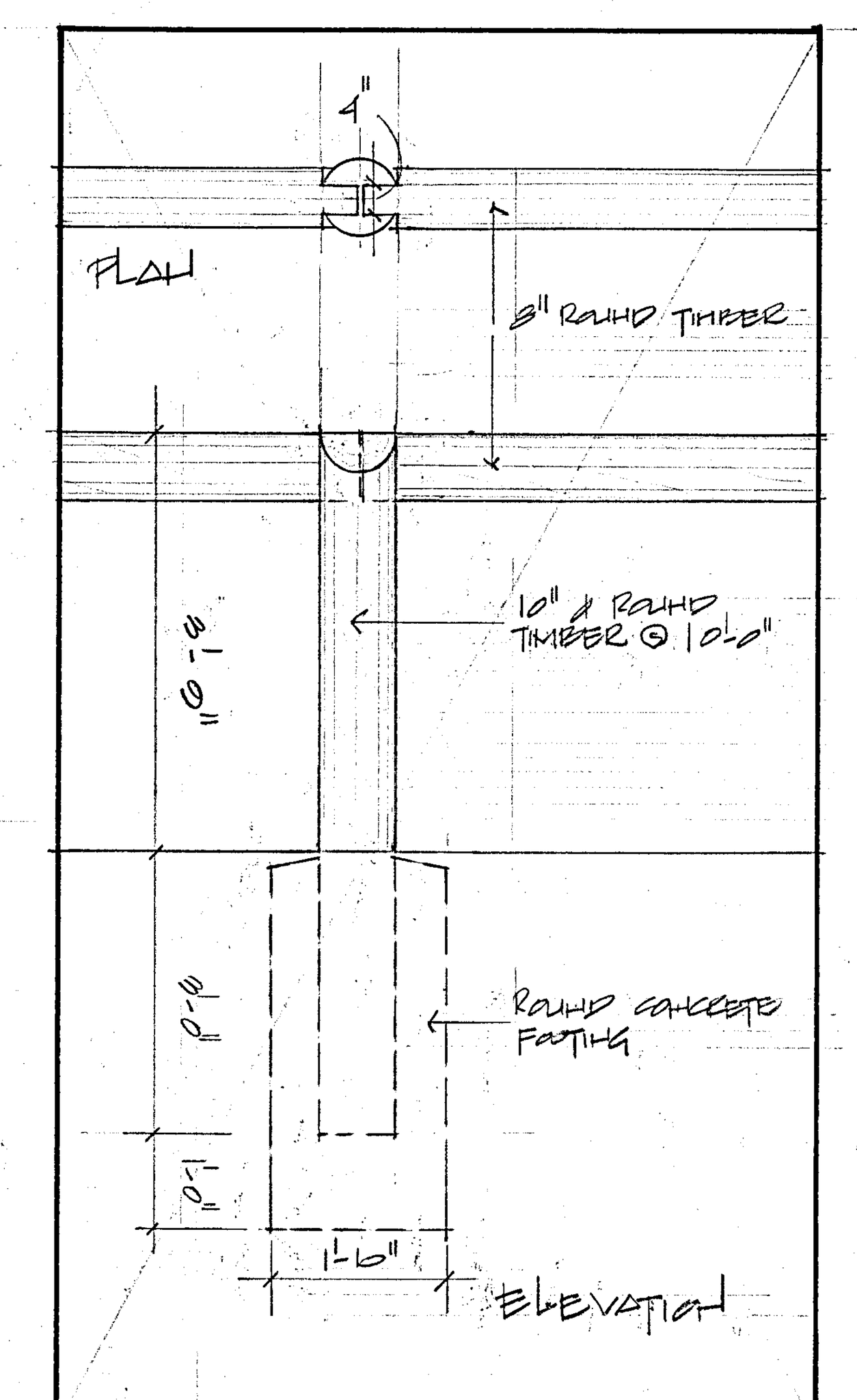
MARCH 21/79
③ — EXTERIOR FENCE N.I.C.
— DELETE WD. SCREEN ON ROOF
— CONC. BLK. FINISH @ EXTERIOR WALL
— 5/8" CEDAR PLY @ CEILING



3 ELEVATION - ROOF SCREEN
1/2" = 1'-0"



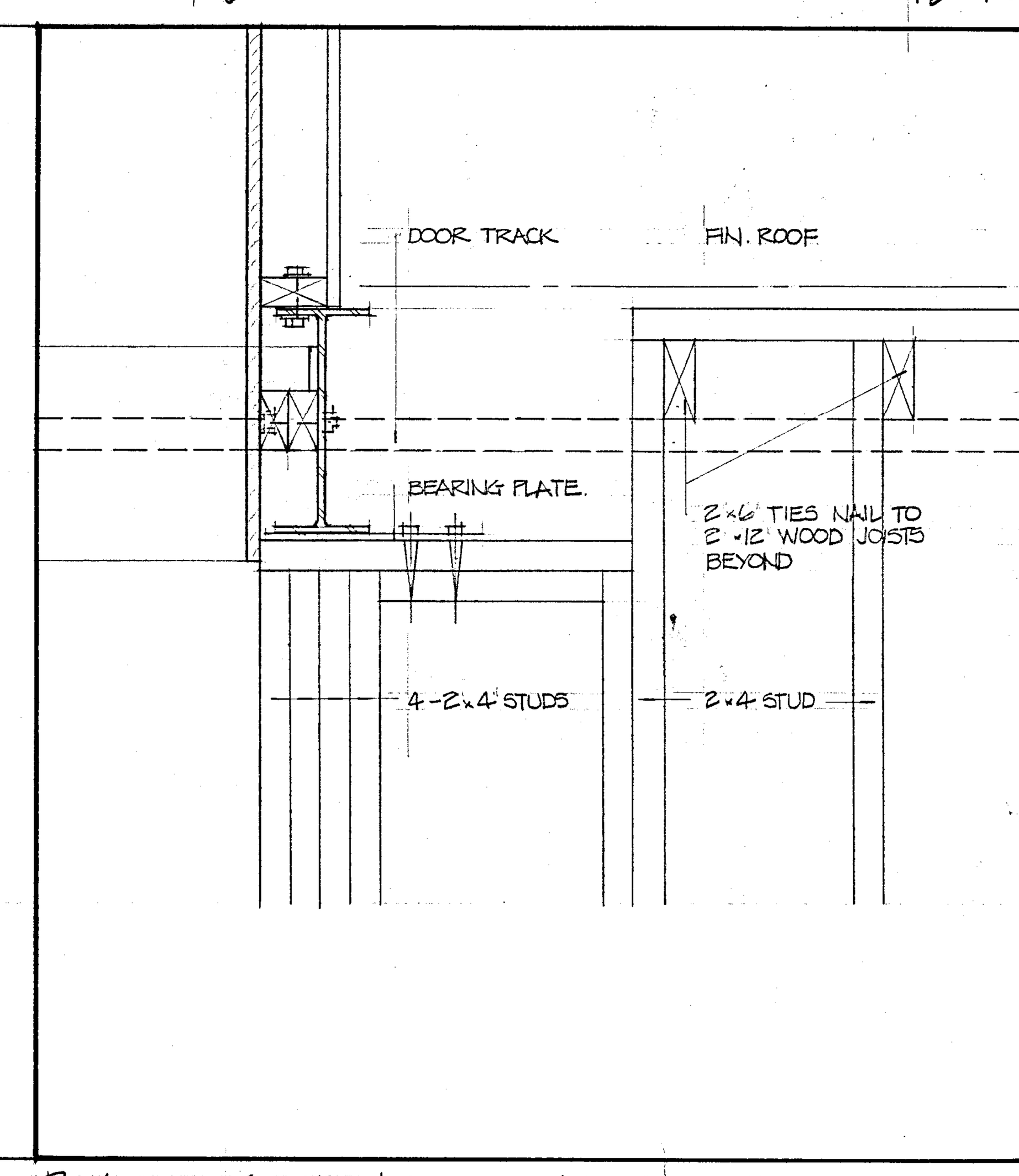
2 SECTION - FLAT ROOF OVER STORAGE RM. ③
1/2" = 1'-0"



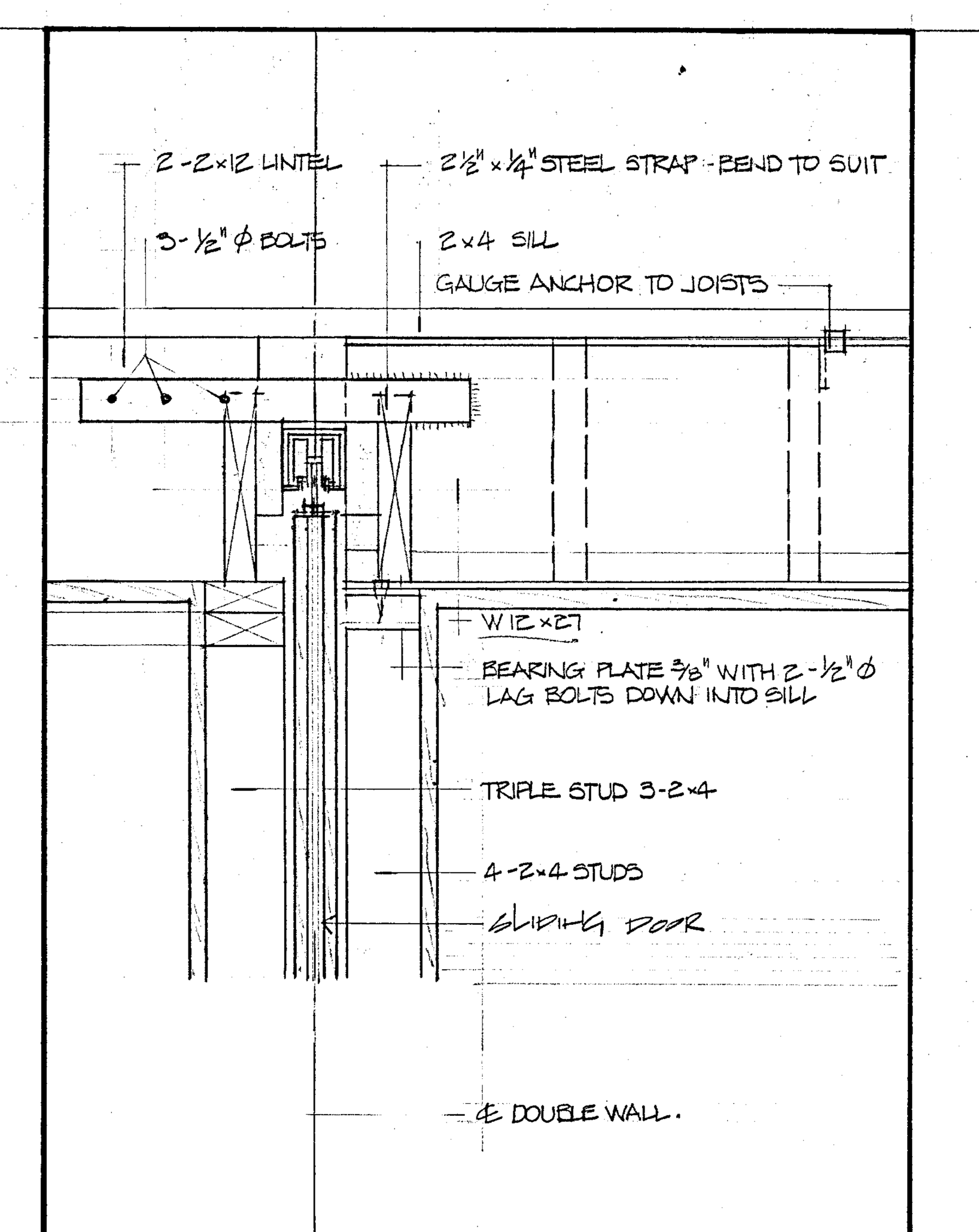
1 FENCE GUIDE N.I.C. ③
1/2" = 1'-0"

STRUCTURAL NOTES

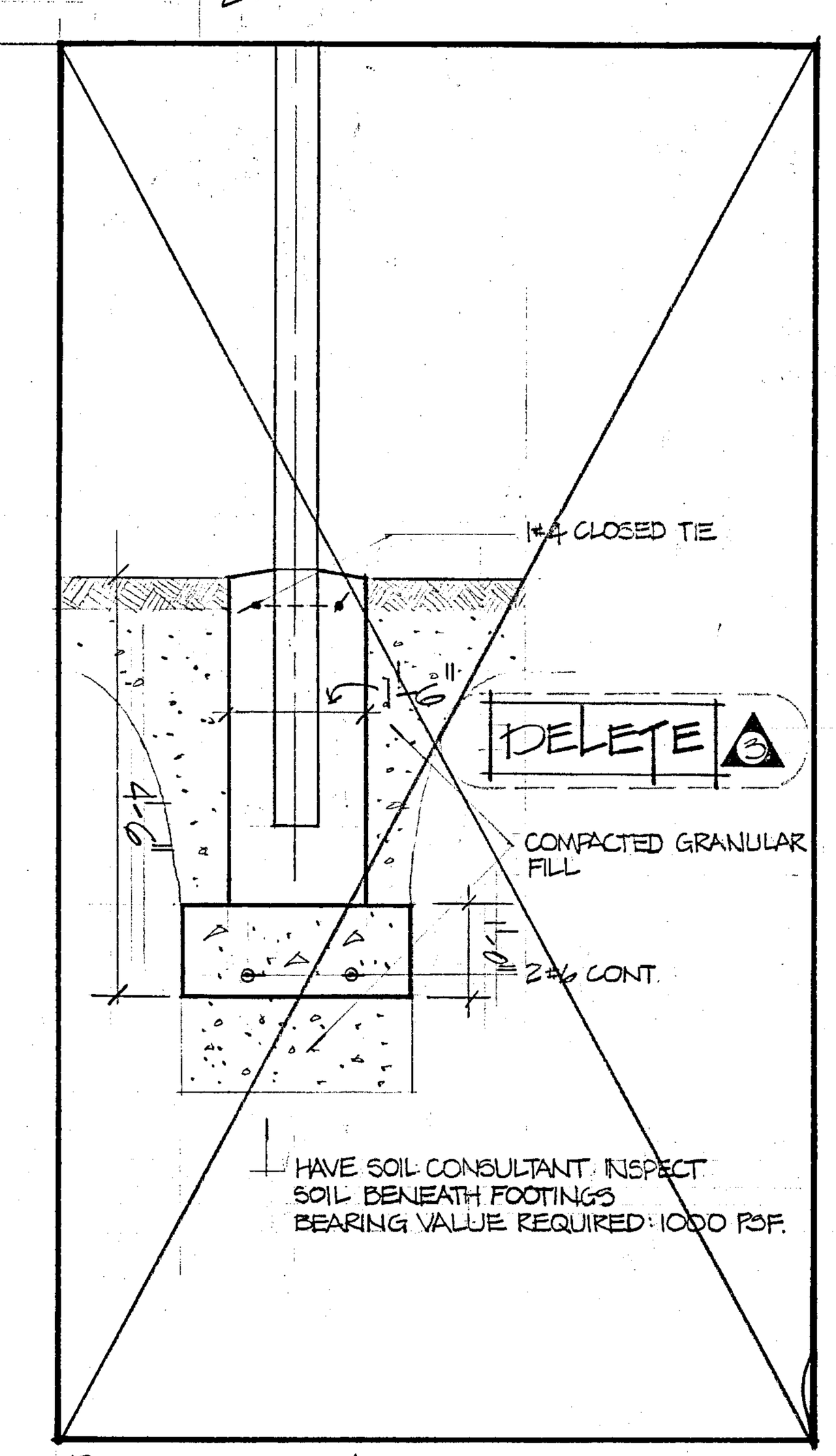
1. MATERIALS AND WORKMANSHIP TO CONFORM TO THE ONTARIO BUILDING CODE, LATEST ISSUE.
2. MATERIALS:
   a) CONCRETE: 3000 PSI, 3" SLUMP, FOR CONCRETE OTHER THAN FOOTINGS PROVIDE 5%±1% ENTRAINED AIR.
   b) REINFORCING STEEL :- CSA G30
   c) STRUCTURAL STEEL : CSA G40.21 - 44 W.
   d) TIMBER : ROOF FRAMING, POSTS AND STUD WALLS: SPRUCE #1, EXCEPT AS OTHERWISE NOTED.
3. PROVIDE HORIZONTAL BLOCK WALL REINFORCING IN EVERY SECOND COURSE.
4. TIMBER CONNECTIONS:
   a) CONFORM TO CSA 086.
   b) INTER CONNECT MEMBERS BY NAILING OR BOLTING TO TRANSFER FORCES SHOWN OR IMPLIED.
5. FOUNDATIONS:
   a) FOUND FOOTINGS ON UNDISTURBED SOIL CAPABLE OF SAFELY SUPPORTING 2000 lbs. PER SQ. FT., BUT FOR PERIMETER FOOTINGS AT LEAST 4'-0" BENEATH THE FINISHED GRADE.
   b) FOR FOOTINGS ABOVE EXISTING MAIN SEWER LINE SEE DETAILS ON DRAWINGS.
6. COMPLY WITH TYPICAL DETAIL SHEETS NOS. TD1-3 UNLESS MORE STRINGENT REQUIREMENTS ARE NOTED ON THE DRAWINGS.
7. DESIGN LOADS ON ROOFS:
   a) GENERAL - 32 PSF
   b) OVER LOW ROOF - 100 PSF AVERAGE DUE TO SNOW PILE UP.



PSK 3 SECTION AT DOUBLE STUD WALL
1/2" = 1'-0"



PSK 2 SECTION THROUGH DOUBLE STUD WALL
1/2" = 1'-0"



PSK1 SECTION - TRELLIS POST FTG.
1/2" = 1'-0"

clifford lawrie bolton ritchie architects
153 st. clair avenue west, toronto

R.J. Thom
Clifford & Lawrie
Craig & Boake

Architects for the Metropolitan Toronto Zoo

GAUR EXHIBIT & SHELTER - DETAILS, STRUCTURAL DTLS. & NOTES

scale	drawn
AS SHOWN	I.F. ML
date	**checked**
OCT 1978	

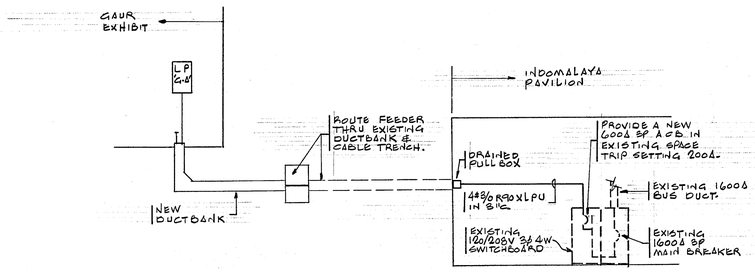
R.J. THOM · CLIFFORD & LAWRIE · CRAIG & BOAKE · ASSOCIATED ARCHITECTS · ARCHITECTS FOR THE METROPOLITAN TORONTO ZOO · ONTARIO ASSOCIATION OF ARCHITECTS · MEMBERS

project no.

drawing no. 5

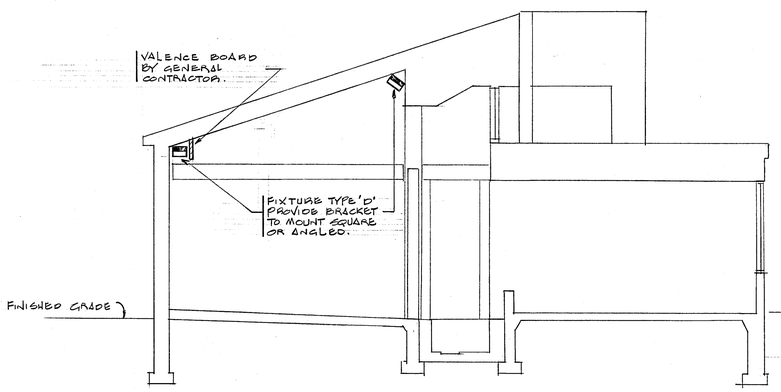
ELECTRICAL LEGEND :

- — 4'-0" FLUORESCENT FIXTURE.
- — 4'-0" FLUORESCENT STRIPLIGHT.
- — CEILING MOUNTED INCANDESCENT FIXTURE.
- — WALL MOUNTED INCANDESCENT FIXTURE.
- — SINGLE POLE SWITCH.
- — TIME SWITCH.
- — 15A 120V 1Φ GROUNDED DUPLEX RECEPTACLE.
- — 208V 1Φ OUTLET AS NOTED.
- — 208V 3Φ OUTLET AS NOTED.
- — COMBINATION STARTER OR DISC. SW. BY OTHERS.
- — DISCONNECT SWITCH BY THIS CONTRACTOR.
- — LIGHTING PANEL.



DISTRIBUTION

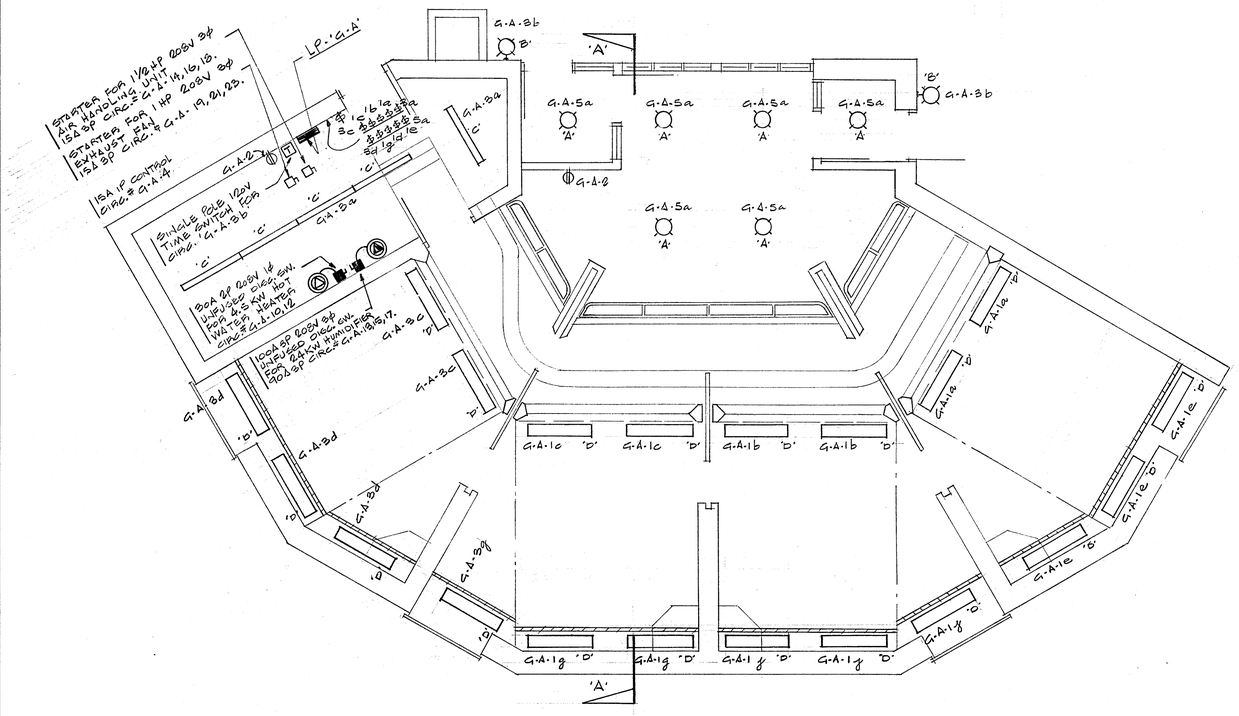
N.T.S.



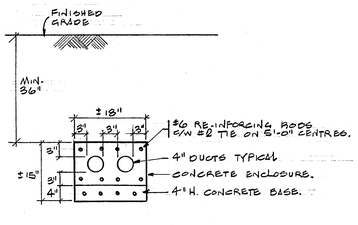
SECTION 'A-A' Scale : 1/4" = 1'-0"

GENERAL NOTES :

1. EXCAVATION FOR NEW DUCTBANK ANYWHERE IN THE VICINITY OF THE EXISTING CABLE TRENCH SHALL BE HAND SHOVELLED. EXACT ROUTING OF EXISTING AND NEW DUCTBANKS SHALL BE DETERMINED ON SITE.
2. ELECTRICAL CONTRACTOR SHALL ENSURE THAT ALL EXCAVATIONS BY OTHER TRADES FOR SUCH WORK AS BUILDING FOOTINGS, MECHANICAL PIPING ETC. ANYWHERE IN THE VICINITY OF EXISTING CABLE TRENCHES OR DUCTBANKS IS HAND SHOVELLED.
3. CO-ORDINATE COMPLETE ELECTRICAL INSTALLATION WITH ALL TRADES.
4. LP-'G-A' SHALL BE SURFACE MOUNTED 30 CIRCUIT 120/208V 3Φ 4W 200AMP COPPER MAINS C/W 200A 3P MAIN BREAKER, 10-15A 1P, 3-20A 1P, 1-30A 2P, 2-15A 3P, 1-90A 3P BRANCH BREAKERS.

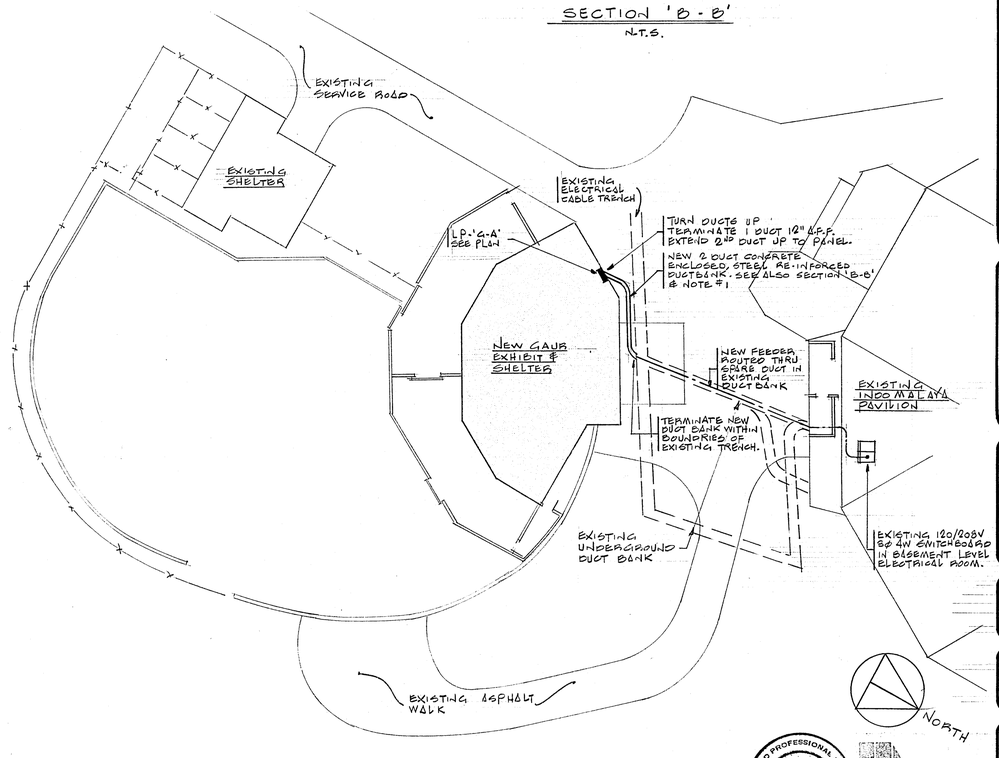


FLOOR PLAN SCALE : 1/4" = 1'-0"



SECTION 'B-B'

N.T.S.



SITE PLAN

SCALE : 1/16" = 1'-0"

clifford lawrie bolton ritchie architects
153 st.clair avenue west, toronto

GAUR EXHIBIT ELECTRICAL

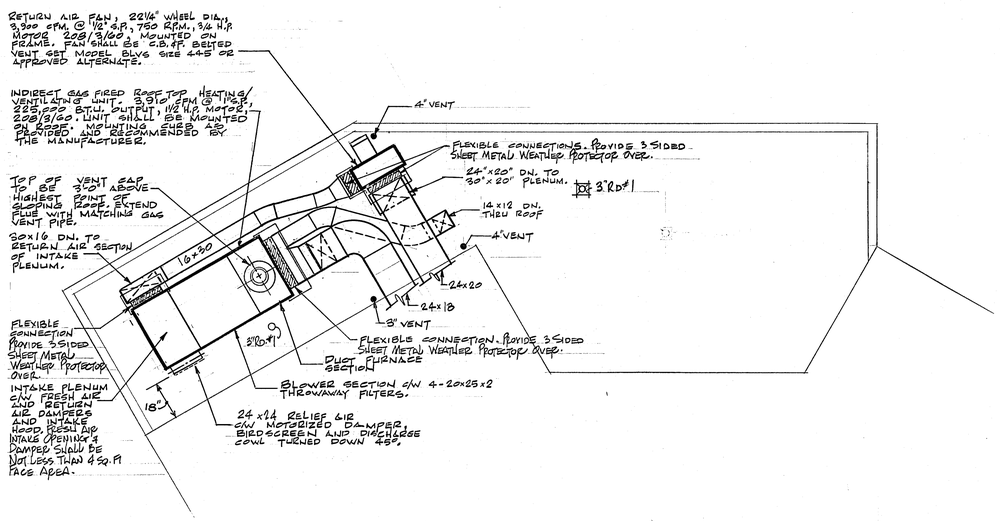
scale AS NOTED	drawn L.G-F.
date OCT. /78.	checked E.B.S.

project no.

drawing no. E-1

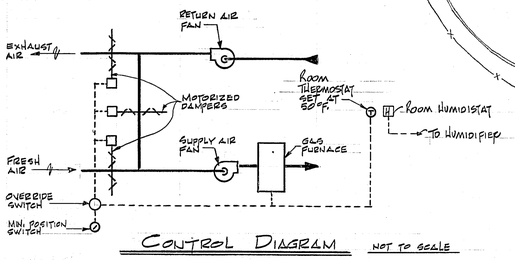
REGISTERED PROFESSIONAL ENGINEER — ELECTRICAL — DAVID ETHERINGTON — 3412 — PROVINCE OF ONTARIO

H H Angus & Associates Limited
Consulting Engineers



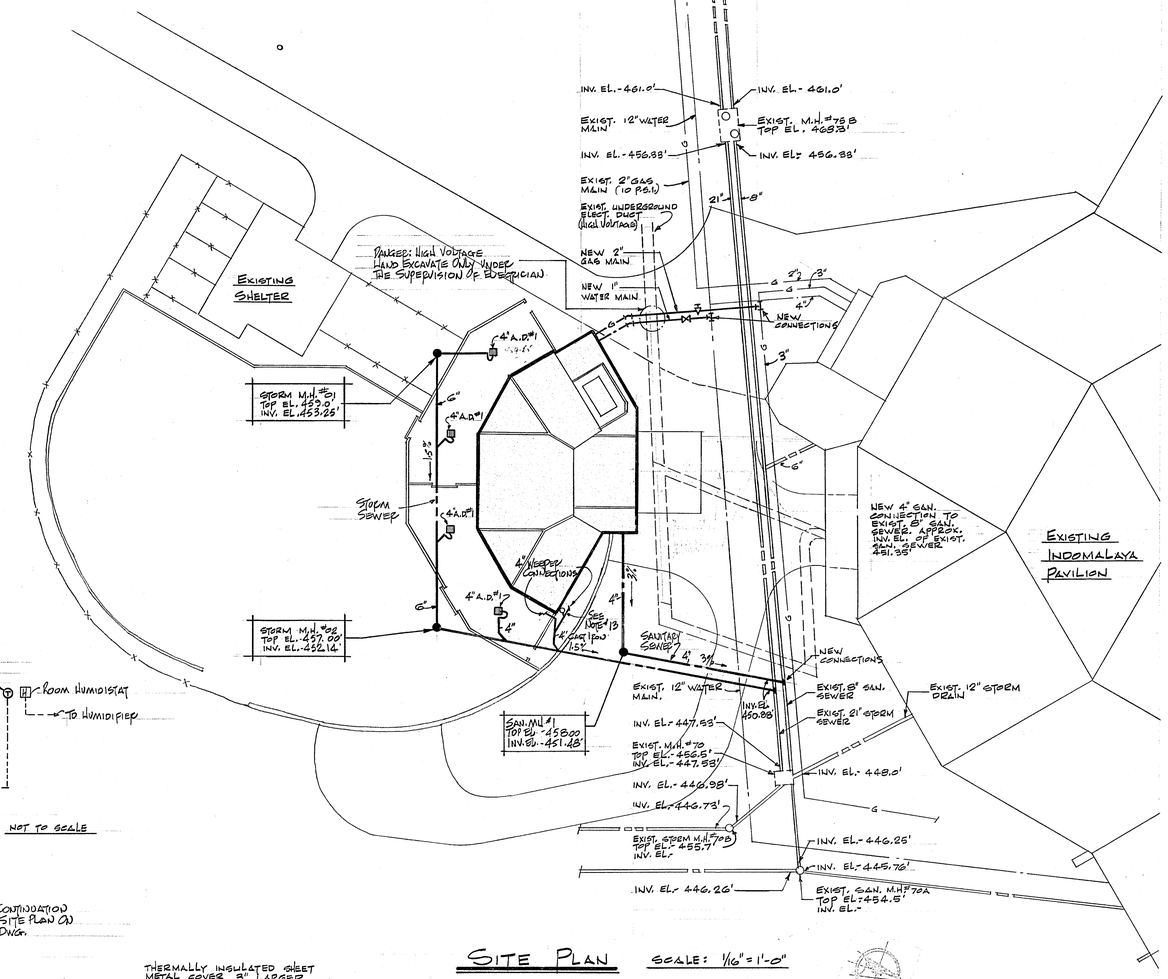
PART ROOF PLAN

SCALE: 1/4"=1'-0"



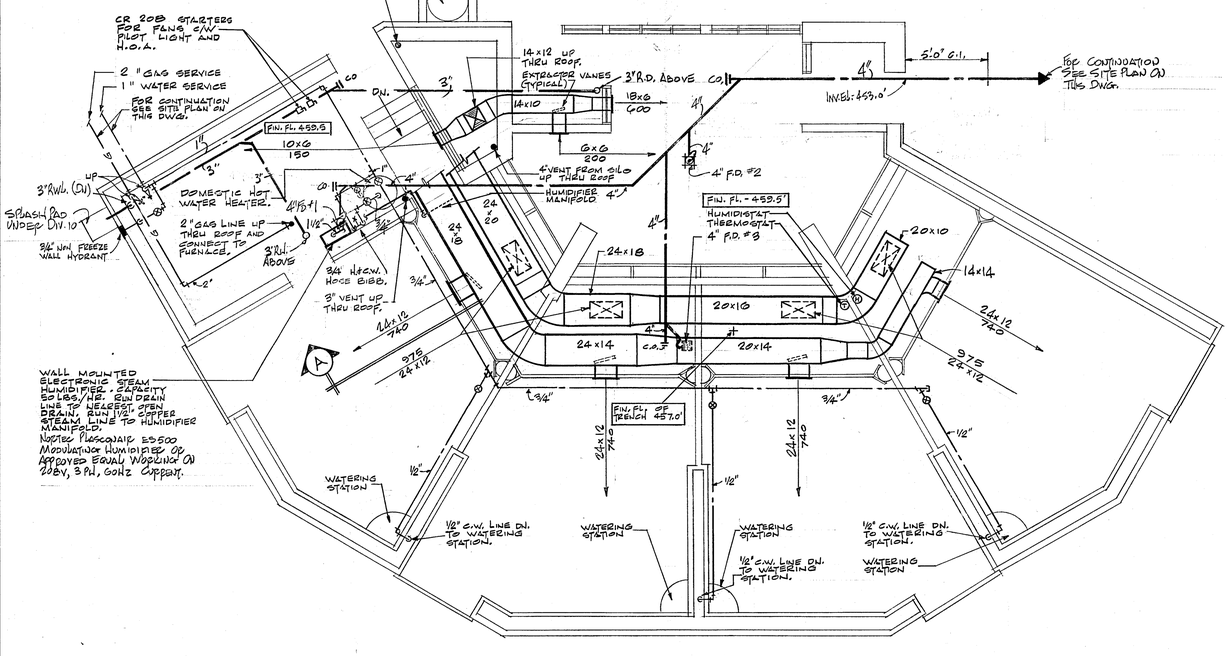
CONTROL DIAGRAM

NOT TO SCALE



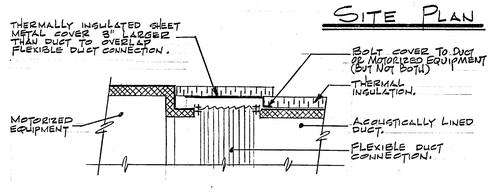
SITE PLAN

SCALE: 1/16" = 1'-0"



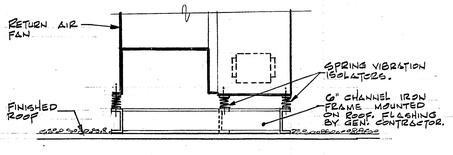
FLOOR PLAN

SCALE: 1/4"=1'-0"



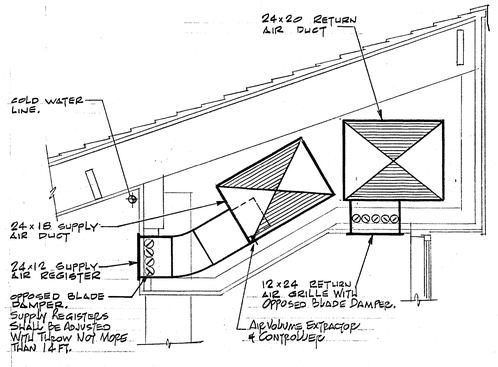
TYPICAL DETAIL OF COVERING OVER FLEXIBLE DUCT CONNECTIONS

NOT TO SCALE



DETAIL OF RETURN AIR FAN BASE

NOT TO SCALE



SECTION 'A'

SCALE: 3/4"= 1'-0"

GENERAL NOTES:

1. THE LAYOUT OF ALL EXISTING OUTSIDE SERVICES ARE APPROX. ONLY AND SHALL BE ACCURATELY CHECKED ON THE SITE AND ANY DISCREPANCY REPORTED BEFORE NEW WORK IS COMMENCED.
2. FIRE EXTINGUISHERS SHALL BE PROVIDED BY THE OWNERS TO SUIT THE REQUIREMENTS OF SCARBOROUGH FIRE DEPT. AND BUILDING DEPARTMENT.
3. F.D.#1 SHALL BE ENPOCO - E-1400 WITH GALVANIZED DUCTILE IRON GRATE AND SEDIMENT BUCKET
4. F.D.#2 SHALL BE ENPOCO E-1000 EHR WITH 6½" DIA. STRAINER, WITH POLISHED BRONZE FINISH, SEDIMENT BUCKET AND VANDAL PROOF SCREWS.
5. F.D.#3 SHALL BE ENPOCO E-1800 BVP WITH GALVANIZED DUCTILE IRON GRADE WITH SEDIMENT BUCKET AND VANDAL PROOF SCREWS.
6. R.D.#1 SHALL BE ENPOCO E-2400 DEP WITH ALUMINUM DOME.
7. WATERING STATION SHALL BE THE 60-09 McKEE MODEL SINGLE AUTOMATIC WATER BOWL C/W FLEXIBLE INSTALLATION KIT SUPPLIED BY THE UNITED CO-OPERATIVES OF ONTARIO, 151 CITY CENTRE DRIVE, MISSISSAUGA PHONE 670-3560.
8. A.D.#1 SHALL BE ENPOCO E-1800 B WITH GALVANIZED DUCTILE IRON GRADE WITH SEDIMENT BUCKET.
9. ALL DUCTWORK AND PLENUMS INSTALLED INSIDE AND OUTDOORS SHALL HAVE 1" ACOUSTIC INSULATION.
10. ALL DUCTWORK INSTALLED OUTDOORS SHALL HAVE AN ADDITIONAL 1" THERMAL INSULATION (SEE SPEC.)
11. SUPPLY DIFFUSERS SHALL BE TITUS MODEL C.S. 272 SBGGS OR APPROVED ALTERNATE.
12. RETURN AIR GRILLES SHALL BE TITUS MODEL C 500 BC GS.
13. PROVIDE A 4" NUB - 12" ABOVE GRADE TO RECEIVE DOWNSPOUT FROM GUTTER DRAIN.
14. LOCATE THERMOSTAT AND HUMIDISTAT AS LATER DIRECTED.
15. EXCAVATION AT AND AROUND EXISTING UNDERGROUND ELECTRIC DUCTBANK CARRYING HIGH VOLTAGE (27,000 VOLTS) SHALL BE DONE ONLY WITH THE SUPERVISION OF ELECTRICAL CONTRACTOR.

clifford lawrie bolton ritchie architects
153 st. clair avenue west, toronto

GAUR EXHIBIT

MECHANICAL

scale: AS NOTED	drawn: R.B.S.
date: Nov. 1, 1978	checked: G.G.

project no.

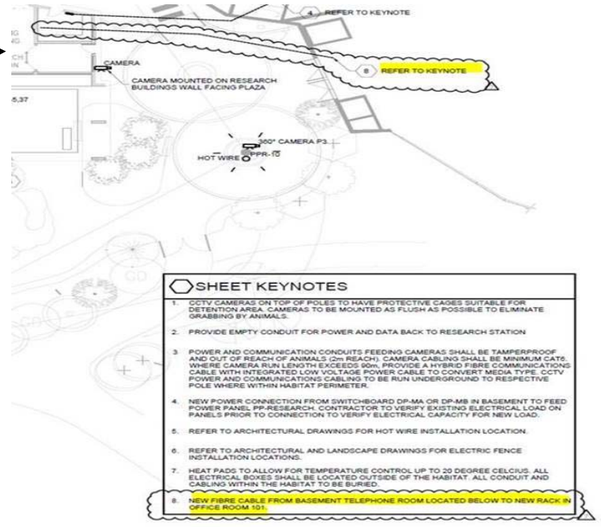
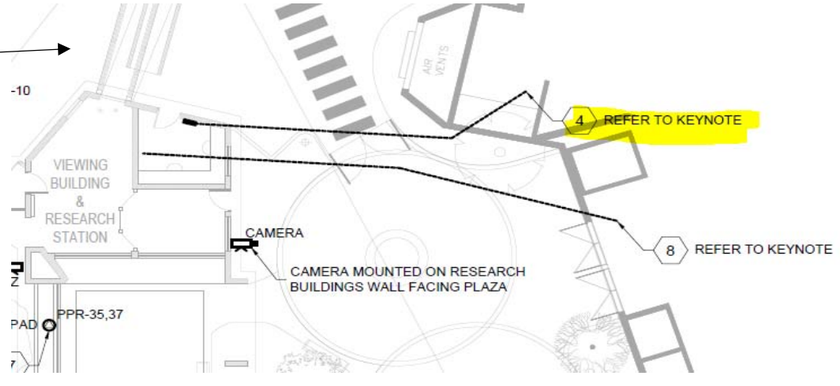
drawing no. M-1

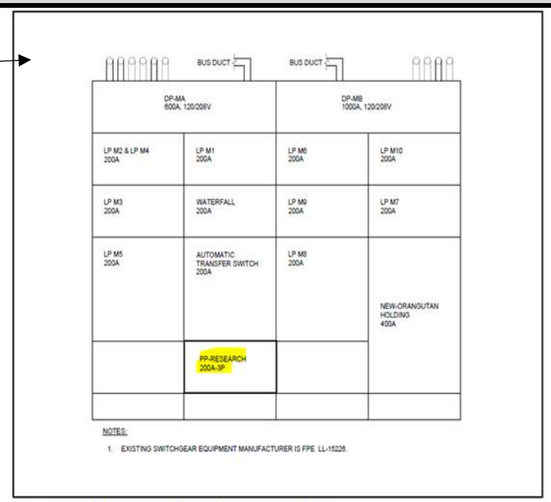
REGISTERED PROFESSIONAL ENGINEER — G. GROZA — 3412 — PROVINCE OF ONTARIO

H.H. Angus & Associates Limited
Consulting Engineers

Toronto Zoo Orangutan Exhibits_TZC T 10-2020-02
Bidder's RFI Log

(G)=General, (A)=Arch, (S)= Struct,
(M)=Mech, (E)=Elec, (Se)= Security,
(C)=Civil, (LA)=Landscape

Date Discipline	Date Rec'd	Description	Zeidler sent to consultants/zoo	Answers	Additional information
03.02.A	**2020.03.02**	**A**	5-Mar		
1 (A)	1	Please specify the area of Shotcrete on the landscape area. Drawing AR101 shows shotcrete on inside of Moat area, while landscaping drawing shows as planting bed and plants.	Zeidler	All shotcrete surfaces are part of Arch dwgs & specs. Moat wall is all shotcrete; refer to detail 13/AR-180.	
2 (E)	2	Is it possible to get information about the raceway of the fiber optic cable on this project?. Where is this cable terminated?	Quasar	"Cable is to terminate per note 8. Office Room 101 is located approximately below the indication of keynote 8."	
3 (E)	3	Is it possible to get information about the raceway of the new power connection on this project?. Where is this cable terminated?. The drawing doesn't show any electrical room.	Quasar	"Electrical room is located approximately below the indication of keynote 4."	

Date Discipline	Date Rec'd	Description	Zeidler sent to consultants/zoo	Answers	Additional information
4 (E)	4	Could you please advise if the disconnect PP-Research 200A-3P on existing switchgear has to be new?	Quasar	Disconnect is to be new	 1 EXISTING SWITCHBOARD ELEVATION SCALE: N.T.S.
5 (E)	5	Could you please clarify what is the responsibility of the electrical contractor with the security cameras?. Is it just rough in?.	Quasar	This question seems to be asking what the scope split is between an electrical contractor and a security contractor. I do not believe this is for us to answer from that respect. I would imagine a GC would provide the scope split. However, the scope of the cameras is a fully operational system.	
6 (E)	6	Could you please clarify what is the responsibility of the electrical contractor with communications?. Is it just rough in?		Similar to questions #5. This question seems to be asking what the scope split is between an electrical contractor and a communications contractor. I do not believe this is for us to answer from that respect. I would imagine a GC would provide the scope split.	
7 (E)	7	is it possible to get details on how are we going to provide conduits for cameras on the different locations?		There are no details specific for this installation. We have provided drawing notes regarding intent of protection from Orangutangs.	
8 (E)	8	Is it possible to get more details on how are we going to provide conduits for rest of loads on drawing EP-101?. Conduit sizes, wiring method, etc..		We can update our panels schedules and issue a revised drawing for further information on conduit and wire sizing.	
03.02.B	**2020.03.02**	**B**			
1 (A)	1	I have provided a link below to Morins roof panel product offering - https://www.kingspan.com/us/en-us/product-groups/metal-roof-wall-systems/roof-systems	J&J	This roof product can be added to Part 5 Appendix V Unsolicited Alternatives.	

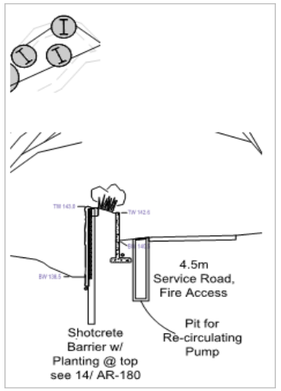
Date Discipline	Date Rec'd	Description	Zeidler sent to consultants/zoo	Answers	Additional information
03.03.A	**2020.03.03**	**A**			
1 (A)	1	What type of insulator are they required? Standard insulator that is mounted on Chain link posts or Offset 5 Inches mounted to chain link fence.	J&J	Standard insulator that is mounted on Chain link posts or Offset 5 Inches mounted to chain link fence. Using the Gallager G671 Standard Porcelain Lag Insulator – drilled and epoxied into the shotcrete wall. Use modified version of same insulator at building faces and metal access gates.	
2 (A)	2	What type of wall or end post are we starting fence?	J&J	Starting at the metal habitat access gate and working counterclockwise around the habitat.	
3 (A)	3	How far away is M360 going to be mounted away from the fence.	J&J	It can be any distance away from the fence.	
4 (A)	4	How far away are ground rods from Gallagher M360?	J&J	They can be any distance away from the Charger	
5 (A)	5	Ground rods need to be spaced 10 feet apart in the dirt area. Line for ground rod can be installed above ground or below ground. If below ground need to know distance back to M360 for excavation.	J&J	The three ground rods should be set to a depth of 8' at 10' on center, Below ground in a conduit is preferred, and it can be any distance away from the charger. Gallagher's technical contact number is 1-800-531-5908.	
6 (S)	6	Shoring: Is Steel profile (W610 and W410) at shoring that going to buried in the soil need to be galvanized?	RJC	Yes they should be galvanized.	
7 (G)	7	Please provide us *Access to Site diagram* provided in previous tender	Zoo	**See Addendum 2- see Site Access map**	
8 (S)	8	Shoring: We are under the assumption that Total performance date (March 26, 2021) indicated in tender documents is for Habitat 1 only please confirm.	Zoo	yes, the dates for substantial and total performance are for the base scope of work only, which is habitat #1	
9 (G)	9	Many of our substrate is pricing this tender for the first time and have requested at list two week extension to the closing date.	Zoo	see addendum 1- extended to March 20	
03.03.B	**2020.03.03**	**B**			
2 (L)	2	We are not able to find Arborist Report in tender document, please advise.	NAK/ Kuntz	**See Addendum 2- see Arborist report & diagrams**	

Date Discipline	Date Rec'd	Description	Zeidler sent to consultants/zoo	Answers	Additional information
03.04.A	**2020.03.04**	**A**			
0	0	I'll be providing pricing for **BOSCH camera solution** to various GCs that will be bidding on the project (**site registered with Bosch**). For the purposes of getting accurate numbers over to the GCs could you please provide some guidance with respect to the following questions?	Zoo	ONVIF compliant cameras.	
1 (Se)	1	Head end – AVIGILON NVR – as far as I could determine there is currently no head end at the Orangutan Exhibits. Please confirm whether the NVR is to be AVIGILON or if we can propose an alternate solution.	Zoo	the head end is currently a Pelco DSSRV NVR but we hope to be moving toward more of an open sourced VMS in the future such as Milestone.	
2 (Se)	2	FPS – do you have guidelines for the frames per second?	Zoo	FPS we usually require a standard that will accommodate up to 30fsp. We will need low light and auto focus in a durable outdoor housing. We will need to protect these cameras in the exhibit from the animals some how. They are incredibly strong and will tear and pull at anything. I have a feeling we may have to come up with some sort of protective house in-house so a lower profile camera may be better suited. With this said the IR on a camera may have to look through a plexiglass. External IR flood lighting may be a better choice.	
3 (Se)	3	STORAGE – do you require 30, 60, 90 days or other?	Zoo	As far as storage we will take care of that at the head end.	
03.04.B	**2020.03.04**	**B**			
1 (A)	1	Please see if the product below would be acceptable for the diamond shingles for metal shingle Roofing. www.diamondroof.on.ca/our-product	J&J	This roof product can be added to Part 5 Appendix V Unsolicited Alternatives.	
03.06.A	**2020.03.06**	**A**	9-Mar		
1 (A)	1	Barrier fence at day room landscaping detail is different than architectural detail	Zeidler	Follow Landscape detail (4/LA4); will revise the same in Arch.	

Date Discipline	Date Rec'd	Description	Zeidler sent to consultants/zoo	Answers	Additional information
2(A)	2	On the plan there is kick rail but there is no difference on plan between kick rail and guardrail – please advise where is kick rail and where is guardrail (details 1,2/AAR-101)	Zeidler	Guardrail behind playground; will clarify in AR-101 plan issued as part of Addendum 2	
(S & LA)	3	Big access gate to exhibit is shown on landscaping plan but not anywhere else – assume that has to be by structural regarding the size of the gate.	RJC & NAK	Structural dwgs provided foundations below the gate posts; Landscape dwgs showed the design of the actual gate itself.	
(M)	4	Ladder rungs detail for cast in concrete are not on the drawings.	Quasar & Zeidler	Ladder rungs in concrete pump chamber -refer to detail 1/MX-100 Note 6. Other Ladder rungs at Pole 7 anchored to steel post and not concrete.	
(A)	5	Grating treads are not on the drawings – please advise where are they?	Zeidler	Rerring to Treehouse ships ladder tread	
(A)	6	150x10 bands for the poles are not wide enough for the platforms and shade, please advise.	J&J	Detail to be resolved during shopdwg process	
03.06.B	**2020.03.06**	**B**	9-Mar		
(A)	1	Concrete retaining wall as shown in section 1/AR-102 – Cannot locate this wall from site plan AR-101, CV-004 & LA1 – Please advise it's location, length of wall & top/bottom of wall datum	Zeidler	Retaining wall location -see plan AR-007; for height (Bottom/Top of wall) see civil grading plan.	
(A)	2	Concrete retaining wall as shown in section 3/AR-102 – Cannot distinguish which one is a cast-in-place retaining wall and/or shotcrete retaining wall from site plan AR-101, CV-004 & LA1. Are they all shotcrete retaining wall as per detail 9, 10, 15, 16/AR-180?	Zeidler	They are all shotcrete wall.	
(A)	3	Cannot locate guardrail detail 1/AR-180 from site plan AR-101. Please advise it's location & length.	Zeidler	Notation for Guardrail (1/AR-180) is behind Play structures/playground. Kick rail (2/AR-180)- see legend; it should be continuous from Habitat 1 east side double access gates all the way along Immersive path.	
(A)	4	Cementitious Waterproofing Section 071600 – Where does it apply to?	Zeidler	Use in moat wall – see 12/AR-180.	
	5	Finish Hardware Section 087000 & Door Schedule in drawing AR-002:			
(A)	5a	a) Please provide Hardware Schedule for Door 101 & 103	Zeidler	see 08 70 00 sec 2.1	

Date Discipline	Date Rec'd	Description	Zeidler sent to consultants/zoo	Answers	Additional information
(A)	5b	b) Please provide specifications for remote door operator for Door 102A1, 102A2, 105A1, 105A2, 105B, 107, 200, 200A, 201A	J&J	See specs; Product manufacturer is A thru Z	
(A)	6	Hot Vines Section 10800/1.3.2 – To obtain a price to design the hot vines to your satisfaction is not possible due to limit of time & generate cost to all bidders. Please provide a Cash Allowance to cover this item.	J&J	No cash allowance.	
	7	Fall Protection System Section 112423:			
(A)	7a	General Note 2 in drawing 1/AR-120 "Provide a total of 6 anchor points for each wall for a total of 24. Are these "Anchor Points" refer to Fall Arrest Anchors?	Zeidler	No, Anchor points are for future ledges & attachments for Orangutan's enrichment purposes.	
(A)	7b	Fall arrest anchor as shown in detail 1/AR-211 – Does it apply to Pole 7 only?	Zeidler / J&J	Yes.	
(S)	7c	Fall arrest anchor as shown in detail 12/AR-180 & note in drawing S-200A "Shoring Contractor to allow for fall arrest anchors connected to steel beams" – Please advise quantity & location of anchors (Note that shoring contractor will not allow for the fall arrest anchors which should be by Section 112423)	RJC	The quantity and location of the anchors should be spec'd on your end, we just included that note on our drawings to make sure it wasn't missed. If the shoring contractor won't allow for the fall arrest anchors, then it would still be up to the general contractor to ensure that they have the anchors in their overall price.	
(A)	8	Metal Shingles Section 073116/1.5.2 – Do you accept non OIRCA member bidding this project?	Zeidler /DGS	NO	
(G)	9	Tender Pricing Form Page 7 – Is it possible to eliminate Part B as well as combine A+B ?	Zoo	NO	
(G)	10	In order to well prepare closing the tender; is it possible to extend the closing time from noon to 4:00 P.M.	Zoo	NO	
	11	Supplementary Bid Form			
(G)	11a	a) We need more time to contact sub-contractors (Some from USA) to obtain information. Please extend closing time from 24 hours to 48 hours	Zoo	Yes- see addendum 1	
(G)	11b	b) Can we submit the supplementary Bid Form by email to you?	Zoo	Yes	

Date Discipline	Date Rec'd	Description	Zeidler sent to consultants/zoo	Answers	Additional information
03.09.A	**2020.03.09**	**A**	10-Mar		
(S)	1	Drawing 1/AR-120 – Please provide structural information for the 2894mm (L) concrete wall adjacent to window W-15	RJC	At Outdoor Training Wall, see struct. 1/S260	
(S)	2	Drawing 3/AR-122 – Please provide structural framing information for the bulkhead between high/low roof (Re: 3/S830)	Zediler/RJC	Light gauge steel framing connected to the concrete wall is probably easier. Design is typically done by the drywall contractor.	
(S)	3	Drawing 4/AR-130 – Please advise type of HSS vertical supports & spacing as shown in structural section 1/S-820	RJC	Per section 1/S820, we have HSS girt below roof framing, and HSS girt above glazing. Vertical HSS are not required to support the glass as the girts will do that.	
(A)	4	Drawing 3/AR-131 – The window sill is a concrete curb as per structural section 1/S-820, not a HSS. Please clarify	Zediler/RJC	Will revise arch to match structural.	
(S)	5	Drawing AR-206 – Please provide structural information of how & extent of cutting of the structural components of the skylight & how to reinforce the opening after cutting	RJC	We have shown this note on 2/S250 to cover this. Some structure will need to be removed in order to actually make the hole for the chute, but none of the existing framing to remain should need to be modified, and as such I don't think we need a shoring plan.	
(A)	6	Drawing 3/AR-206 – Please provide specifications for the steel pane enclosure	Zeidler	We do have a steel plate cladding specified in Section 05 50 00 that is 6 mm thick. For this application we could make the steel cladding 2 mm or 3 mm steel plate. The vapour retarder is Covered in Section 07 26 00 and the rigid insulation is covered in Section 07 21 00.	
(A)	7	Drawing 3/AR-140 & 2, 3, 4/AR-141 – The upper floor deck is concrete on metal deck as per structural plan 3/S-210 & section 2, 3/S-810. Not cedar floor. Please clarify.	Zediler/RJC	Arch details to be revised to match structural's dwg (conc on metal deck).	
(M)	8	Detail 1/MX-100 – Please provide size & depth of the pump chamber. Is it a precast concrete unit by mechanical section or a cast-in-place unit by Div. 03?	Quasar	Final dimensions will need to be coordinated with the selected sump pump system, and elevations required for piping. I would assume two compartments at 4'x4' x 8'deep. However, this may change depending on the final location of the pit, grading, etc. Follow Struct detail for Access pit on S108.	

Date Discipline	Date Rec'd	Description	Zeidler sent to consultants/zoo	Answers	Additional information
03.09.B	**2020.03.09**	**B**	10-Mar		
(S)	1	Architectural drawing section 1/AR-102 shows Freestanding Retaining Wall but structural drawing S-200C shows pile type retaining wall, please clarify.	Zeidler/ RJC	Structural pile will govern.	
03.13_A	**2020.03.10**	**Additional information**			
(G)	1	Site Access Map	Zoo	**See Addendum 2 - Site Access Map**	
(G)	2	Zoo Working hours clarifications	Zoo	24/7 for any outdoor work; 7:30 to Zoo close for any indoor work (Zoo closing time varies based on time of year)	
(G)	3	Existing building Gaur 1 As built drawings	Zoo	**See Addendum 2 - Gaur 1 As built scans**	

zeidler

DRAWING LIST WITH REVISION DESCRIPTION

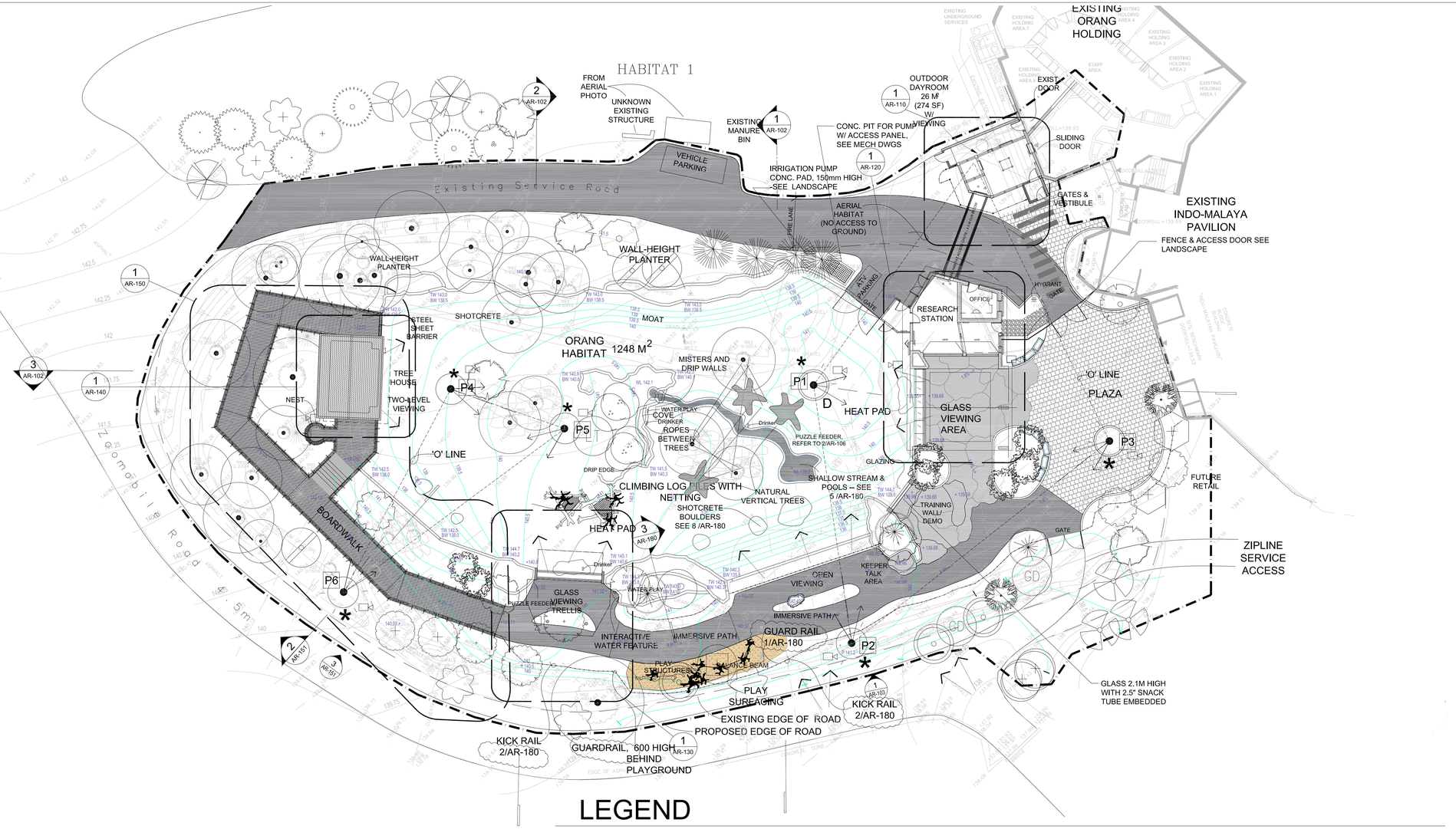
Toronto Zoo Orangutan Exhibits

JOB # 18-1-086

includes ADD-A002

DATE UPDATED: MARCH 13, 2019

Drawing Series	Habitat 1	Habitat 2	Drawing No.	Drawing Title	Revision Description	Issued for Addendum #A002 (retender) 03/13/2020		
ARCHITECTURAL GENERAL								
			AR-101	LAYOUT AND MATERIAL PLAN	Clarify Guardrail & Kickrail locations;	6		
			AR-111	DAYROOM SECTIONS	Barrier Fence revised to be part of Landscape scope.	7		
			AR-131	GLASS VIEWING TRELLIS SECTIONS	Revised window sill to concrete to match structural dwgs	5		
			AR-140	TREE HOUSE - PLANS	Revised upper deck slab to concrete to match structural; Added guardrail around ships ladder opening; reposition opening	6		
			AR-141	TREE HOUSE - SECTIONS & ELEVATIONS	Revised upper deck slab to concrete to match structural; Added guardrail around ships ladder opening; reposition opening. Added detail 5 for Sectional detail at ladder opening	6		
			AR-180	DETAILED SECTIONS	Det. 14- Corrected detail no.	5		
			AR-205	CHUTES	Det 2- Added note on metal ships ladder for Orangutans	5		
			AR-206	SECTIONAL DETAIL	Det 2- Added WWM mesh on the interior face of the square transition chute.	5		
STRUCTURAL	Habitat 1	Habitat 2						
			S-210	BOARDWALK & TREEHOUSE FRAMING PLANS - HABITAT 1	Det 3 - reposition opening	10		



1 AR-101 HABITAT 1: LAYOUT & MATERIAL PLAN
SCALE - 1: 200

LEGEND

- 'O' LINE (AERIAL HABITAT)
- ROPE (AERIAL HABITAT)
- CLIMBING POLE, upper platform with hotwire
- POLE W/ HOTWIRE
- CLIMBING POLE
- FEEDER (AT TOP OF POLE) *
- DRINKER AT TOP OF POLE D
- POLE # (SEE AR-104 & AR-105) P1
- VIDEO FEE (TOP OF POLE) OR SECURITY CAMERA
- VIDEO FEED CAMERA ANGLE
- VIEWING GUARDRAIL SEE 6 /AR-180
- GUARDRAIL / KICK RAIL SEE 1 & 2/ AR-180
- BARRIER FENCE SEE 3 /AR-111
- LIMIT OF WORK
- CONCRETE PAVING W/ COLOR & TEXTURE, see landscape
- ASHPALTIC PAVING, see landscape
- CONCRETE PAVERS, see landscape
- BENCH W/ BACKREST
- HEAT PAD-MINIMUM 2M X 4M

GENERAL NOTES:

1.FOR GRADING, SEE CIVIL DWGS.

2.FOR PAVING MATERIAL SEE LANDSCAPE

3.DRINKERS & HOSE BIBS LOCATION, SEE MECH . PLUMBING DWGS.

4. SECURITY CAMERA LOCATION, SEE ELEC. DWGS

NO.	REV.	ISSUED FOR	DATE
1		PERMIT	2019-11-14
2		TENDER REVIEW	2019-12-06
3		TENDER	2019-12-11
4		~~ADDENDUM # A-002~~	~~2020-01-08~~
5		RE-TENDER	2020-02-13
6		ADDENDUM # A-002	2020-03-13

**LOCAL COORDINATES SHOWN IN THIS DRAWING ARE +39.49 TO ACHIEVE GEODETIC COORDINATES

N

ARCHITECT'S STAMP

CONTRACTOR SHALL CHECK ALL DIMENSIONS ON THE WORK AND REPORT ANY DISCREPANCY TO THE CONSULTANT BEFORE PROCEEDING. THIS DRAWING IS NOT TO BE USED FOR CONSTRUCTION UNTIL AUTHORIZED IN WRITING BY CONSULTANT.

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PROJECT:
ORANGUTAN EXHIBITS

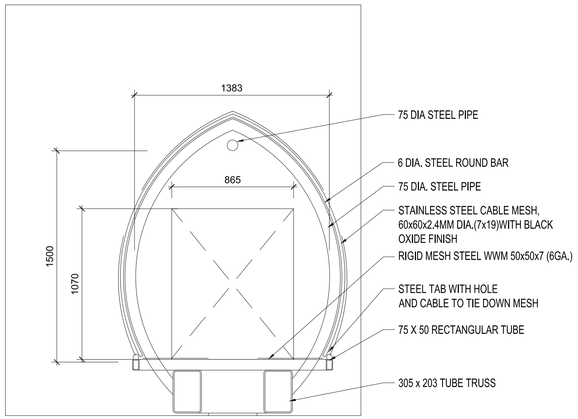
DRAWING NAME :

HABITAT 1
LAYOUT & MATERIAL PLAN

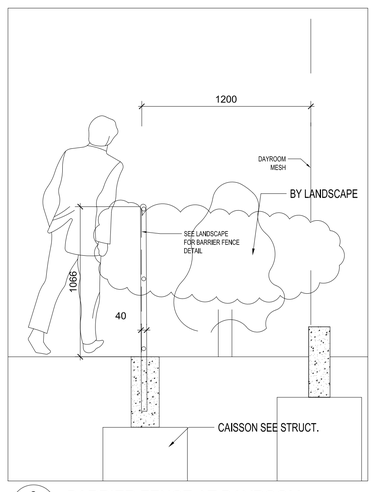
PROJECT NO.:	DRAWN BY :	CHECKED BY:
18-1-086	LL	LC

SCALE:
AS NOTED
FEBRUARY 13,2020

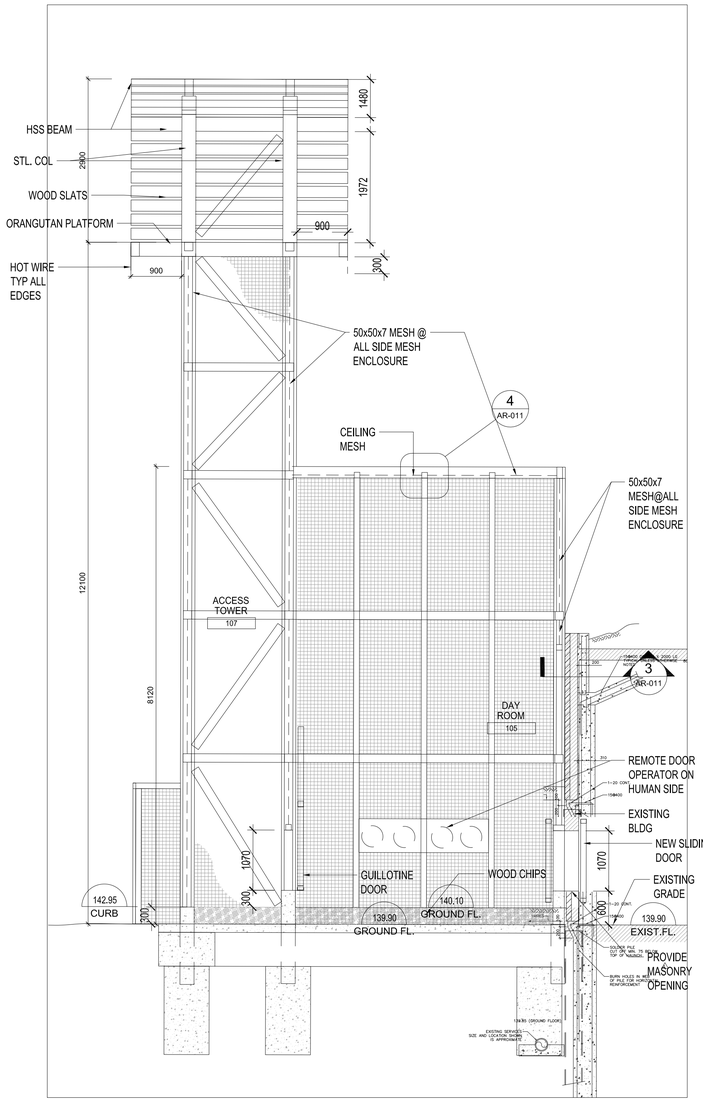
DRAWING NUMBER:
AR-101



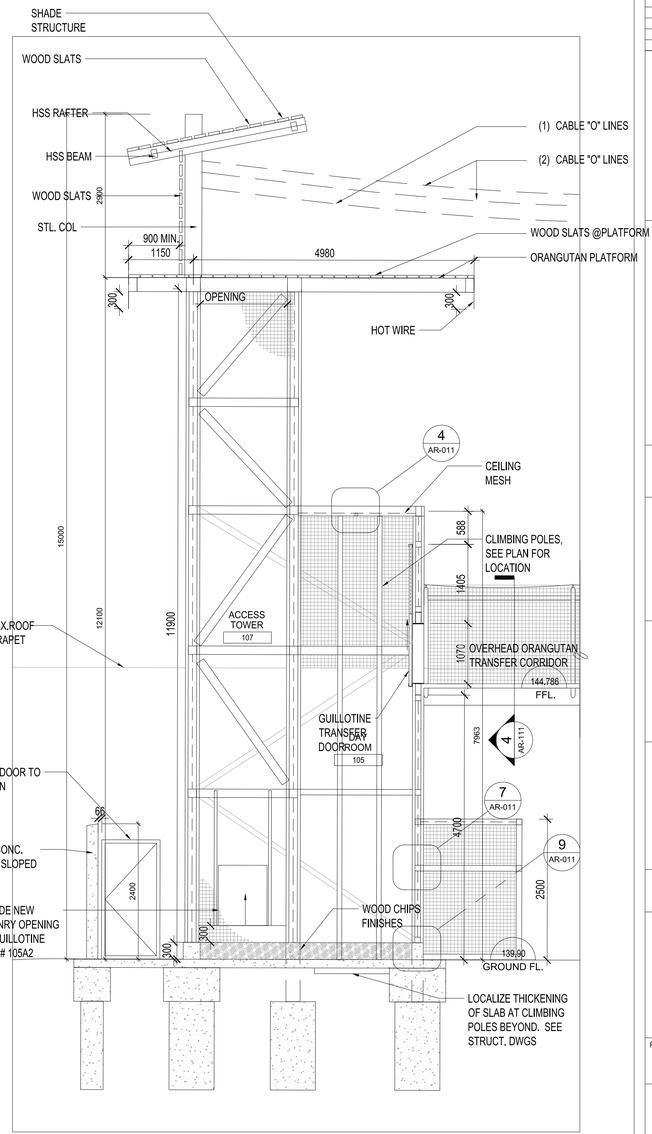
4 / AR-111 SECTION AT CHUTE
SCALE - 1:20



3 / AR-111 BARRIER FENCE AT DAYROOM
SCALE - 1:20



2 / AR-111 SECTION
SCALE - 1:50



1 / AR-111 SECTION
SCALE - 1:50

NO.	REV.	ISSUED FOR	DATE
1		PERMIT	2019-11-14
2		TENDER REVIEW	2019-12-06
3		TENDER	2019-12-11
4		~~ADDENDUM # A-002~~	~~2020-01-08~~
5		PERMIT R1	2020-02-06
6		RE-TENDER	2020-02-13
7		ADDENDUM # A-002	2020-03-13

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toronto zoo
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PROJECT:
ORANGUTAN EXHIBITS

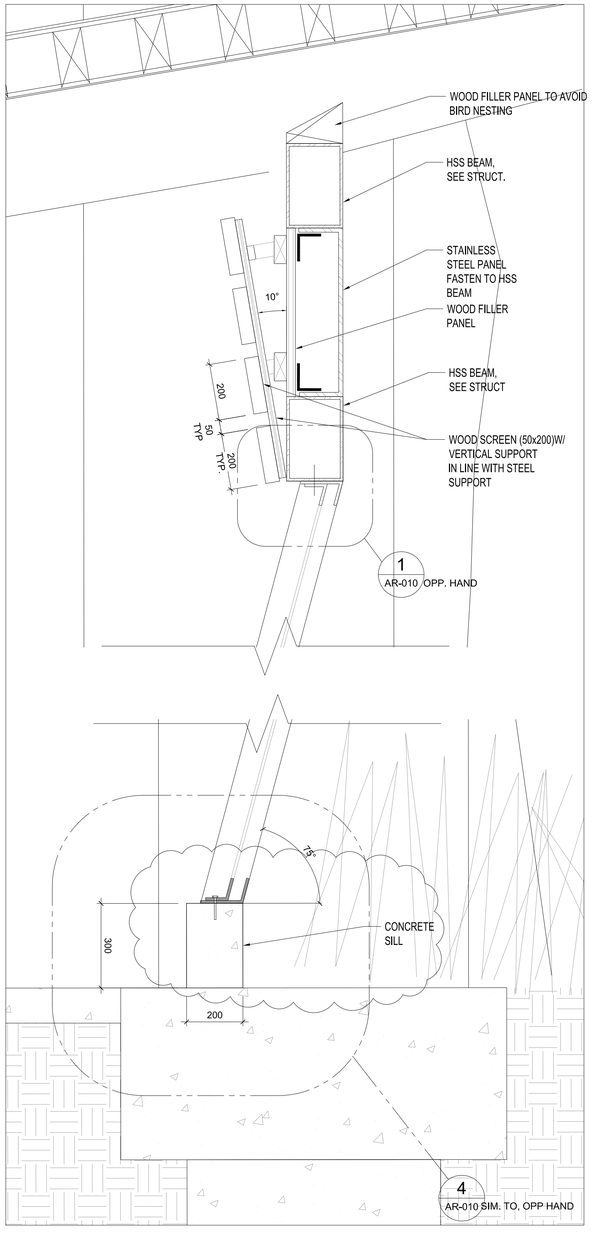
DRAWING NAME :

HABITAT 1
DAYROOM SECTIONS

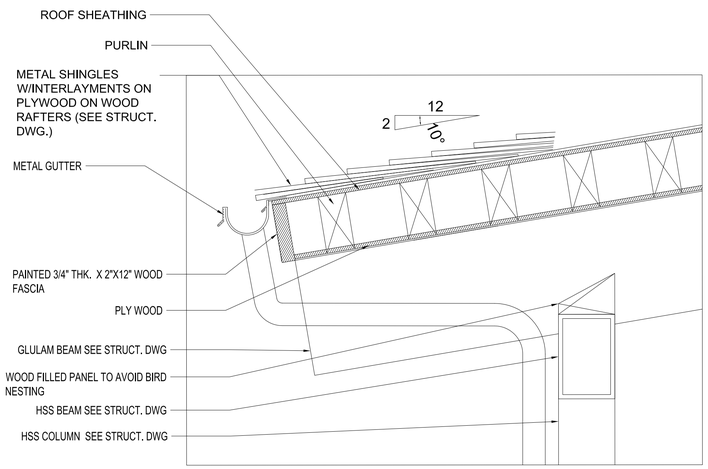
PROJECT NO.:	DRAWN BY :	CHECKED BY:
18-1-086	LL	LC

SCALE:
AS NOTED
FEBRUARY 13,2020

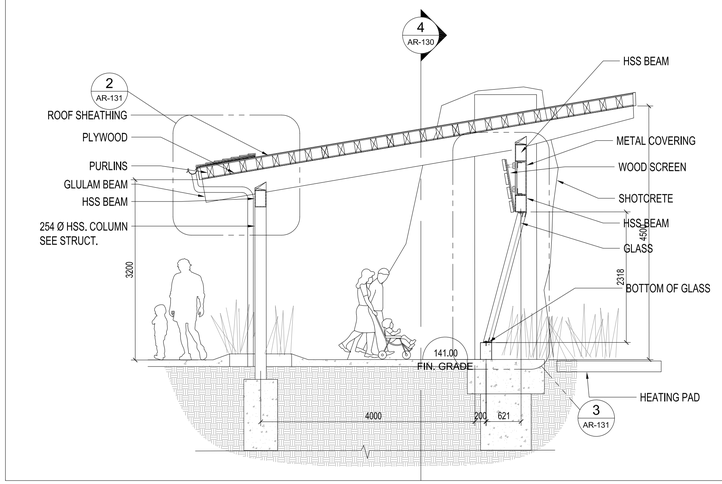
DRAWING NUMBER:
AR-111



3 AR-131 DETAIL SECTION @ GLAZING
SCALE-1:10



2 AR-131 DETAIL SECTION@ ROOF
SCALE - 1:10



1 AR-131 SECTION
SCALE - 1:50

NO.	REV.	ISSUED FOR	DATE
1		PERMIT	2019-11-14
2		TENDER REVIEW	2019-12-06
3		TENDER	2019-10-11
4		RE-TENDER	2020-02-13
5		ADDENDUM # A-002	2020-03-13

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PROJECT:
ORANGUTAN EXHIBITS

DRAWING NAME :

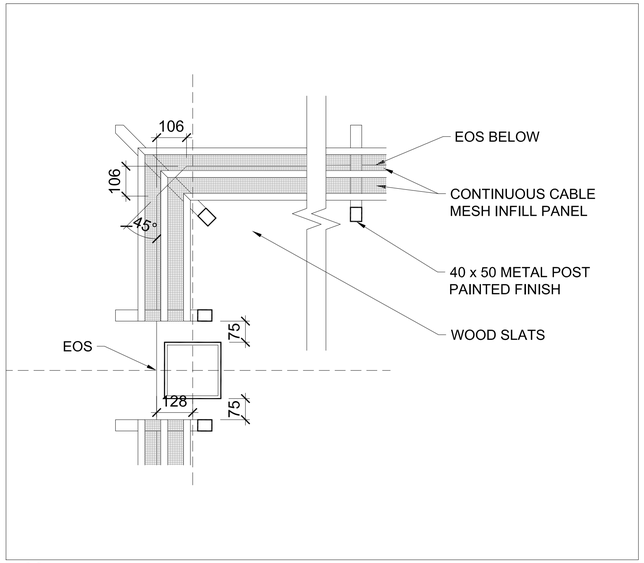
HABITAT 1
GLASS VIEWING TRELLIS SECTIONS

PROJECT NO.:	DRAWN BY :	CHECKED BY:
18-1-086	LL	LC

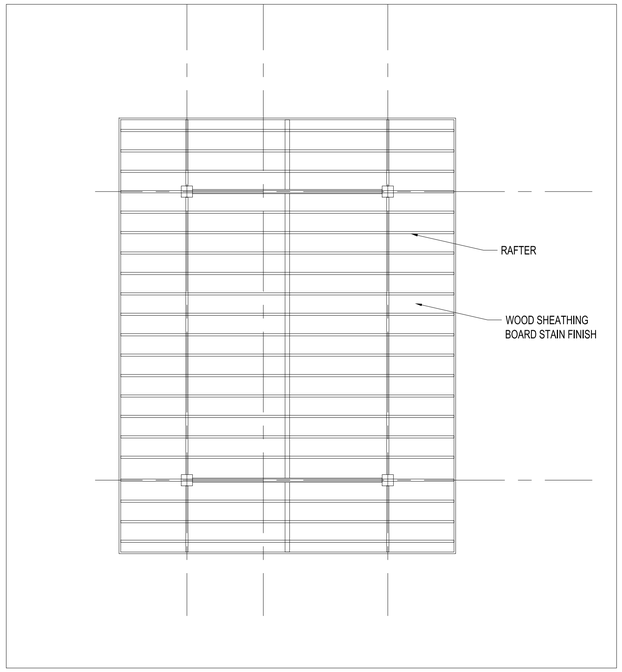
DRAWING NUMBER:

SCALE:
AS NOTED
FEBRUARY 13,2020

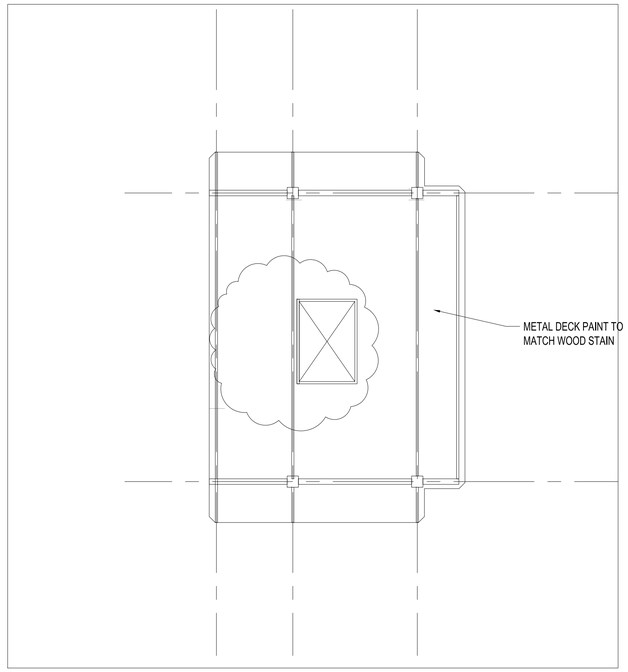
AR-131



6 AR-140 GUARDRAIL CONER DETAIL
SCALE - 1:10



4 AR-140 REFELCTED CEILING PLAN - UPPER LEVEL
SCALE - 1:50



2 AR-140 REFELCTED CEILING PLAN - LOWER LEVEL
SCALE - 1:50

NO.	REV.	ISSUED FOR	DATE
1		PERMIT	2019-11-14
2		TENDER REVIEW	2019-12-06
3		TENDER	2019-12-11
4		ADDENDUM # A-002	2020-01-08
5		RE-TENDER	2020-02-13
6		ADDENDUM # A-002	2020-03-13

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PROJECT:
ORANGUTAN EXHIBITS

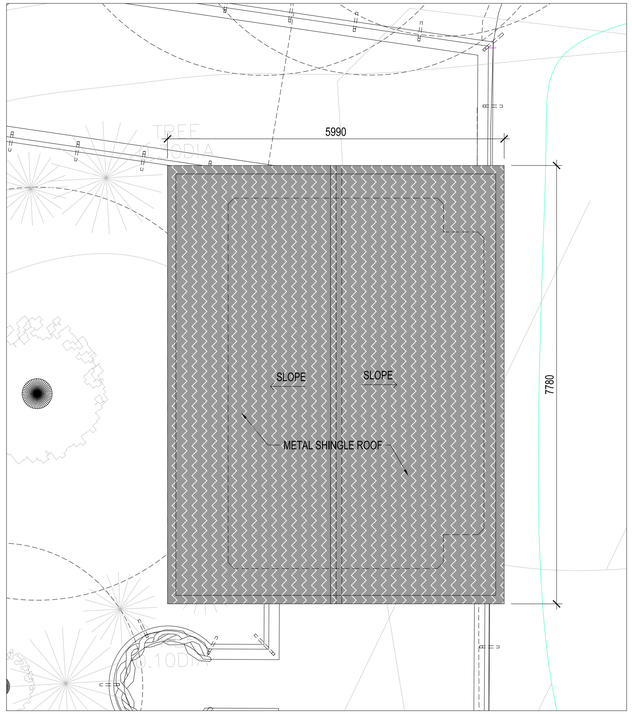
DRAWING NAME :

HABITAT 1
TREE HOUSE PLANS

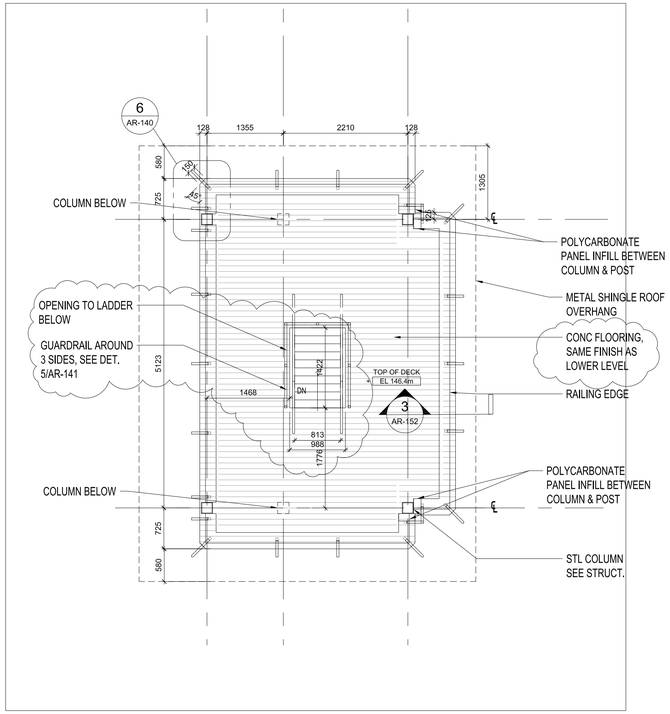
PROJECT NO.:	DRAWN BY :	CHECKED BY:
18-1-086	LL	LC

SCALE:
AS NOTED
FEBRUARY 13,2020

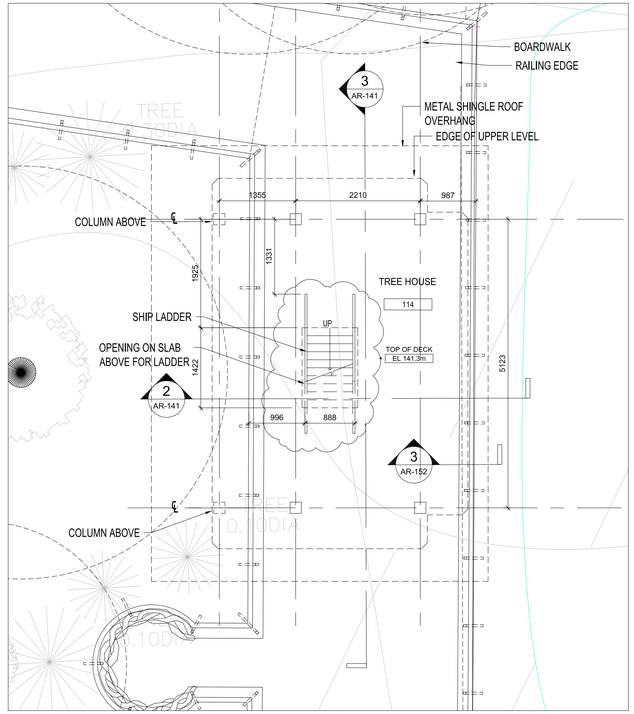
DRAWING NUMBER:
AR-140



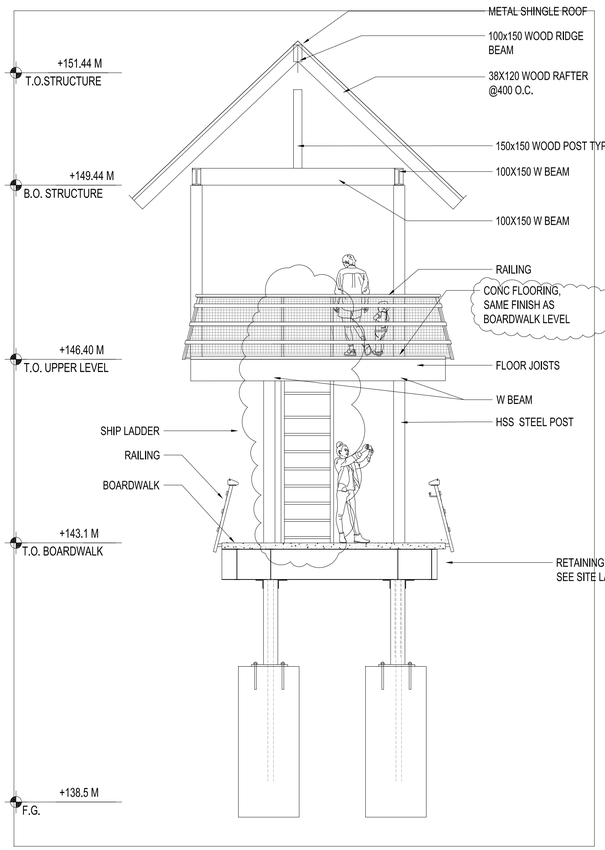
5 AR-140 METAL SHINGLE ROOF PLAN
SCALE - 1:50



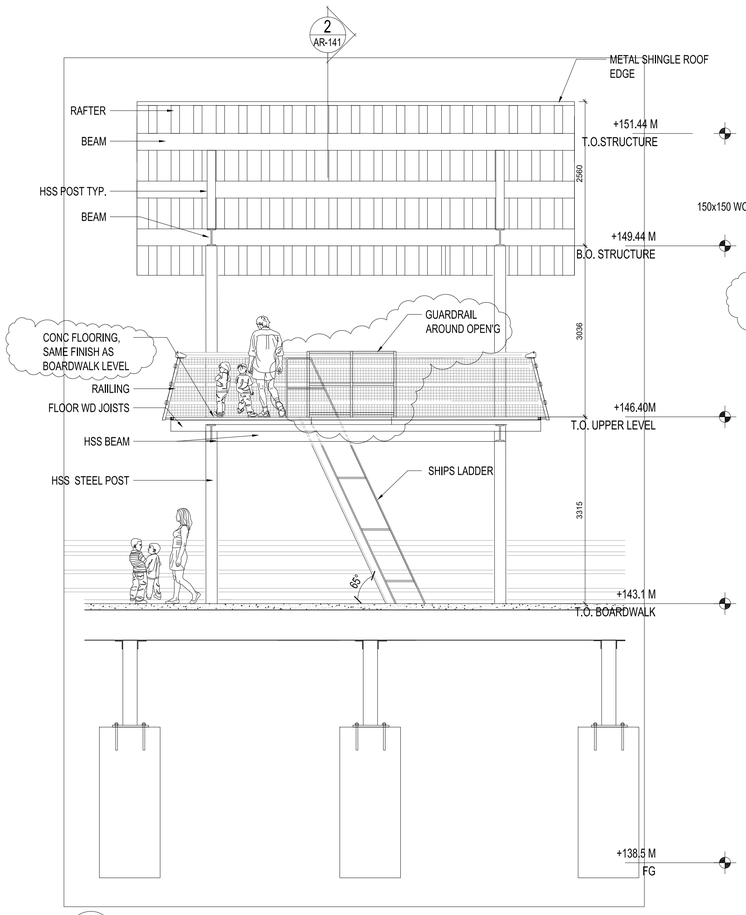
3 AR-140 CONSTRUCTION PLAN - UPPER LEVEL
SCALE - 1:50



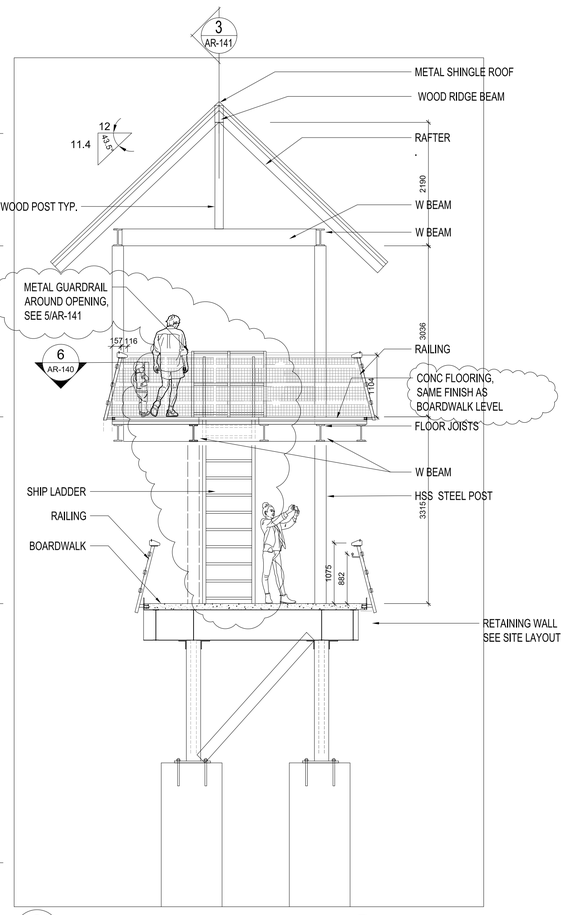
1 AR-140 CONSTRUCTION PLAN - LOWER LEVEL
SCALE - 1:50



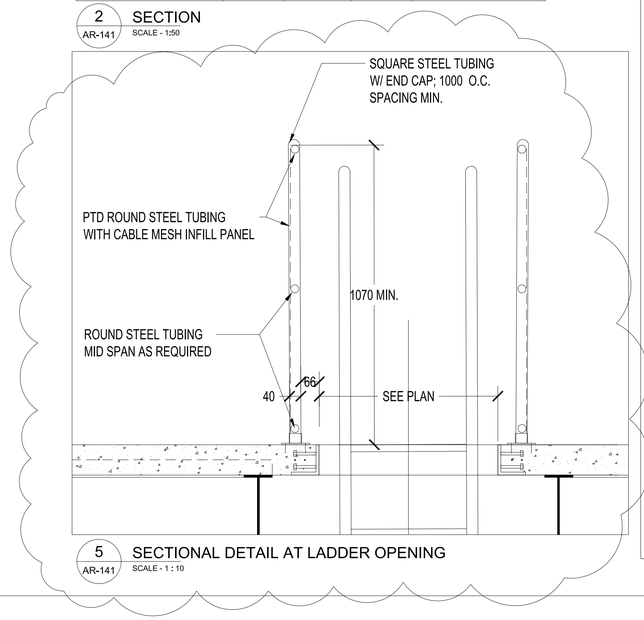
4 AR-141 ELEVATION
SCALE - 1:50



3 AR-141 SECTION
SCALE - 1:50



2 AR-141 SECTION
SCALE - 1:50



5 AR-141 SECTIONAL DETAIL AT LADDER OPENING
SCALE - 1 : 10

NO.	REV.	ISSUED FOR	DATE
1		PERMIT	2019-11-14
2		TENDER REVIEW	2019-12-06
3		TENDER	2019-12-11
4		ADDENDUM # A-002	2020-01-08
5		RE-TENDER	2020-02-13
6		ADDENDUM # A-002	2020-03-13

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PROJECT:
ORANGUTAN EXHIBITS

DRAWING NAME :

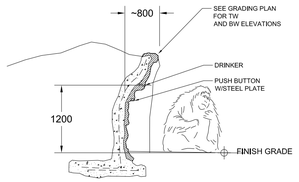
HABITAT 1

TREE HOUSE SECTIONS AND ELEVATIONS

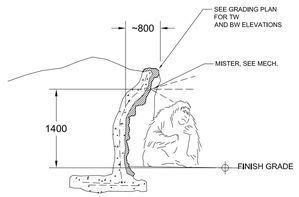
PROJECT NO.:	DRAWN BY :	CHECKED BY:
18-1-086	LL	LC

SCALE:
AS NOTED
FEBRUARY 13,2020

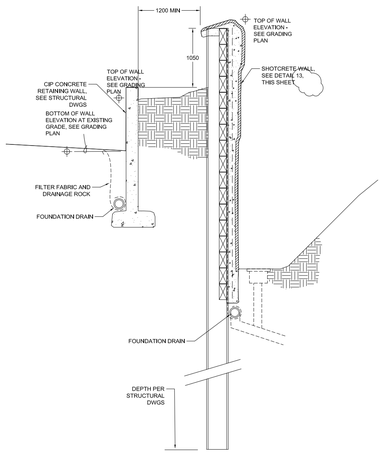
DRAWING NUMBER:
AR-141



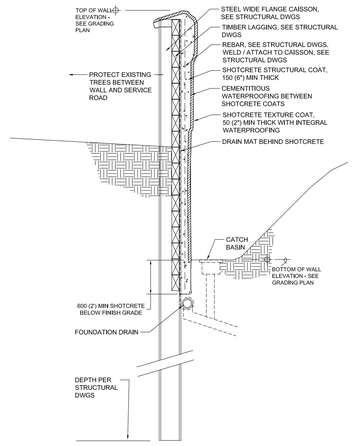
16 AR-180 ORANG DRINKER
SCALE - 1:50



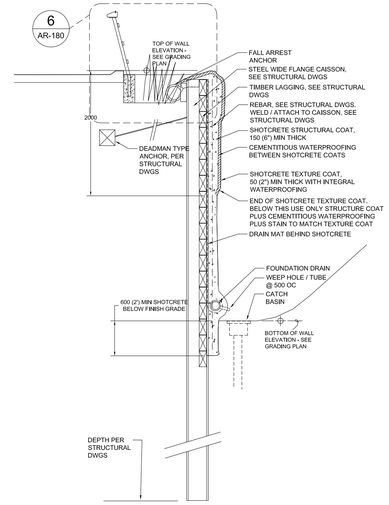
15 AR-180 ORANG MISTER
SCALE - 1:50



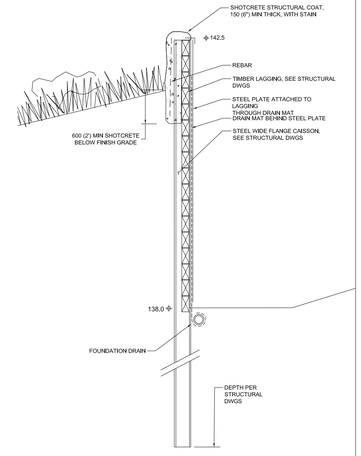
14 AR-180 HALF MOAT WALL W/ PLANTER
SCALE - 1:50



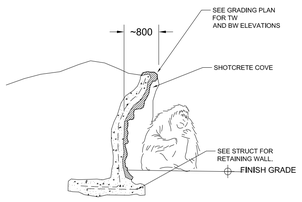
13 AR-180 HALF MOAT WALL
SCALE - 1:50



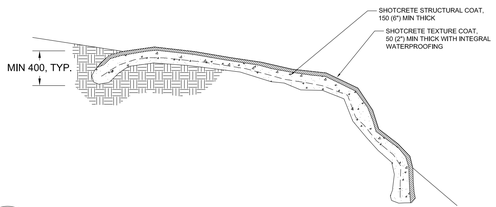
12 AR-180 FULL MOAT WALL
SCALE - 1:50



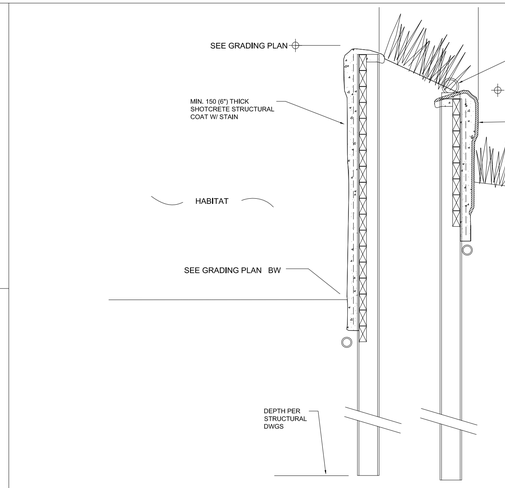
11 AR-180 STEEL METAL WALL
SCALE - 1:50



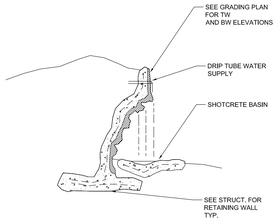
10 AR-180 SHOTCRETE COVE
SCALE - 1:50



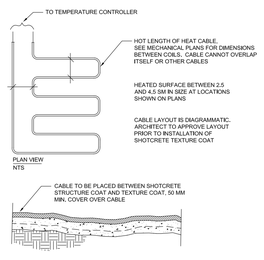
8 AR-180 SHOTCRETE BOULDER
SCALE - 1:50



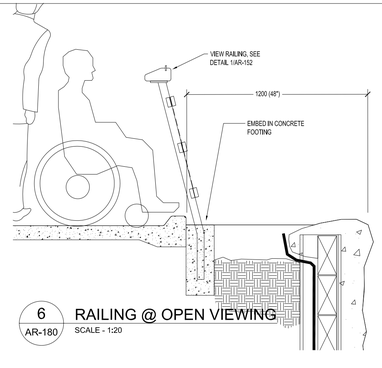
3 AR-180 RAILING @ OPEN VIEWING
SCALE - 1:50



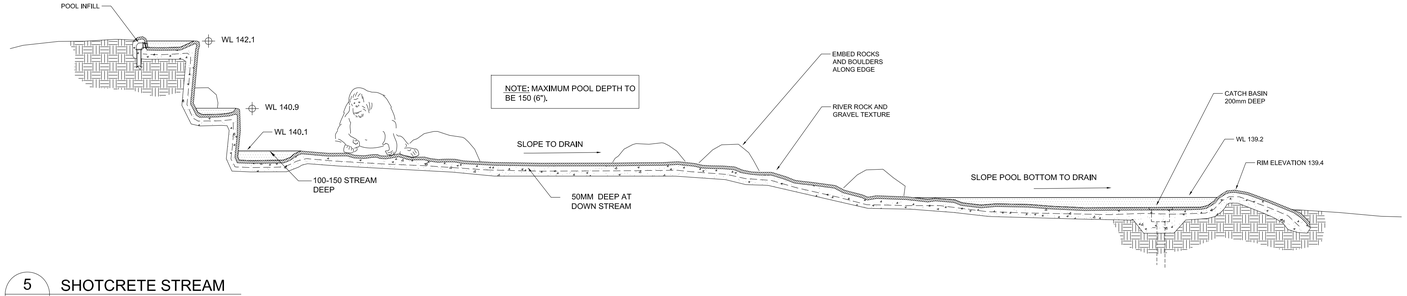
9 AR-180 SHOTCRETE DRIP EDGE
SCALE - 1:50



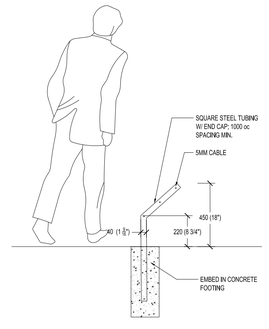
7 AR-180 SHOTCRETE HEAT PAD
SCALE - 1:50



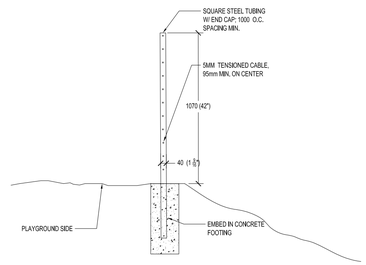
6 AR-180 RAILING @ OPEN VIEWING
SCALE - 1:20



5 AR-180 SHOTCRETE STREAM
SCALE - 1:50



2 AR-180 KICK RAIL
SCALE - 1:20



1 AR-180 GUARDRAIL @ PLAYGROUND
SCALE - 1:20

NO.	REV.	ISSUED FOR	DATE
1		PERMIT	2019-11-14
2		TENDER REVIEW	2019-12-06
3		TENDER	2019-12-11
4		RE-TENDER	2020-02-13
5		ADDENDUM # A-002	2020-03-13

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PROJECT:
ORANGUTAN EXHIBITS

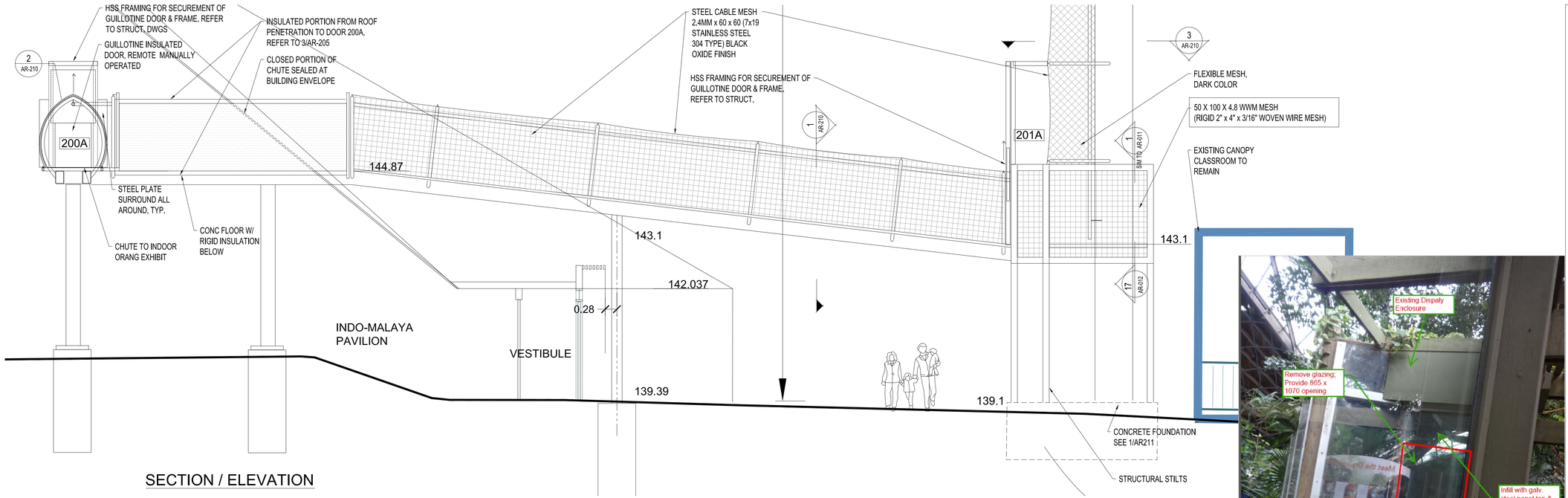
DRAWING NAME :

HABITAT 1
DETAILED SECTIONS

PROJECT NO.:	DRAWN BY :	CHECKED BY:
18-1-086	LL	LC

SCALE:
AS NOTED
FEBRUARY 13,2020

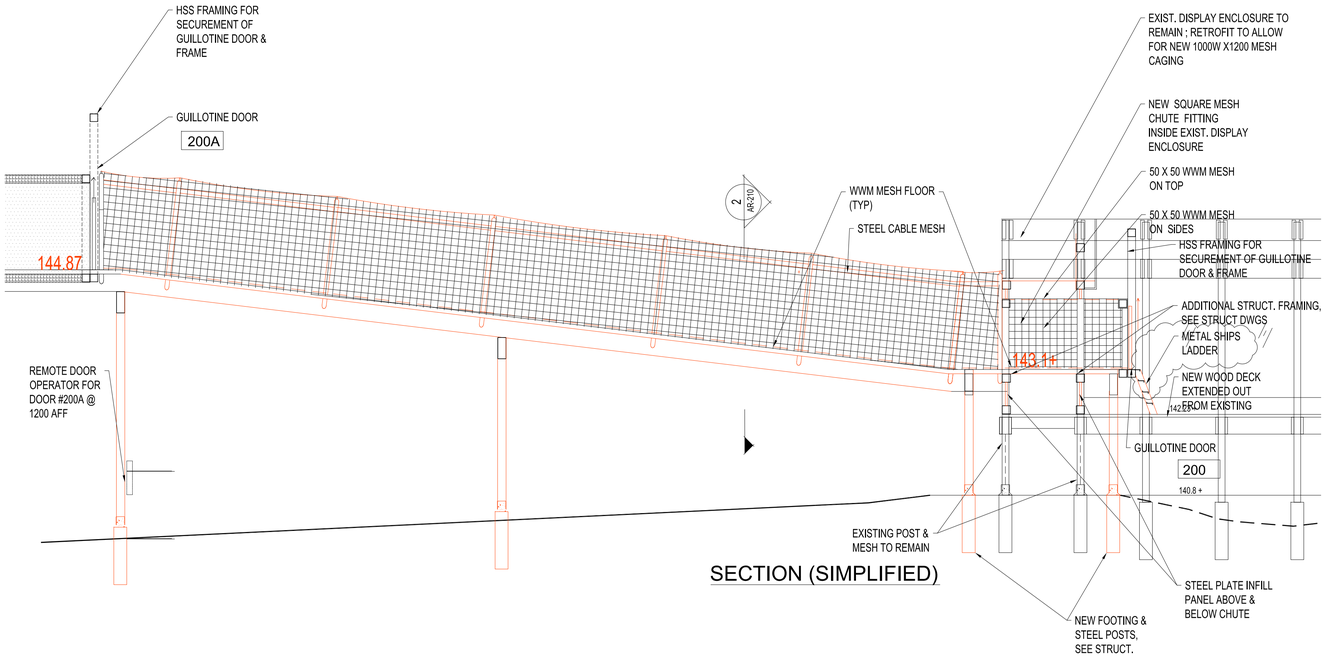
DRAWING NUMBER:
AR-180



SECTION / ELEVATION

1 CHUTE AT PAVILION & PLAZA

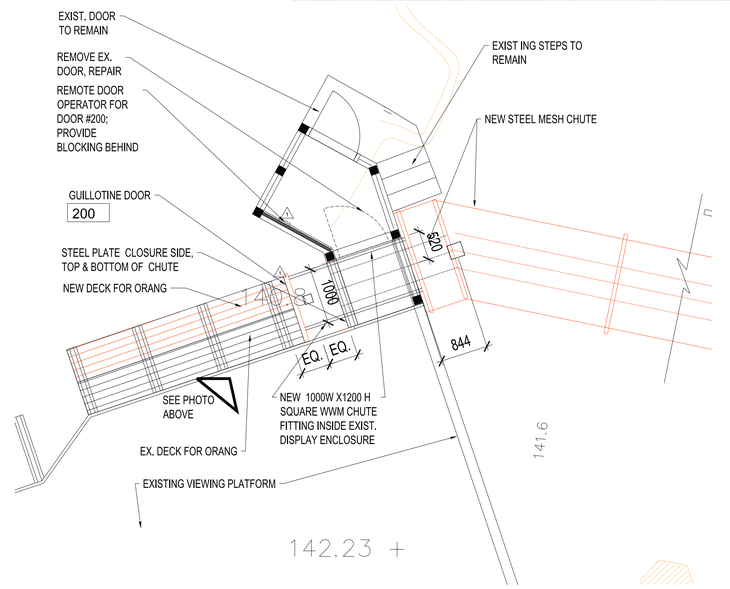
SCALE: 1:50



SECTION (SIMPLIFIED)

2 ACCESS TOWER AT EXISTING VIEWING PLATFORM, SECTION

SCALE: 1:50



3 ACCESS CHUTE AT EXISTING VIEWING PLATFORM PLAN

SCALE: 1:50

NO.	REV.	ISSUED FOR	DATE
1		PERMIT	2019-11-14
2		TENDER REVIEW	2019-12-06
3		TENDER	2019-12-11
4		RE-TENDER	2020-02-13
5		ADDENDUM # A-002	2020-03-13

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CLIENT: **TORONTO ZOO**

toronto zoo

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PROJECT:
ORANGUTAN EXHIBITS

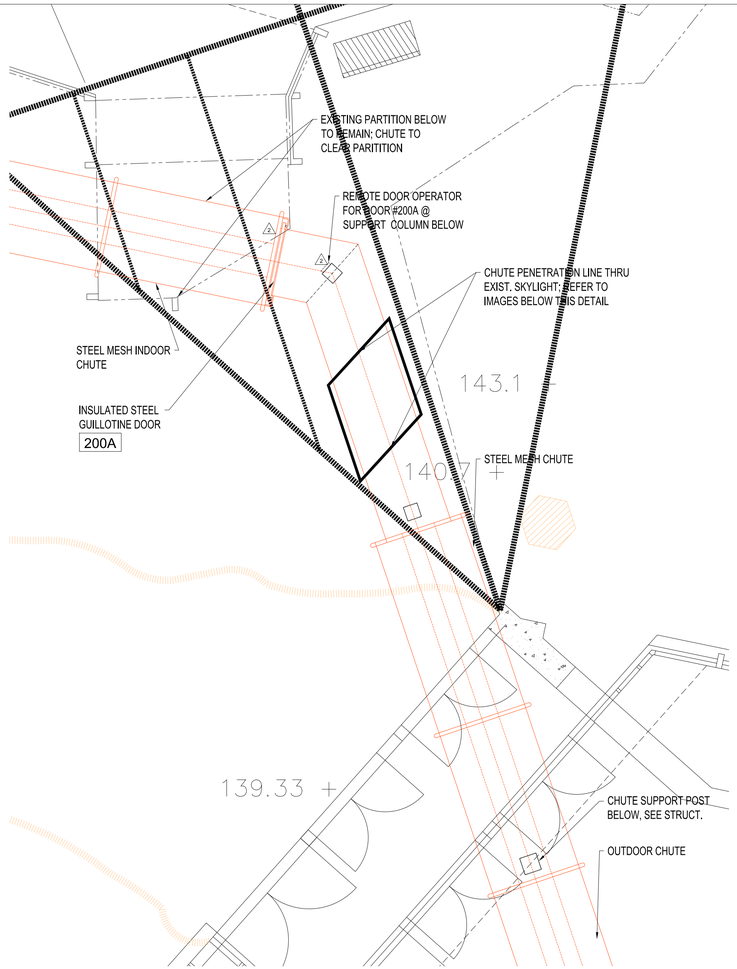
DRAWING NAME :

HABITAT 2
CHUTES

PROJECT NO.:	DRAWN BY :	CHECKED BY:
18-1-086	LL	LC

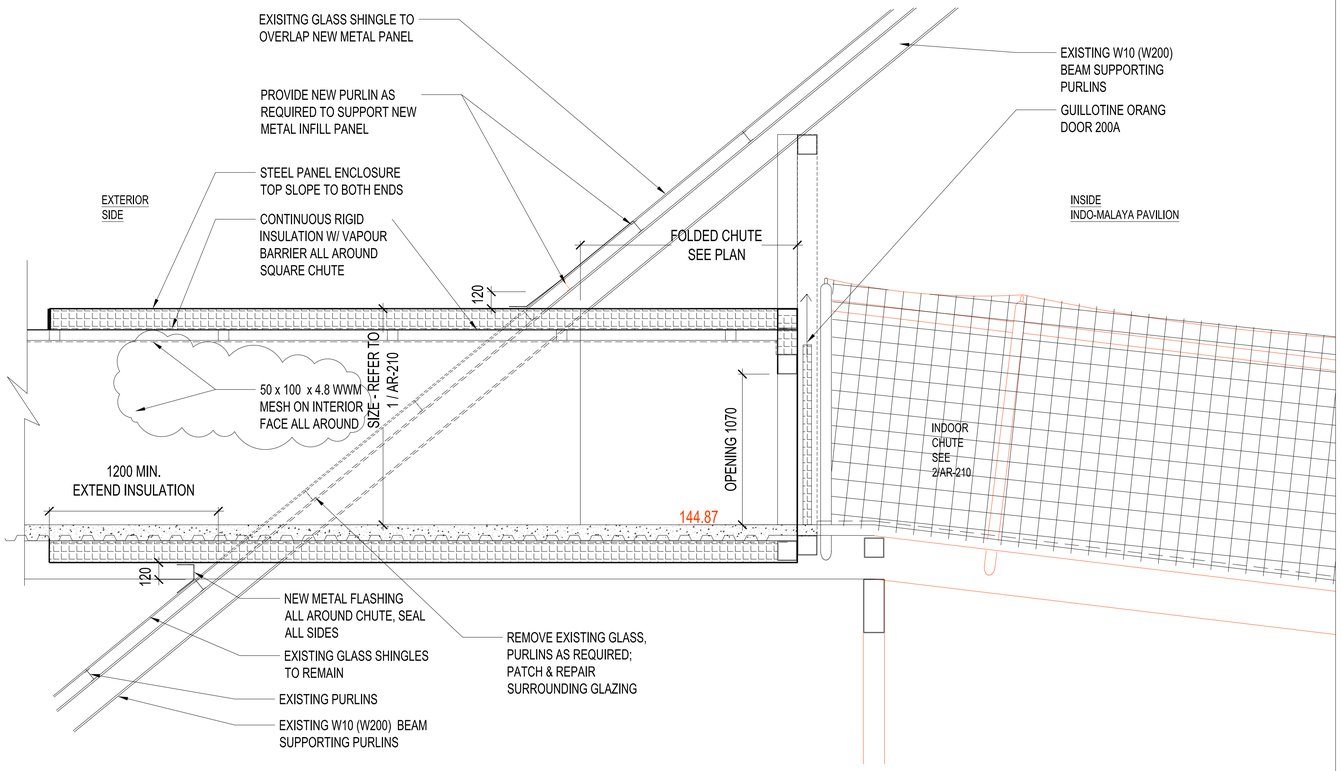
SCALE:
AS NOTED
FEBRUARY 13,2020

DRAWING NUMBER:
AR-205



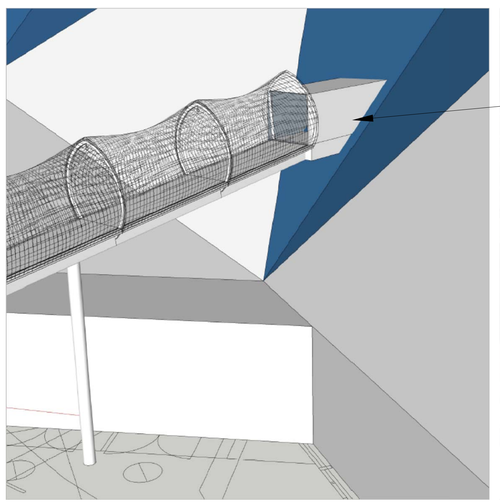
1 PLAN: CHUTE THRU SKYLIGHT

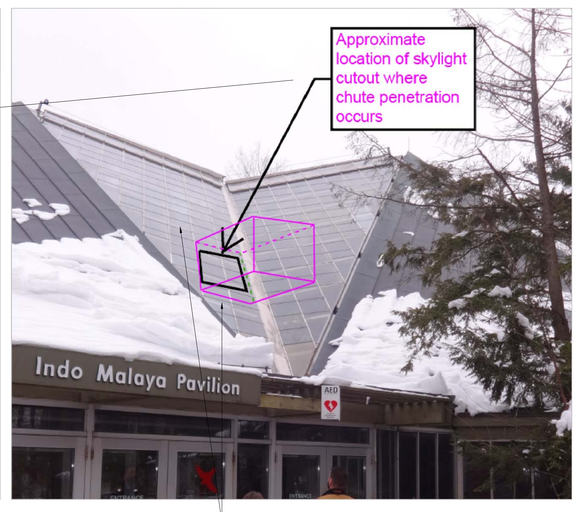
SCALE: 1:50



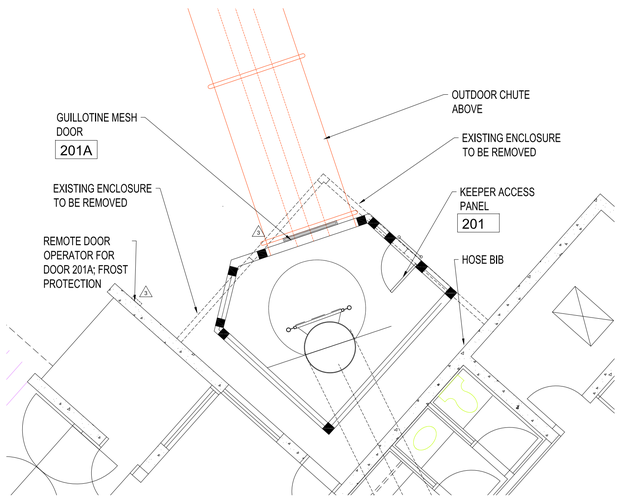
3 DETAIL: CHUTE PENETRATION @SKYLIGHT

SCALE: 1: 20





PROVIDE SS PANELS SIDES, BOTTOM & TOP OF OPENING WHERE GLASS SHINGLES ARE REMOVED. COMPLETELY SEAL CHUTE TO METAL PANELS; SEE DETAIL 3 OF THIS SHEET



2 PLAN: HABITAT 2 OUTDOOR DAYROOM

SCALE: 1:50

NO.	REV.	ISSUED FOR	DATE
1		PERMIT	2019-11-14
2		TENDER REVIEW	2019-12-06
3		TENDER	2019-12-11
4		RE-TENDER	2020-02-13
5		ADDENDUM # A-002	2020-03-13

**LOCAL COORDINATES SHOWN IN THIS DRAWING ARE +39.49 TO ACHIEVE GEODETIC COORDINATES

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ARCHITECT'S STAMP

CONTRACTOR SHALL CHECK ALL DIMENSIONS ON THE WORK AND REPORT ANY DISCREPANCY TO THE CONSULTANT BEFORE PROCEEDING. THIS DRAWING IS NOT TO BE USED FOR CONSTRUCTION UNTIL AUTHORIZED IN WRITING BY CONSULTANT.

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CLIENT: **TORONTO ZOO**

toronto zoo

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PROJECT:
ORANGUTAN EXHIBITS

DRAWING NAME :

HABITAT 2
SECTIONAL DETAILS

PROJECT NO.:	DRAWN BY :	CHECKED BY:
18-1-086	LL	LC

SCALE:
AS NOTED
FEBRUARY 13,2020

DRAWING NUMBER:
AR-206

Engineers

ADDENDUM NO. 2

Project:	Toronto Zoo Orangutan Outdoor Exhibit Toronto	Project No.:	TOR.113946.0011
Client:	Zeidler Partnership Archtects	Date:	March 13, 2020
Contact:	Lena Chow, OAA, M.Sc., B.Arch., LEED AP	Page:	1 of 1 + 1 drawings
		Issued By:	Nathan Bissell, P.Eng.

This addendum forms part of the contract documents and amends the original drawings, specifications, schedules, and details Issued for Re-Tender, February 13, 2020

1.0 DRAWINGS ISSUED

1.1. S-210 Boardwalk and Treehouse Framing Plans – Habitat 1

2.0 SPECIFICATIONS ISSUED

2.1. none

3.0 SKETCHES ISSUED

3.1. none

4.0 DESCRIPTION OF ADDITIONAL REVISIONS

4.1. S-210

a. Stair opening moved and framing modified to suit

END OF ADDENDUM NO. 2

Copy to:

[x] Edward Chan - Zeidler

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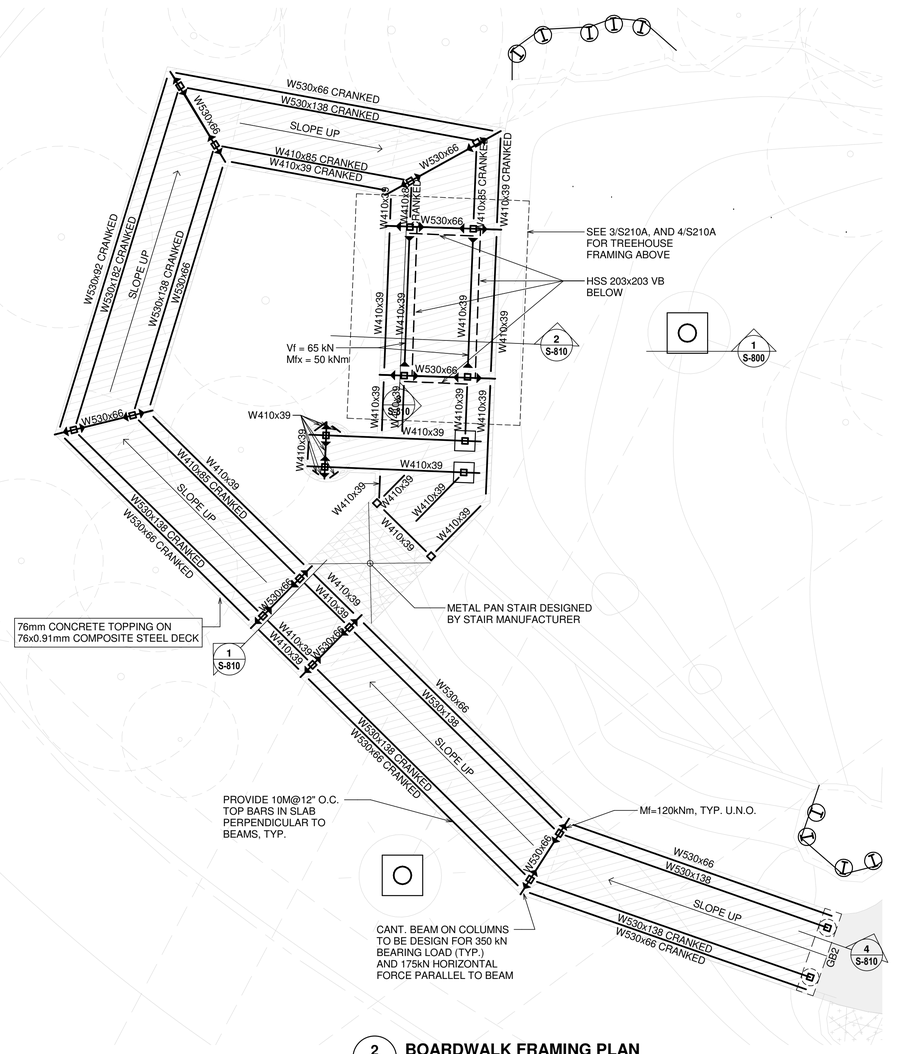
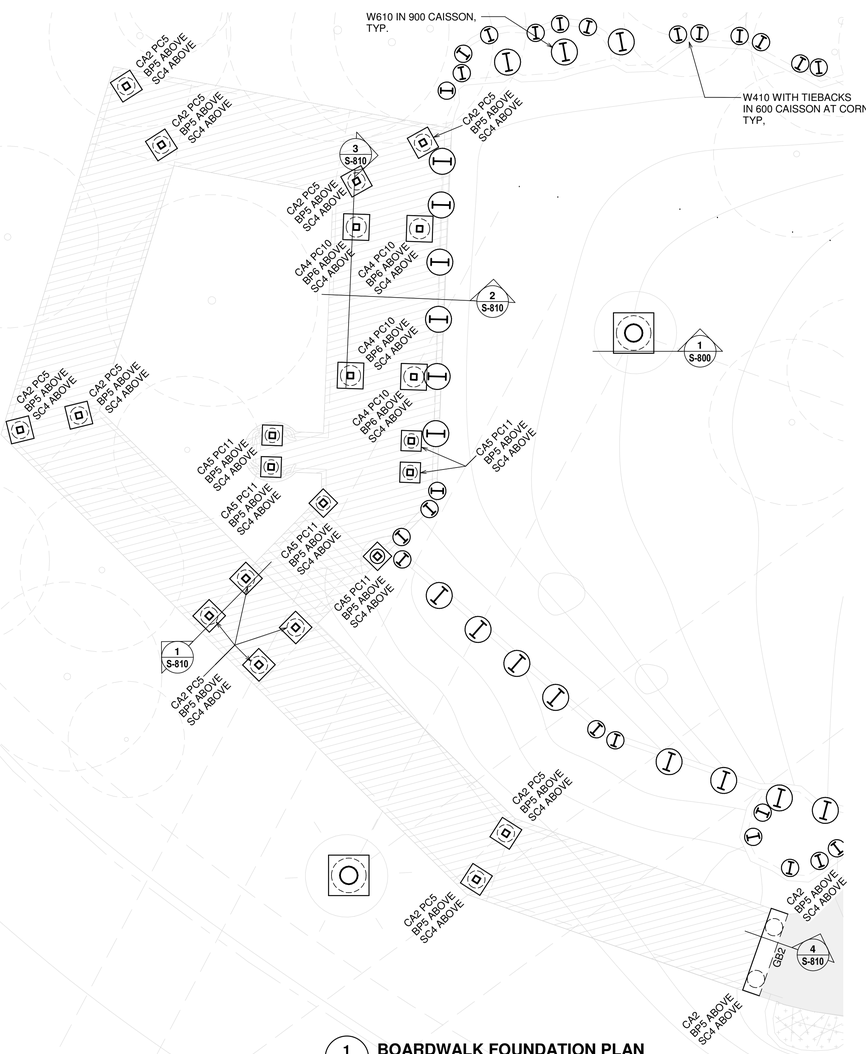


2 S-210 BOARDWALK FRAMING PLAN

1 : 100

NOTES:

1. SEE ARCHITECTURAL DRAWINGS FOR TOP OF SLAB ELEVATIONS, SLOPES, DIMENSIONS, CURBS, AND SLAB EDGES.
2. TOP OF STRUCTURAL STEEL IS 152MM BELOW TOP OF SLAB U.N.O.
3. DESIGN LIVE LOADS ARE AS FOLLOWS UNLESS CROSSED AND NOTED ON PLAN:
   a. LIVE LOAD 4.8KPA
4. DESIGN SUPERIMPOSED DEAD LOADS ARE AS FOLLOWS UNLESS CROSSED AND NOTED ON PLAN:
   a. FLOOR FINISHES 0.8KPA
   b. SOFFIT/SERVICES 0.6KPA
5. ALL STEEL DECK WITH CONCRETE TOPPING TO BE COMPOSITE UNLESS NOTED OTHERWISE. REFER TO GENERAL NOTES FOR REINFORCEMENT OF CONCRETE TOPPING SLABS.
6. DESIGN STEEL BEAM CONNECTIONS FOR FORCES SHOWN ON PLAN. WHERE NO FORCE IS INDICATED, DESIGN CONNECTIONS FOR VF =150KN.
7. ALL STRUCTURAL STEEL OUTSIDE OF THE BUILDING ENVELOPE TO BE HOT DIPPED GALVANIZED UNLESS NOTED OTHERWISE.
8. GENERAL CONTRACTOR TO VERIFY SITE CONDITIONS AND DIMENSIONS PRIOR TO COMMENCEMENT OF WORK.
9. REFER TO THE FOLLOWING DRAWINGS:
   a. GENERAL NOTES – S-100 SERIES
   b. SCHEDULES – S-300 SERIES
   c. BOARDWALK AND TREEHOUSE SECTIONS AND DETAILS – S-810 SERIES

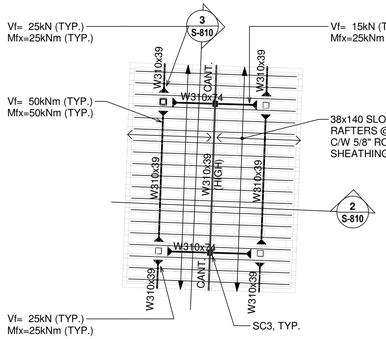


1 S-210 BOARDWALK FOUNDATION PLAN

1 : 100

NOTES:

1. CAISSON EMBEDMENT DEPTHS BELOW FINISHED GRADE ARE SHOWN ON SCHEDULE, SEE S-300 SERIES
2. CAISSON HAVE BEEN DESIGNED ASSUMING SKIN FRICTION CAPACITY OF 60KPA (SLS), NEGLECTING THE TOP 1.2M OF SHAFT DEPTH BELOW FINISHED GRADE. WHERE A PILE CAP IS USED ATOP THE CAISSON, THE 1.2M OF NEGLECTED SHAFT DEPTH INCLUDES THE DEPTH OF THE CAP AND IS NOT IN ADDITION TO IT.
3. CAISSON EMBEDMENT DEPTHS TO BE VERIFIED BY GEOTECHNICAL ENGINEER ON SITE AND MAY HAVE TO BE ADJUSTED TO SUIT DESIGN REQUIREMENTS.
4. CENTER ALL CAPS, PIERS, CAISSONS AND FOOTINGS UNDER COLUMNS EXCEPT WHERE NOTED OTHERWISE ON PLAN.
5. UNDERSIDE OF BASE PLATE TO BE FOUNDED 300MM ABOVE FINISHED GRADE. UNDERSIDE OF BASE PLATE ELEVATIONS VARY DEPENDING ON FINISHED GRADE ELEVATION. REFER TO GRADING PLAN.
6. GENERAL CONTRACTOR TO VERIFY SITE CONDITIONS AND DIMENSIONS PRIOR TO COMMENCEMENT OF WORK.
7. REFER TO THE FOLLOWING DRAWINGS:
   a. GENERAL NOTES – S-100 SERIES
   b. SCHEDULES – S-300 SERIES
   c. BOARDWALK AND TREEHOUSE SECTIONS AND DETAILS – S-810 SERIES

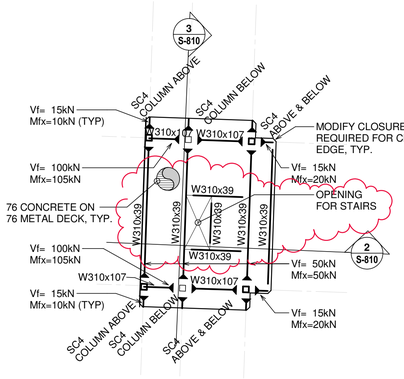


4 S-210 TREEHOUSE ROOF FRAMING PLAN

1 : 100

NOTES:

1. SEE ARCHITECTURAL DRAWINGS FOR TOP OF ROOF ELEVATIONS, SLOPES, DIMENSIONS, CURBS, AND SLAB EDGES.
2. SEE S810 SERIES FOR SECTIONS TO BE USED IN CONJUNCTION WITH ARCHITECTURAL DRAWINGS TO DETERMINE TOP OF STRUCTURAL FRAMING ELEVATIONS.
3. DESIGN LIVE LOADS ARE AS FOLLOWS UNLESS CROSSED AND NOTED ON PLAN:
   a. SNOW LOAD 1.3KPA
4. DESIGN SUPERIMPOSED DEAD LOADS ARE AS FOLLOWS UNLESS CROSSED AND NOTED ON PLAN:
   a. ROOF FINISHES 0.5KPA
   b. CEILING/SERVICES 0.6KPA
5. SEE GENERAL NOTES FOR WOOD FRAMING INFORMATION.
6. REFER TO PLAN NOTES ON 2/S-210 FOR ADDITIONAL INFORMATION NOT RELATED TO LOADING.



3 S-210 TREEHOUSE UPPER LEVEL FRAMING PLAN

1 : 100

NOTES:

1. DESIGN LIVE LOADS ARE AS FOLLOWS UNLESS CROSSED AND NOTED ON PLAN:
   a. LIVE LOAD 4.8KPA
2. DESIGN SUPERIMPOSED DEAD LOADS ARE AS FOLLOWS UNLESS CROSSED AND NOTED ON PLAN:
   a. CEILING/SERVICES 0.6KPA
1. REFER TO PLAN NOTES ON 2/S-210 FOR ADDITIONAL INFORMATION NOT RELATED TO LOADING.

NO.	REV.	ISSUED FOR	DATE
1	1	100% DD	2019-10-02
2	2	PROGRESS	2019-10-17
3	3	60% CD	2019-10-25
4	4	100% CD	2019-11-12
5	5	ISSUED FOR PERMIT	2019-11-14
6	6	ISSUED FOR TENDER REVIEW	2019-12-06
7	7	ISSUED FOR TENDER	2019-12-11
8	8	ISSUED FOR ADDENDUM #2	2020-01-10
9	9	ISSUED FOR RE-TENDER	2020-02-13
10	10	ISSUED FOR ADDENDUM #2	2020-03-13

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PROJECT:

DRAWING NAME:

BOARDWALK & TREEHOUSE FRAMING PLANS - HABITAT 1

PROJECT NO:	DRAWN BY:	CHECKED BY:
TOR.113946.0011	JP	NB

Scale: 1 : 100 DRAWING NUMBER:

S-210

Ravine Stewardship Plan
Toronto Zoo, Orangutan Enclosure Habitat 1
Toronto, Ontario

prepared for

Toronto Zoo
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Toronto, ON M1B 5K7

prepared by

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4 November 2019, revised 6 March 2020

KUNTZ FORESTRY CONSULTING INC Project P2221

Contents

1. Introduction

Kuntz Forestry Consulting Inc. was retained by the Toronto Zoo to complete a Ravine Stewardship Plan in support of a development application for a new Orangutan Enclosure adjacent to the Indo-Malaya Pavilion at the Toronto Zoo. This report respects the proposed Habitat 1 enclosure. A Ravine Stewardship Plan for the feature referred to as Habitat 2 will be prepared under separate cover.

The work plan for this Ravine Stewardship Plan included the following:

- Conduct an ecological assessment of the natural feature;
- Evaluate restoration opportunities based on existing conditions and considering proposed construction plans; and
- Document the findings in a Ravine Stewardship Plan Report.

The results of the evaluation are provided below.

2. Policy Framework

2.1. City of Toronto Ravine and Natural Feature Protection By-law

The subject areas are subject to provisions of the City of Toronto Ravine and Natural Feature Protection (RNFP) By-law (Chapter 658 of the Municipal Code).

The City of Toronto's Ravine Protection By-law prohibits and regulates the injury and destruction of trees, filling, grading, and dumping in ravines and associated wooded areas within the Ravine Protection Line. Trees are subject to the Ravine By-law regardless of species or diameter. The Urban Forestry Services defines a tree as any woody species that will grow to tree size (4.5m height).

2.2. Toronto and Region Conservation Authority (TRCA)

In accordance with Ontario Regulation 166/06; TRCA's Regulation of Development, Interference with Wetlands and Alterations to Shorelines and Watercourses (TRCA N/D), the Habitat 2 area is regulated by the Toronto and Region Conservation Authority. Where work is proposed within these areas, a permit from the TRCA may be required.

3. Methodology

Field investigations were completed on 1 November 2019 to conduct an assessment of the natural features and restoration opportunities of the study area. Vegetation community boundaries were determined using desk top analysis (aerial photo interpretation) and confirmed in the field; communities are described according to the Ecological Land Classification (ELC) system for southern Ontario (Lee et al. 1998). Nomenclature for vascular plant species follows the Ontario Plant List (Newmaster et al. 1998) with updates from the Flora Ontario – Integrated Botanical Information System (FOIBIS) (2005).

Refer to Appendix A for photographs of the subject natural features.

4. Existing Site Conditions

The subject area includes a former Gaur enclosure located west of the existing Indo-Malaya Pavilion (known as Habitat 1). The area known as Habitat 2 is located within the ravine south of the Pavilion adjacent to the existing zipline feature and pedestrian bridge. Hardwood forest surrounds the subject areas. A tributary of the Rouge River transects the area of Habitat Area 2. Refer to Figure 1 for the existing conditions.

4.1. Woodland Resources

ELC community types are summarized below.

4.1.1. FOD5a

The natural feature north of Habitat 1 was identified as an FOD5 unit – a Dry-Fresh Sugar Maple Deciduous Forest Ecosite. This feature is located on a slope, which extends from the service path on the south limit of the feature to the road at the top of the slope. The canopy has approximately 70% crown closure and is dominated by Sugar Maple (*Acer saccharum*), with Basswood (*Tilia americana*), Black Cherry (*Prunus serotina*), Ironwood (*Ostrya virginiana*), and White Elm (*Ulmus americana*) as occasional associates. The subcanopy has approximately 30% cover and contains Sugar Maple, Hawthorne (*Crataegus sp.*), Common Buckthorn (*Rhamnus carthatica*), and American Beech (*Fagus grandifolia*). The shrublayer has approximately 20% cover and contains Common Buckthorn and Tartarian Honeysuckle (*Lonicera tartarica*). The Buckthorn is concentrated more towards the southern edge of the feature. The groundlayer was quite sparse given the season of the survey but contained abundant Dog Strangling Vine (*Vincetoxicum rossicum*). Along the top of bank along the northern limit of the feature, the unit is more disturbed and contains Manitoba Maple (*Acer negundo*). The unit extends east outside of the study area.

4.1.2. CUW1

The community located immediately adjacent to the existing Habitat 1 feature was identified as a Mineral Cultural Woodland Ecosite. This feature is dominated by Sugar Maple, Eastern White Cedar (*Thuja occidentalis*), and Manitoba Maple. The understory is heavily dominated by Common Buckthorn and the groundlayer is heavily dominated by Dog Strangling Vine. This area appears to have undergone some disturbance in the past and is largely unmanaged regeneration.

4.1.3. FOD5b

The natural feature south of Habitat 1 and extending down towards Habitat 2 was also identified as FOD5 unit – a Dry-Fresh Sugar Maple Deciduous Forest Ecosite. This feature is also located on a slope; the zoomobile road south of Habitat 1 is located at the top of bank on the northern reaches of this unit, and the topography slopes steeply towards the Rouge River tributary at the bottom of the slope. Adjacent to Habitat 2, the feature exists on the south bank as well, sloping up towards the Malayan Woods Pavilion.

The canopy of this unit has approximately 60% crown closure and is dominated by Sugar Maple (*Acer saccharum*), with Red Oak (*Quercus rubra*), Ironwood (*Ostrya virginiana*), White Birch (*Betula papyrifera*), White Pine (*Pinus strobus*), Eastern Hemlock (*Abies balsamea*), Basswood (*Tilia americana*), and Black Cherry (*Prunus serotina*), as

occasional associates. The subcanopy has approximately 40% cover and contains Sugar Maple, White Birch, Eastern White Cedar, and Eastern Hemlock. The shrublayer contains approximately 20% cover and contains Tartarian Honeysuckle and Common Buckthorn. The groundlayer was sparse due to the season of the survey but contains Dog Strangling Vine, Zig-zag Goldenrod (*Solidago flexicaulis*), Columbine (*Aquilegia sp.*), Wild Ginger (*Asarum canadense*), and Garlic Mustard (*Alliaria petiolata*). The unit extends well beyond the study area.

5. Proposed Development

The demolition of the existing features within the enclosure and the construction of a new orangutan enclosure is proposed for Habitat 1, including a moat, viewing platforms, and habitat features. Much of the area will require regrading. Renovations within the Indo-Malaya Pavilion will also be occurring.

6. Ravine Stewardship Plan

6.1. Goals and Management Issues

The general stewardship goals for the subject property include the replacement of non-native species, increased biological diversity, and post-construction restoration. Key management issues identified and addressed in the Plan include the following:

- Non-native, invasive species
- Native species diversity
- Re-naturalization of disturbed areas

6.2. Key Issues, Constraints and Opportunities

The key issues associated with the ecological integrity of the subject natural feature include invasive species. Challenges will include preventing re-colonization of invasives (including Common Buckthorn Dog Strangling Vine) and establishment of native plants. Restoration efforts will focus on the areas immediately adjacent to the proposed construction. A robust monitoring plan will be essential to ensure the success of restoration efforts.

6.3. Management Objectives and Strategies

Objectives and strategies for this RSP have been developed to address the specific management issues identified in the site assessment.

6.3.1. Natural Feature Protection

Objective:

Prevent impacts to natural feature during construction.

Strategies:

Protect the natural areas during construction.

Implementation:

A Tree Inventory and Preservation Plan has been developed for the subject property. The majority of trees along the peripheries can be retained with the use of appropriate tree protection and mitigation measures. Refer to the Tree Inventory and Preservation Plan for details (KFCI 2019). The preservation fencing as prescribed will prevent impacts to retained vegetation within the buffer area and beyond and prevent intrusion of sediments into this area during construction.

6.3.2. Invasive Species Management and Biodiversity

Impacts to the subject property's biodiversity include the presence of non-native/invasive species. Proper removal and management of invasive species will improve the floristic quality of the subject property and, in conjunction with the planting plan, will increase the overall ecological integrity of the site.

Objective:

Remove and replace undesirable species with native populations to increase biological richness of the property.

Strategies:

Remove the identified non-native and invasive species and replant with recommended native species.

Implementation:

Proper removal and management of invasive species will improve the floristic quality of the subject property and increase the overall ecological integrity of the site. It should be noted that the FOD5 units contain many invasive species throughout; complete management throughout these units is not a recommendation of this report; rather, invasive species management should target areas where planting is to occur to ensure success of planting efforts. At the request of Urban Forestry, Dog Strangling Vine control is also being proposed south of the service road on the south side of Habitat 1; the area of control along this limit should target the colonies above the top of bank. Invasive species removal should focus on Dog Strangling Vine and Buckthorn as these are the primary disruptors within the areas to be planted. During monitoring events, the recolonization of invasive species should be monitored and managed, where applicable. Refer to Table 2 below for proposed invasive species management strategies. Refer to Figure 2 for the location of the invasive species management areas.

Table 2. Invasive Species Management Strategies

Invasive Species	Biology	Removal and Control Strategy	Timing
Dog Strangling Vine	An invasive perennial herbaceous plant in the milkweed family. It forms thick mats of	In dense colonies backpack spraying with glyphosate-based herbicide is recommended.	Removal should occur just after the plants flower and before seed pods are produced. Herbicides should be

	vegetation, choking out native species.		applied in early June, or slightly later in shadier conditions. Re-treating of seedling growth will be required in subsequent years for successful control. Subsequent efforts should be addressed within monitoring reports (see below).
Common Buckthorn	Dioecious shrub; females produce berrylike drupes. Typically found in upland habitats, floodplain forests, woodland edges, hedgerows, and old fields. Common Buckthorn has a tolerance of a wide range of conditions allowing it to reproduce successively within various habitat types. High seed production and germination rates.	Stem cutting is recommended for mature specimens. A glyphosate-based herbicide should be applied immediately following cutting to suppress coppice growth. Smaller individuals can be hand pulled, taking care to remove the root as well.	Buckthorn is most efficiently removed in fall/late fall when most other plants are entering dormancy to prevent any negative impacts on surrounding native species. Removal can occur in early spring as well, before seeds have formed. Repeated, multi-year efforts will be required for successful eradication. Subsequent efforts should be addressed within monitoring reports (see below).

The proposed planting plan will help improve floristic quality and ecological integrity while expanding the canopy cover on site and increasing biodiversity of the subject areas. Adjacent to Habitat Area 1, the Landscape Plan includes extensive native plantings surrounding the feature, including within the CUW1 unit and the area of the FOD5a unit adjacent to the new generator pad. Refer to NAK drawings LA1.3 and 1.4 for the planting plan within these areas.

6.3.3. Maintenance and Monitoring

Objective:

Track the success of ecological restoration initiatives and guide the short and long-term maintenance of the restored features.

Strategy:

Execute monitoring strategies and create a monitoring schedule involving periodic site inspections by a consultant and/or responsible agencies.

Implementation:

Short-term monitoring events should occur twice during the growing season for a minimum of two years following the implementation of restoration plantings and initiatives, and once during the growing season for an additional year (three years total). Due to the limited size of the subject property, permanent plots or sample quadrants are not necessary for successful monitoring. Visual analysis incorporating detailed notes to address survivorship of plant species, individual plant health and potential growth of invasive species is recommended. Mortality of all planted individuals should be determined and the causes of mortality identified (shade intolerance, herbivory, drought, etc.). Removal and control of invasive species should be addressed during monitoring events to prevent invasive species from becoming re-established. Long-term monitoring events should track the success of restoration initiatives and monitor the spread and/or re-establishment of non-native/invasive species.

6.4. Cost Schedule and Timing

Table 4 below indicates the approximate cost of implementing the above Ravine Stewardship Plan and a timing schedule of when the works should occur.

Table 4. Timing and Cost Schedule of Works

Objective/ Strategy	Task Description	Timing	Responsible Parties	Estimated Person Days	Equipment/ Materials Required	Estimated Costs
Invasive Species Management	Remove Dog Strangling Vine and Buckthorn	Spring Year 1	Contractor	9 person days @ $300/day	Disposal, $100	$2,800
Planting	See NAK cost estimates for Habitat 1					
Maintenance and Monitoring	Four monitoring events (two per growing season for two years, one for an additional year)	Fall Year 1, Spring Year 2, Fall Year 2, Spring Year 3	Consultant	4 person days @ $1,160/day	-	$4,640
	Additional invasive species control measures	Spring and/or fall Years 2 and 3	Contractor	4 person days @ $300/day	Disposal, $200	$1,400
					Total	**$8,840.00**

7. Summary and Recommendations

Kuntz Forestry Consulting was retained by the Toronto Zoo to complete a Ravine Stewardship Plan in support of a development application for Habitat 1 of a new orangutan exhibit at the Toronto Zoo. The overall objective of the Stewardship Plan is to improve the ecological integrity of the subject areas and rehabilitate the areas impact by canopy loss and construction disturbances, by way of invasive species management and native species plantings.

Respectfully Submitted,

Kuntz Forestry Consulting Inc.

Celine Batterink

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References

City of Toronto, 2008. Ravine and Natural Feature Protection By-law. Chapter 658. By-law No. 513-2008. May 27, 2008.

City of Toronto, 2000. Sustaining Biodiversity: A Strategic Plan for Managing Invasive Plants in Southern Ontario. Prepared by Donna Havinga and the Ontario Invasive Plants Working Group.

KFCI 2019. Kuntz Forestry Consulting Inc. Tree Inventory and Preservation Plan; Toronto Zoo Orangutan Enclosure, Toronto. 30 October 2019, revised 6 March 2020

Lee, H.T., W.D. Bakowsky, J. Riley, J. Bowles, M. Puddister, P. Uhlig and S. McMurray. 1998. Ecological Land Classification for Southern Ontario: First Approximation and its Application. Southern Region Science and Technology Transfer Unit, Ontario Ministry of Natural Resources. Ontario Ministry of Natural Resources, Southcentral Science Section, Science Development and Transfer Branch. SCSS Field Guide FG-02.

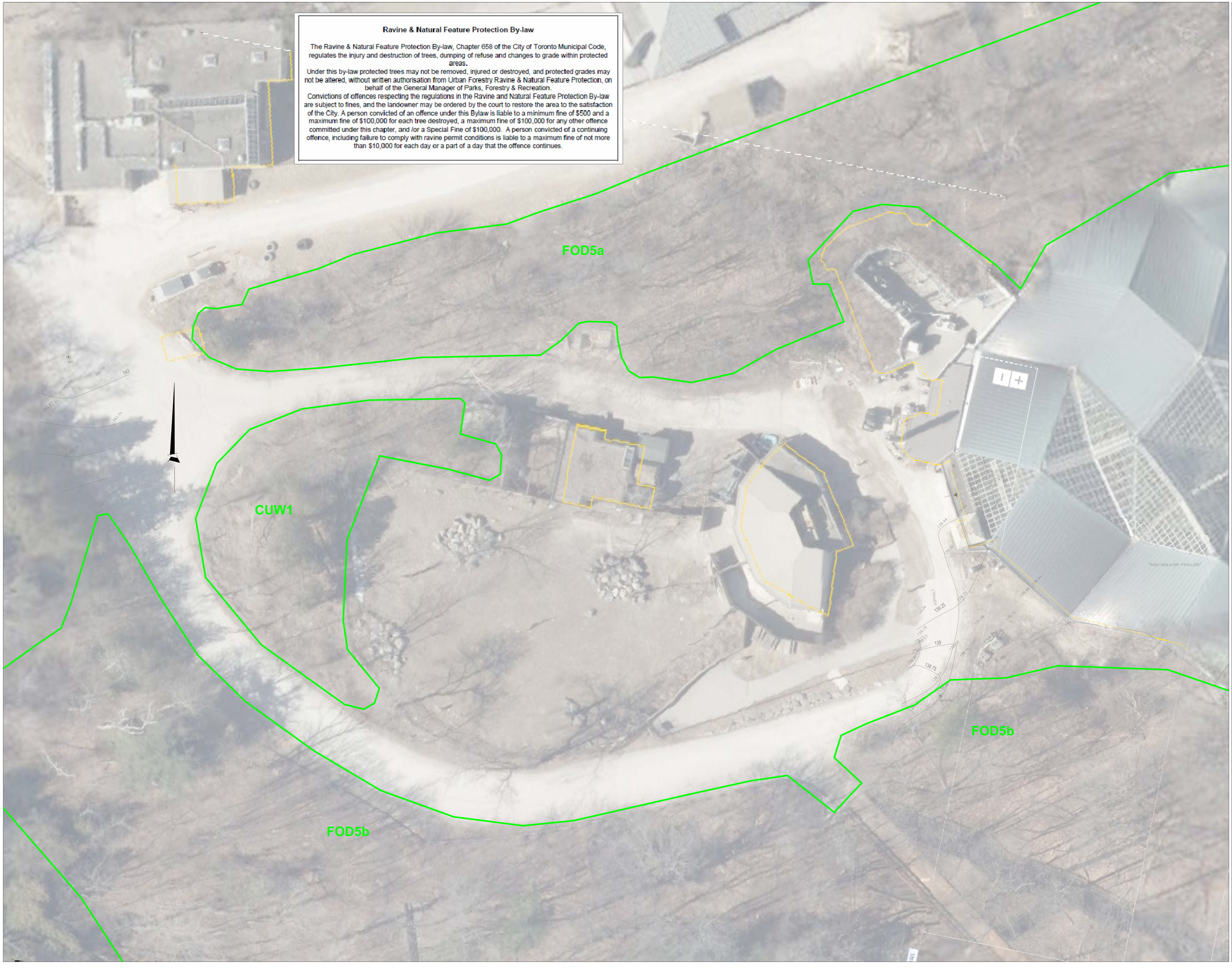
Toronto and Region Conservation Authority (TRCA), N/D. Ontario Regulation 166/06 – Toronto and Region Conservation Authority: Regulation of Development, Interference with Wetlands and Alternations to Shorelines and Watercourses.

Appendix A. Photographs of Subject Property

Image 1. FOD5a unit, located north of service road

Image 2. CUW1 unit, west of Habitat 1

Image 3. CUW1 unit, west of Habitat 1



LEGEND

Ecological Land Classification Limits

Ecological Land Classification Label XXXX

FOD5 - Dry-Fresh Sugar Maple Deciduous Forest Ecosite
CUW1 - Mineral Cultural Woodland Ecosite

No.	Issue/Revisions	Date	By
1	Report Submission	4 Nov. '19	CB
2	Report Revisions	6 Mar. '20	CB

Base Data: Tom. A Senkus (topo), Jones and Jones Architects and Landscape Architects, Ltd. (site plan), City of Toronto Mapping (raster)

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Property
Toronto Zoo - Orangutan Enclosure, Habitat 1
Toronto, Ontario

Ravine Stewardship Plan
Ecological Land Classification

Project	P2221	Figure	1
Date	4 November 2019		
Scale	1:200		

Ravine & Natural Feature Protection By-law

The Ravine & Natural Feature Protection By-law, Chapter 658 of the City of Toronto Municipal Code, regulates the injury and destruction of trees, dumping of refuse and changes to grade within protected areas.

Under this by-law protected trees may not be removed, injured or destroyed, and protected grades may not be altered, without written authorisation from Urban Forestry Ravine & Natural Feature Protection, on behalf of the General Manager of Parks, Forestry & Recreation.

Convictions of offences respecting the regulations in the Ravine and Natural Feature Protection By-law are subject to fines, and the landowner may be ordered by the court to restore the area to the satisfaction of the City. A person convicted of an offence under this Bylaw is liable to a minimum fine of $500 and a maximum fine of $100,000 for each tree destroyed, a maximum fine of $100,000 for any other offence committed under this chapter, and /or a Special Fine of $100,000. A person convicted of a continuing offence, including failure to comply with ravine permit conditions is liable to a maximum fine of not more than $10,000 for each day or a part of a day that the offence continues.

LEGEND

- Area of Buckthorn Removal Only
- Area of Dog Strangling Vine and Buckthorn Removal
- Area of Dog Strangling Vine Removal

No.	Issue/Revisions	Date	By
1	Report Submission	4 Nov. '19	CB
2	Report Revisions	6 Mar. '20	CB

Base Data: Tom. A Senkus (topo), Jones and Jones Architects and Landscape Architects, Ltd. (site plan), City of Toronto Mapping (raster)

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Client
Toronto Zoo
361A Old Finch Avenue
Toronto, ON M1B 5K7

Property
Toronto Zoo - Orangutan Enclosure, Habitat 1
Toronto, Ontario

Ravine Stewardship Plan
Restoration Areas

Project	P2221	Figure	2
Date	4 November 2019		
Scale	1:200		

Ravine Stewardship Plan
Toronto Zoo, Orangutan Enclosure
Toronto, Ontario

prepared for

Toronto Zoo
361A Old Finch Avenue
Toronto, ON M1B 5K7

prepared by

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4 November 2019

KUNTZ FORESTRY CONSULTING INC Project P2221

Contents

1. Introduction

Kuntz Forestry Consulting Inc. was retained by the Toronto Zoo to complete a Ravine Stewardship Plan in support of a development application for a new Orangutan Enclosure adjacent to the Indo-Malaya Pavilion at the Toronto Zoo.

The work plan for this Ravine Stewardship Plan included the following:

- Conduct an ecological assessment of the natural feature;
- Evaluate restoration opportunities based on existing conditions and considering proposed construction plans; and
- Document the findings in a Ravine Stewardship Plan Report.

The results of the evaluation are provided below.

2. Policy Framework

2.1. City of Toronto Ravine and Natural Feature Protection By-law

The subject areas are subject to provisions of the City of Toronto Ravine and Natural Feature Protection (RNFP) By-law (Chapter 658 of the Municipal Code).

The City of Toronto's Ravine Protection By-law prohibits and regulates the injury and destruction of trees, filling, grading, and dumping in ravines and associated wooded areas within the Ravine Protection Line. Trees are subject to the Ravine By-law regardless of species or diameter. The Urban Forestry Services defines a tree as any woody species that will grow to tree size (4.5m height).

2.2. Toronto and Region Conservation Authority (TRCA)

In accordance with Ontario Regulation 166/06; TRCA's Regulation of Development, Interference with Wetlands and Alterations to Shorelines and Watercourses (TRCA N/D), the Habitat 2 area is regulated by the Toronto and Region Conservation Authority. Where work is proposed within these areas, a permit from the TRCA may be required.

3. Methodology

Field investigations were completed on 1 November 2019 to conduct an assessment of the natural features and restoration opportunities of the property. Vegetation community boundaries were determined using desk top analysis (aerial photo interpretation) and confirmed in the field; communities are described according to the Ecological Land Classification (ELC) system for southern Ontario (Lee et al. 1998). Nomenclature for vascular plant species follows the Ontario Plant List (Newmaster et al. 1998) with updates from the Flora Ontario – Integrated Botanical Information System (FOIBIS) (2005).

Refer to Appendix A for photographs of the subject natural features.

4. Existing Site Conditions

The subject areas include a former Gaur enclosure located west of the existing Indo-Malaya Pavilion (known as Habitat 1), and the ravine south of the Pavilion adjacent to the existing zipline feature and pedestrian bridge (known as Habitat 2). Hardwood forest surrounds the subject areas. A tributary of the Rouge River transects the area of Habitat Area 2. Refer to Figure 1 for the existing conditions.

4.1. Woodland Resources

ELC community types are summarized below.

4.1.1. FOD5a

The natural feature north of Habitat 1 was identified as an FOD5 unit – a Dry-Fresh Sugar Maple Deciduous Forest Ecosite. This feature is located on a slope, which extends from the service path on the south limit of the feature to the road at the top of the slope. The canopy has approximately 70% crown closure and is dominated by Sugar Maple (*Acer saccharum*), with Basswood (*Tilia americana*), Black Cherry (*Prunus serotina*), Ironwood (*Ostrya virginiana*), and White Elm (*Ulmus americana*) as occasional associates. The subcanopy has approximately 30% cover and contains Sugar Maple, Hawthorne (*Crataegus sp.*), Common Buckthorn (*Rhamnus carthatica*), and American Beech (*Fagus grandifolia*). The shrublayer has approximately 20% cover and contains Common Buckthorn and Tartarian Honeysuckle (*Lonicera tartarica*). The Buckthorn is concentrated more towards the southern edge of the feature. The groundlayer was quite sparse given the season of the survey but contained abundant Dog Strangling Vine (*Vincetoxicum rossicum*). Along the top of bank along the northern limit of the feature, the unit is more disturbed and contains Manitoba Maple (*Acer negundo*). The unit extends east outside of the study area.

4.1.2. CUW1

The community located immediately adjacent to the existing Habitat 1 feature was identified as a Mineral Cultural Woodland Ecosite. This feature is dominated by Sugar Maple, Eastern White Cedar (*Thuja occidentalis*), and Manitoba Maple. The understory is heavily dominated by Common Buckthorn and the groundlayer is heavily dominated by Dog Strangling Vine. This area appears to have undergone some disturbance in the past and is largely unmanaged regeneration.

4.1.3. FOD5b

The natural feature south of Habitat 1 and extending down towards Habitat 2 was also identified as FOD5 unit – a Dry-Fresh Sugar Maple Deciduous Forest Ecosite. This feature is also located on a slope; the zoomobile road south of Habitat 1 is located at the top of bank on the northern reaches of this unit, and the topography slopes steeply towards the Rouge River tributary at the bottom of the slope. Adjacent to Habitat 2, the feature exists on the south bank as well, sloping up towards the Malayan Woods Pavilion.

The canopy of this unit has approximately 60% crown closure and is dominated by Sugar Maple (*Acer saccharum*), with Red Oak (*Quercus rubra*), Ironwood (*Ostrya virginiana*), White Birch (*Betula papyrifera*), White Pine (*Pinus strobus*), Eastern Hemlock (*Abies balsamea*), Basswood (*Tilia americana*), and Black Cherry (*Prunus serotina*), as

occasional associates. The subcanopy has approximately 40% cover and contains Sugar Maple, White Birch, Eastern White Cedar, and Eastern Hemlock. The shrublayer contains approximately 20% cover and contains Tartarian Honeysuckle and Common Buckthorn. The groundlayer was sparse due to the season of the survey but contains Dog Strangling Vine, Zig-zag Goldenrod (*Solidago flexicaulis*), Columbine (*Aquilegia sp.*), Wild Ginger (*Asarum canadense*), and Garlic Mustard (*Alliaria petiolata*). The unit extends well beyond the study area.

5. Proposed Development

The demolition of the existing features within the enclosure and the construction of a new orangutan enclosure is proposed for Habitat 1, including a moat, viewing platforms, and habitat features. Much of the area will require regrading. Renovations within the Indo-Malaya Pavilion will also be occurring. South of the Pavilion within the Habitat 2 area, work includes the construction of a traverse cable for the orangutans with support towers on either end of the ravine.

6. Ravine Stewardship Plan

6.1. Goals and Management Issues

The general stewardship goals for the subject property include the replacement of non-native species, increased biological diversity, and post-construction restoration. Key management issues identified and addressed in the Plan include the following:

- Non-native, invasive species
- Native species diversity
- Re-naturalization of disturbed areas

6.2. Key Issues, Constraints and Opportunities

The key issues associated with the ecological integrity of the subject natural feature include invasive species. Challenges will include preventing re-colonization of invasives (including Common Buckthorn Dog Strangling Vine) and establishment of native plants. Restoration efforts will focus on the areas immediately adjacent to the proposed construction. A robust monitoring plan will be essential to ensure the success of restoration efforts.

6.3. Management Objectives and Strategies

Objectives and strategies for this RSP have been developed to address the specific management issues identified in the site assessment.

6.3.1. Natural Feature Protection

Objective:

Prevent impacts to natural feature during construction.

Strategies:

Protect the slope and associated vegetation during construction.

Implementation:

A Tree Inventory and Preservation Plan has been developed for the subject property. The majority of trees along the peripheries can be retained with the use of appropriate tree protection and mitigation measures. Refer to the Tree Inventory and Preservation Plan for details (KFCI 2019). The preservation fencing as prescribed will prevent impacts to retained vegetation within the buffer area and beyond and prevent intrusion of sediments into this area during construction.

6.3.2. Invasive Species Management and Biodiversity

Impacts to the subject property's biodiversity include the presence of non-native/invasive species. Proper removal and management of invasive species will improve the floristic quality of the subject property and, in conjunction with the planting plan, will increase the overall ecological integrity of the site.

Objective:

Remove and replace undesirable species with native populations to increase biological richness of the property.

Strategies:

Remove the identified non-native and invasive species and replant with recommended native species.

Implementation:

Proper removal and management of invasive species will improve the floristic quality of the subject property and increase the overall ecological integrity of the site. It should be noted that the FOD5 units contain many invasive species throughout; complete management throughout these units is not a recommendation of this report; rather, invasive species management should target areas where planting is to occur to ensure success of planting efforts. Invasive species removal should focus on Dog Strangling Vine and Buckthorn as these are the primary disruptors within the areas to be planted. During monitoring events, the recolonization of invasive species should be monitored and managed, where applicable. Refer to Table 2 below for proposed invasive species management strategies. Refer to Figure 2 for the location of the invasive species management areas.

Table 2. Invasive Species Management Strategies

Invasive Species	Biology	Removal and Control Strategy	Timing
Dog Strangling Vine	An invasive perennial herbaceous plant in the milkweed family. It forms thick mats of	In dense colonies backpack spraying with glyphosate-based herbicide is recommended.	Removal should occur just after the plants flower and before seed pods are produced.

	vegetation, choking out native species.		Herbicides should be applied in early June, or slightly later in shadier conditions.
Common Buckthorn	Dioecious shrub; females produce berrylike drupes. Typically found in upland habitats, floodplain forests, woodland edges, hedgerows, and old fields. Common Buckthorn has a tolerance of a wide range of conditions allowing it to reproduce successively within various habitat types. High seed production and germination rates.	Stem cutting is recommended for mature specimens. A glyphosate-based herbicide should be applied immediately following cutting to suppress coppice growth. Smaller individuals can be hand pulled, taking care to remove the root as well.	Buckthorn is most efficiently removed in fall/late fall when most other plants are entering dormancy to prevent any negative impacts on surrounding native species. Removal can occur in early spring as well, before seeds have formed.

The proposed planting plan will help improve floristic quality and ecological integrity while expanding the canopy cover on site and increasing biodiversity of the subject areas. Adjacent to Habitat Area 1, the Landscape Plan includes extensive native plantings surrounding the feature, including within the CUW1 unit and the area of the FOD5a unit adjacent to the new generator pad. Refer to NAK drawings LA1.3 and 1.4 for the planting plan within these areas.

Planting areas adjacent to Habitat 2 will focus on canopy rehabilitation following tree removals and naturalization of disturbed areas, specifically, adjacent to the southernmost support pillar. Microsites will be selected at the time of planting, to be based on site and species compatibility. Recommended tree and shrub plantings will help the property to achieve as natural a state as possible. Species selection is based on native nursery stock availability and species adapted to the existing conditions. Refer to Table 3 below for the planting schedule and Figure 2 for the planting plan and more detailed planting notes. Individuals should be planted across the planting areas considering any natural native specimens already located on site. Upon completion of planting, it is recommended that mulch be applied to trees and shrubs to limit direct competition with the new plantings as native plantings become established.

Table 3. Planting Schedule

Planting Area 1 - 140m^2

Type	Qty	Botanical Name	Common Name	Stock Type	Condition
Trees	5	*Ostrya virginiana*	Ironwood	Container	2 gallon pot
	5	*Acer saccharum*	Sugar Maple	Container	2 gallon pot
	5	*Prunus serotina*	Black Cherry	Container	2 gallon pot
Shrubs	15	*Prunus virginiana*	Choke Cherry	Container	1 gallon pot
	15	*Cornus alternifolia*	Alternate-leaved Dogwood	Container	1 gallon pot
	15	*Viburnum acerifolium*	Maple-leaf Viburnum	Container	1 gallon pot

Planting Area 2 - 200m^2

Type	Qty	Botanical Name	Common Name	Stock Type	Condition
Trees	8	*Ostrya virginiana*	Ironwood	Container	2 gallon pot
	8	*Acer saccharum*	Sugar Maple	Container	2 gallon pot
	8	*Prunus serotina*	Black Cherry	Container	2 gallon pot
Shrubs	32	*Prunus virginiana*	Choke Cherry	Container	1 gallon pot
	32	*Cornus alternifolia*	Alternate-leaved Dogwood	Container	1 gallon pot
	32	*Viburnum acerifolium*	Maple-leaf Viburnum	Container	1 gallon pot

Within planting area 2, the use of an herbaceous seed mix is recommended in addition to tree and shrub plantings to restore native groundcover after construction disturbance:

20% Virginia Rye (*Elymus virginicus ssp. virginicus*)
15% Bottle Brush Grass (*Elymus hystrix*)
7% Wild Columbine (*Aquilegia canadensis*)
15% Common Wood Sedge (*Carex blanda*)
7% Wild Geranium (*Geranium maculatum*)
7% Spreading Dogbane (*Apocynum androsaemifolium*)
7% Barren Strawberry (*Waldesteinia fragarioides*)
7% Wild Bergamot (*Monarda fistulosa*)
7% Black Eye Susan (*Rudbeckia hirta*)
7% New England Aster (*Symphyotrichu, novae-angliae*)

A cover crop of Annual Rye Grass (*Lolium multiflorum*) is recommended.

6.3.3. Maintenance and Monitoring

Objective:

Track the success of ecological restoration initiatives and guide the short and long-term maintenance of the restored features.

Strategy:

Execute monitoring strategies and create a monitoring schedule involving periodic site inspections by a consultant and/or responsible agencies.

Implementation:

Short-term monitoring events should occur twice during the growing season for a minimum of two years following the implementation of restoration plantings and initiatives, and once during the growing season for an additional year (three years total). Due to the limited size of the subject property, permanent plots or sample quadrants are not necessary for

successful monitoring. Visual analysis incorporating detailed notes to address survivorship of plant species, individual plant health and potential growth of invasive species is recommended. Mortality of all planted individuals should be determined and the causes of mortality identified (shade intolerance, herbivory, drought, etc.). Removal and control of invasive species should be addressed during monitoring events to prevent invasive species from becoming re-established. Long-term monitoring events should track the success of restoration initiatives and monitor the spread and/or re-establishment of non-native/invasive species.

6.4. Cost Schedule and Timing

Table 4 below indicates the approximate cost of implementing the above Ravine Stewardship Plan and a timing schedule of when the works should occur.

Table 4. Timing and Cost Schedule of Works

Objective/ Strategy	Task Description	Timing	Responsible Parties	Estimated Person Days	Equipment/ Materials Required	Estimated Costs
Invasive Species Management	Remove Dog Strangling Vine and Buckthorn	Spring Year 1	Contractor	5 person days @ $300/day	Disposal, $100	$1,600
Planting	Order, pickup, deliver, install new plants including mulch and seed mix	Spring Year 1	Contractor			$3,800
	Site Inspection and Supervision	Spring Year 1	Consultant	1 person days @ $1,160/day	-	$1,160
Maintenance and Monitoring	Four monitoring events (two per growing season for two years, one for an additional year)	Fall Year 1, Spring Year 2, Fall Year 2, Spring Year 3	Consultant	4 person days @ $1,160/day	-	$4,640
	Additional invasive species control measures	Spring and/or fall Years 2 and 3	Contractor	3 person days @ $300/day	Disposal, $200	$1,100
					Total	**$12,300**

7. Summary and Recommendations

Kuntz Forestry Consulting was retained by the Toronto Zoo to complete a Ravine Stewardship Plan in support of a development application for a new orangutan exhibit at the Toronto Zoo. The overall objective of the Stewardship Plan is to improve the ecological integrity of the subject areas and rehabilitate the areas impact by canopy loss and construction disturbances, by way of invasive species management and native species plantings.

Respectfully Submitted,

Kuntz Forestry Consulting Inc.

Celine Batterink

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References

City of Toronto, 2008. Ravine and Natural Feature Protection By-law. Chapter 658. By-law No. 513-2008. May 27, 2008.

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Toronto and Region Conservation Authority (TRCA), N/D. Ontario Regulation 166/06 – Toronto and Region Conservation Authority: Regulation of Development, Interference with Wetlands and Alternations to Shorelines and Watercourses.

Appendix A. Photographs of Subject Property

Image 1. FOD5a unit, located north of service road

Image 2. CUW1 unit, west of Habitat 1

Image 3. CUW1 unit, west of Habitat 1

Image 4. FOD5b unit, near Habitat 2

Image 5. FOD5b unit, near Habitat 2

LEGEND

Ecological Land Classification Limits

Ecological Land Classification Label XXXX

FOD5 - Dry-Fresh Sugar Maple Deciduous Forest Ecosite
CUW1 - Mineral Cultural Woodland Ecosite

No.	Issue/Revisions	Date	By
1	Report Submission	4 Nov. '19	CB

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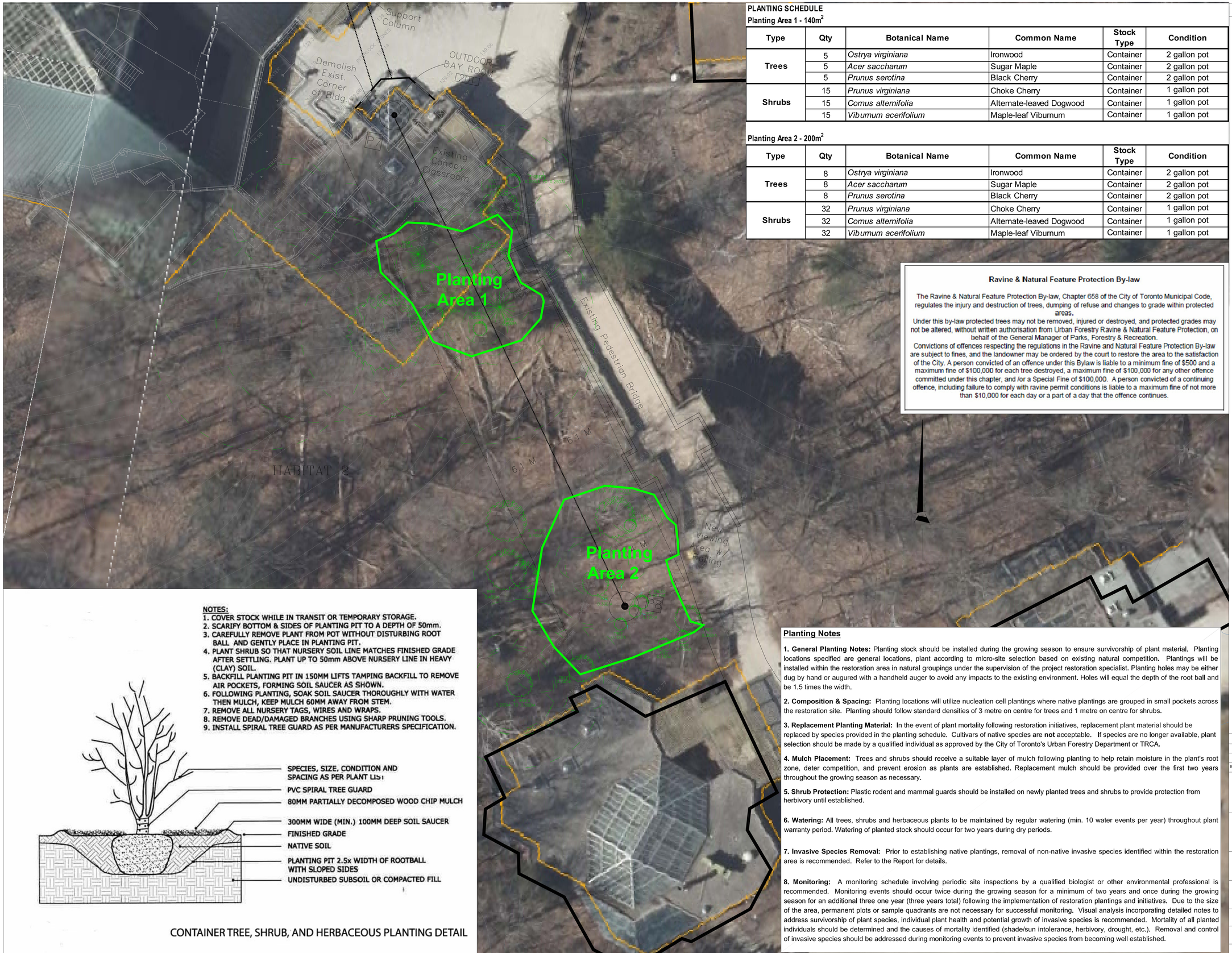
Ravine Stewardship Plan
Ecological Land Classification

Project	P2221
Date	4 November 2019
Scale	1:150

Figure 1b



PLANTING SCHEDULE

Planting Area 1 - 140m²

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Planting Area 2 - 200m²

Type	Qty	Botanical Name	Common Name	Stock Type	Condition
Trees	8	*Ostrya virginiana*	Ironwood	Container	2 gallon pot
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LEGEND

Buckthorn Removal

Dog Strangling Vine Removal

NOTES:

1. COVER STOCK WHILE IN TRANSIT OR TEMPORARY STORAGE.
2. SCARIFY BOTTOM & SIDES OF PLANTING PIT TO A DEPTH OF 50mm.
3. CAREFULLY REMOVE PLANT FROM POT WITHOUT DISTURBING ROOT BALL AND GENTLY PLACE IN PLANTING PIT.
4. PLANT SHRUB SO THAT NURSERY SOIL LINE MATCHES FINISHED GRADE AFTER SETTLING. PLANT UP TO 50mm ABOVE NURSERY LINE IN HEAVY (CLAY) SOIL.
5. BACKFILL PLANTING PIT IN 150MM LIFTS TAMPING BACKFILL TO REMOVE AIR POCKETS, FORMING SOIL SAUCER AS SHOWN.
6. FOLLOWING PLANTING, SOAK SOIL SAUCER THOROUGHLY WITH WATER THEN MULCH, KEEP MULCH 60MM AWAY FROM STEM.
7. REMOVE ALL NURSERY TAGS, WIRES AND WRAPS.
8. REMOVE DEAD/DAMAGED BRANCHES USING SHARP PRUNING TOOLS.
9. INSTALL SPIRAL TREE GUARD AS PER MANUFACTURERS SPECIFICATION.

CONTAINER TREE, SHRUB, AND HERBACEOUS PLANTING DETAIL

Planting Notes

1. General Planting Notes: Planting stock should be installed during the growing season to ensure survivorship of plant material. Planting locations specified are general locations, plant according to micro-site selection based on existing natural competition. Plantings will be installed within the restoration area in natural groupings under the supervision of the project restoration specialist. Planting holes may be either dug by hand or augured with a handheld auger to avoid any impacts to the existing environment. Holes will equal the depth of the root ball and be 1.5 times the width.

2. Composition & Spacing: Planting locations will utilize nucleation cell plantings where native plantings are grouped in small pockets across the restoration site. Planting should follow standard densities of 3 metre on centre for trees and 1 metre on centre for shrubs.

3. Replacement Planting Material: In the event of plant mortality following restoration initiatives, replacement plant material should be replaced by species provided in the planting schedule. Cultivars of native species are **not** acceptable. If species are no longer available, plant selection should be made by a qualified individual as approved by the City of Toronto's Urban Forestry Department or TRCA.

4. Mulch Placement: Trees and shrubs should receive a suitable layer of mulch following planting to help retain moisture in the plant's root zone, deter competition, and prevent erosion as plants are established. Replacement mulch should be provided over the first two years throughout the growing season as necessary.

5. Shrub Protection: Plastic rodent and mammal guards should be installed on newly planted trees and shrubs to provide protection from herbivory until established.

6. Watering: All trees, shrubs and herbaceous plants to be maintained by regular watering (min. 10 water events per year) throughout plant warranty period. Watering of planted stock should occur for two years during dry periods.

7. Invasive Species Removal: Prior to establishing native plantings, removal of non-native invasive species identified within the restoration area is recommended. Refer to the Report for details.

8. Monitoring: A monitoring schedule involving periodic site inspections by a qualified biologist or other environmental professional is recommended. Monitoring events should occur twice during the growing season for a minimum of two years and once during the growing season for an additional three one year (three years total) following the implementation of restoration plantings and initiatives. Due to the size of the area, permanent plots or sample quadrants are not necessary for successful monitoring. Visual analysis incorporating detailed notes to address survivorship of plant species, individual plant health and potential growth of invasive species is recommended. Mortality of all planted individuals should be determined and the causes of mortality identified (shade/sun intolerance, herbivory, drought, etc.). Removal and control of invasive species should be addressed during monitoring events to prevent invasive species from becoming well established.

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Ravine Stewardship Plan
Planting Plan

Project	P2221	Figure 3
Date	4 November 2019	
Scale	1:200	

Tree Inventory and Preservation Plan Report
Toronto Zoo Orangutan Enclosure
Habitat 1
Toronto, Ontario

prepared for

Toronto Zoo
361A Old Finch Avenue
Toronto, ON

prepared by

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30 October 2019, revised 6 March 2020

KUNTZ FORESTRY CONSULTING INC Project P2221

Introduction

Kuntz Forestry Consulting Inc. was retained by the Toronto Zoo to complete a Tree Inventory and Preservation Plan in support of a development application for Habitat 1 of a new orangutan enclosure at the Toronto Zoo. The subject area is adjacent to the Indo-Malaya Pavilion, located at the Toronto Zoo. The Zoo itself is located at 2000 Meadowvale Road in Toronto, northwest of Meadowvale Road and Sheppard Avenue East, within the Rouge National Urban Park.

The work plan for this tree preservation study included the following:

- Prepare inventory of the tree resources on and within 12 metres of the subject property areas with the potential to be impacted by the proposed work;
- Evaluate potential tree saving opportunities based on proposed development plans; and
- Document the findings in a Tree Inventory and Preservation Plan Report.

The results of the evaluation are provided below.

Policy Framework

The entire subject area is subject to the provisions of the City of Toronto Ravine and Natural Feature Protection (RNFP) By-law (Chapter 658 of the Municipal Code) as it is situated within the Ravine and Natural Features Protection Area.

The City of Toronto's Ravine Protection By-law prohibits and regulates the injury and destruction of trees, filling, grading, and dumping in ravines and associated wooded areas within the Ravine Protection Line. Trees are subject to the Ravine By-law regardless of species or diameter. The Urban Forestry Services defines a tree as any woody species that will grow to tree size (4.5m height).

Preliminary information is acquired on individual trees which are then categorized in compliance with the by-law in support of development applications (refer to Table 1). Tree categories range from one through five and are as follows:

> ***Categories***
> ***1.*** *Trees with diameters of 30 cm or more situated on private property on the subject site.*
> ***2.*** *Trees with diameters of 30 cm or more, situated on private property, within 6 m of the subject site.*
> ***3.*** *Trees of all diameters situated on City owned parkland within 6 m of the subject site.*
> ***4.*** *On lands designated under City of Toronto Municipal Code, Chapter 658, Ravine and Natural Feature Protection, trees of all diameters within 10 metres of any construction activity.*
> ***5.*** *Trees of all diameters situated within the City road allowance adjacent to the subject site.* (City of Toronto, 2008).

Methodology

Trees on and within 12 metres of the subject area with the potential to be impacted by the proposed development were included in the inventory. Trees were located using the topographic survey provided for the property, estimations made in-field, and aerial imagery. Trees were tagged using numbers 528-600 and 901-913. Trees that could not be tagged were

identified as Trees A-I and M-W. See Table 1 for the results of the inventory and Figure 1 and for their locations.

Tree resources were assessed utilizing the following parameters.

Tree # - number assigned to tree that corresponds to Table 1 and Figure 1.
Species - common and botanical names provided in the inventory table.
DBH - diameter (centimetres) at breast height, measured at 1.4 m above the ground.
Condition - condition of tree considering trunk integrity, crown structure, and crown vigour. Condition ratings include poor (P), fair (F) and good (G).
Dripline – radius of tree crown, as measured from stem to outermost reaches of branches.
Comments - additional relevant detail.

Existing Site Conditions

The subject area includes a former Gaur enclosure located west of the existing Indo-Malaya Pavilion (known as Habitat 1). Habitat 2, for which a separate report will be prepared, is the ravine south of the Pavilion adjacent to the existing zipline feature and pedestrian bridge. Tree resources within the subject area exist in the form of landscape and naturally occurring trees. Hardwood forest surrounds the subject areas. Refer to Figure 1 for the existing conditions.

Individual Tree Resources

The tree inventory was conducted on 23 October 2019 and 21 January 2020. The inventory documented 106 trees on and within 12 metres of the Habitat 1 subject area. Refer to Table 1 for the full tree inventory and Figure 1 for the location of trees reported in the tree inventory.

Tree resources were comprised of Manitoba Maple (*Acer negundo*), Silver Maple (*Acer saccharinum*), Black Locust (*Robinia pseudoacacia*), Sugar Maple (*Acer saccharum*), Eastern White Cedar (*Thuja occidentalis*), Green Ash (*Fraxinus pennsylvanica*), Trembling Aspen (*Populus tremuloides*), Basswood (*Tilia americana*), White Elm (*Ulmus americana*), Largetooth Aspen (*Populus grandidentata*), Tree-of-heaven (*Ailanthus altissima*), Eastern Hemlock (*Tsuga canadensis*), Black Cherry (*Prunus serotina*), Scots Pine (*Pinus sylvestris*), Ironwood (*Ostrya virginiana*), Red Oak (*Quercus rubra*), White Birch (*Betula papyrifera*), Apple species (*Malus sp.*), White Pine (*Pinus strobus*), White Ash (*Fraxinus americana*), and Norway Maple (*Acer platanoides*).

Proposed Development

The demolition of the existing features within the enclosure and the construction of a new orangutan enclosure is proposed for Habitat 1, including a moat, viewing platforms, and habitat features. Much of the area will require regrading. Renovations within the Indo-Malaya Pavilion will also be occurring. Refer to Figure 1 for the existing conditions and proposed site plan.

Discussion

The following sections provide a discussion and analysis of tree impacts and tree preservation relative to the proposed development and existing conditions.

Development Impacts/Tree Removals

The removal of Trees 531, 533-537, 541, 542, 548, 549, 551, 552, 554-556, 562-567, 569, 573-575, 908-910, O-Q, and S will be required to accommodate the proposed development. Refer to Figure 1 for the location of these trees. Within Habitat 1, trees will require removal to accommodate regarding of the habitat area, excavation for the moat along the peripheries of the site, the construction of habitat features, and the base for the generator.

Trees M, N, R, T, U, and W should also be removed as they are dead. If desired, Tree N, located south of Habitat 1, could be bucked to reduce habitat potential but retained for wildlife value.

All trees identified for removal are Category 4 trees and are protected by the City's Ravine and Natural Feature Protection By-law. In total, there are 32 living Category 4 trees identified for removal.

Tree Preservation

The preservation of all other trees, identified as 528-530, 532, 538-540, 543-547, 550, 553, 557-561, 568, 570-572, 576-600, 901-907, 911-913, A-I, and V will be possible with the use of appropriate tree protection measures as indicated on Figure 1. Tree protection measures will have to be implemented prior to demolition to ensure tree resources designated for retention are not impacted by the development. Refer to Figure 1 for the location of required tree preservation fencing, general Tree Protection Plan Notes, and the tree preservation fence detail.

Tree 906 has a splitting union and poses a hazard in its current state. It is recommended that it be cabled or one stem removed to mitigate this hazard. KFCI did not identify markings from the Zoo's maintenance Arborist that would indicate it is on the list of trees to be monitored or removed.

The following is a discussion of proposed tree injuries and prescribed mitigation measures. In total, 30 trees are proposed to be injured, including Trees 528-530, 532, 538, 540, 543-547, 550, 553, 557-561, 568, 587-589, 594, 906, 907, 911, 912, B, P, and Q.

Special Mitigation Measures, Habitat 1:

Trees 538, 540, 543-546

A moat feature is proposed within the minimum tree protection zones (mTPZ's) of Trees 538, 540, and 543-546, which will require excavation. To ensure these trees respond well to the excavation, the following mitigation measures should be employed:

- The preservation fencing as shown on Figure 1 should be installed and maintained throughout construction.
- Excavation for the moat within the mTPZ's of these trees should occur using air spading technology.
- The work should be supervised by a certified Arborist. Exposed roots should be pruned in accordance with Good Arboricultural Standards, then covered with soil or damp burlap.

Trees 528-530 and 532

Trees 528-530 and 532 are located within the orangutan enclosure and will form part of the habitat features, particularly Trees 528-530, onto which climbing ropes for the orangutans will be installed. Trees 529, 530, and 532 currently exist within rock piles which will need to be removed. A building exists within the mTPZ of Tree 528. The following mitigation measures must be employed to ensure the trees respond well to construction.

- Horizontal hoarding (300mm of coarse wood chips laid beneath steel plates and plywood) should be installed within the mTPZ's to the furthest extent possible prior to demolition. This will allow equipment into the mTPZ's of trees for demolition while reducing compaction within the root zones of trees.
- The existing features within the mTPZ's of trees must be removed carefully to ensure the trees are not damaged during demolition. Adjacent to Tree 528, the sheds should be demolished by pulling them away from the existing tree.
- The rocks within the mTPZ's of Trees 529, 530, and 532 should also be removed carefully to avoid impacts to trees.
- After demolition, the subsurfaces (ie. the areas beneath the sheds and rocks) within the mTPZ's of trees can be remediated gently by hand grading. Quality topsoil can be added to bring the grades up to level with the surrounding grades and remove depressions that may be present after the sheds and rocks have been removed. Cutting should be avoided. All other grading should be kept outside of the TPZ's of these trees.
- The remaining horizontal hoarding should then be installed in all areas shown on Figure 1 to prevent compaction from passing equipment during the remainder of construction. Horizontal hoarding, as opposed to vertical hoarding, has been prescribed to allow access to the areas throughout construction.
- Fasteners to the trees to secure the proposed ropes should be installed by a certified Arborist in accordance with Good Arboricultural Standards and maintained regularly.
- A shallow stream and pool feature and a pole are proposed within the mTPZ's of Trees 529, 530, and 532.
    - Excavation for these features within the mTPZ's of these trees should occur using air spading technology.
    - The work should be supervised by a certified Arborist. Exposed roots should be pruned in accordance with Good Arboricultural Standards, then covered with soil or damp burlap.

Trees 543, 544, 547, 550, 553, 558, P, and Q

A boardwalk/viewing structure is proposed within the mTPZ's of Trees 543, 544, 547, 550, 553, and 558. The structures will be installed on posts. The following mitigation measures are required to ensure the trees respond well to the construction:

- Vertical and horizontal hoarding as indicated on Figure 1 should be installed and maintained throughout construction. A combination of the two hoarding types has been identified adjacent to these trees to allow equipment and person access to the boardwalk and viewing structure throughout construction.
- Posts for these features required within the mTPZ's of trees should first be dug by hand or using air spading. The work should be supervised by a certified Arborist.
- If structural roots are encountered, the holes should be filled and the posts relocated. Smaller roots can be pruned in accordance with Good Arboricultural Standards.

- The horizontal hoarding can be removed/adjusted where required to allow for post installation.
- Crown pruning may be required for the construction/use of the proposed boardwalk and viewing structure. All crown pruning should be conducted by a certified Arborist in accordance with Good Arboricultural Standards.

Trees 587, 588, 589, 594, 906, 907, 911, and 912

Along the northern limit of the existing service road north of Habitat 1, a new vehicle parking spot and a new pad for a generator are proposed. This will require some level of regrading and/or excavation for the installation of these features. To ensure these trees respond well to the work, the following mitigation measures should be employed:

- The preservation fencing as shown on Figure 1 should be installed and maintained throughout construction.
- Excavation for the features within the mTPZ's of these trees should occur using air spading technology.
- The work should be supervised by a certified Arborist. Exposed roots should be pruned in accordance with Good Arboricultural Standards, then covered with soil or damp burlap.

Tree 568

A playground, walkway, and grading area proposed within the mTPZ of Tree 568. The following mitigation measures must be employed to ensure the tree responds well to construction:

- The preservation fencing as shown on Figure 1 should be installed and maintained throughout construction.
- Excavation for the features within the mTPZ of this trees should occur using air spading technology.
- The work, including any hand grading, should be supervised by a certified Arborist. Exposed roots should be pruned in accordance with Good Arboricultural Standards, then covered with soil or damp burlap.

Trees 559, 560, 561, and B

The road, or portions of the road, will be removed within the mTPZ's of Trees 559, 560, 561, and B. The following mitigation measures must be employed to ensure these trees respond well to construction:

- The preservation fencing as shown on Figure 1 should be installed and maintained throughout construction.
- The existing asphalt within the mTPZ's of these trees should be removed by hand or using small equipment (ie. a skidsteer). If roots are encountered within the subsurface, it should be left intact.
- The areas can then be amended using topsoil and sod or seed.

Summary and Recommendations

Kuntz Forestry Consulting Inc. was retained by the Toronto Zoo to complete a Tree Inventory and Preservation Plan in support of a development application for a new orangutan enclosure at the Toronto Zoo. A tree inventory was conducted and reviewed in the context of the proposed site plan.

The findings of the study indicate a total of 106 trees on and within 12 metres of the subject property. The removal of 30 trees will be required to accommodate the proposed development. Six dead trees are also identified for removal. All other trees can be saved provided appropriate tree protection measures are installed prior to the development.

The following recommendations are suggested to minimize impact to trees identified for preservation. Refer to Figure 1 for the location of required tree preservation fencing, general Tree Protection Plan Notes, and the tree preservation fence detail.

- Tree protection barriers and fencing should be erected at locations as prescribed on Figure 1. All tree protection measures should follow the guidelines as set out in the tree preservation plan notes and the tree preservation fencing detail.

- No construction activity including surface treatments, excavations of any kind, storage of materials or vehicles, unless specifically outlined above, is permitted within the area identified on Figure 1 as a tree protection zone (TPZ at any time during or after construction.

- Special mitigation measures as described in the *Tree Preservation* section above will be required adjacent to all trees.

- Branches and roots that extend beyond prescribed tree protection zones that require pruning must be pruned by a qualified Arborist or other tree professional. All pruning of tree roots and branches must be in accordance with Good Arboricultural Standards.

- Site visits, pre, during, and post construction are recommended by either a certified consulting arborist (I.S.A.) or registered professional forester (R.P.F.) to ensure proper utilization of tree protection barriers. Trees should also be inspected for damage incurred during construction to ensure appropriate pruning or other measures are implemented.

Respectfully Submitted,

Kuntz Forestry Consulting Inc.

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Limitations of Assessment

Only the tree(s) identified in this report were included in the inventory. The assessment of the trees presented in this report has been made using accepted arboricultural techniques. These may include a visual examination taken from the ground of all the above-ground parts of the tree for structural defects, scars, external indications of decay such as fungal fruiting bodies, evidence of attack by insects, discoloured foliage, the condition of any visible root structures, the degree of lean (if any), the general condition of the trees and the identification of potentially hazardous trees or recommendations for removal (if applicable). Where trees could not be directly accessed (ie. due to obstructions, and/or on neighbouring properties), trees were assessed as accurately as possible from nearby vantage points.

Locations of trees provided in the report are determined as accurately as possible based on the best information available. If official survey information is not provided, tree location in the report may not be exact. In this case, if trees occur on or near property boundaries, an official site survey may be required to determine ownership utilizing specialized survey protocol to gain precise location.

Furthermore, recommendations made in this report are based on the site plans that have been provided at the time of reporting. These recommendations may no longer be applicable should changes be made to the site plan and/or grading, servicing, or landscaping plans following report submission.

Notwithstanding the recommendations and conclusions made in this report, it must be recognized that trees are living organisms, and their health and vigor constantly change over time. They are not immune to changes in site conditions or seasonal variations in the weather conditions. Any tree will fail if the forces applied to the tree exceed the strength of the tree or its parts.

Although every effort has been made to ensure that this assessment is reasonably accurate, the trees should be re-assessed periodically. The assessment presented in this report is valid at the time of inspection.

Table 1. Tree Inventory

Location: Toronto Zoo Orangutan Enclosure

Tree #	Common Name	Scientific Name	DBH	TI	CS	CV	CDB	mTPZ	cat.	Comments	Action
528	Manitoba Maple	*Acer negundo*	27	F	F-G	F		3.6	4	Lean (L), epicormic branching (L), poor form (M), seam (L)	Retain (injure)
529	Silver Maple	*Acer saccharinum*	23	F-G	G	G		3.6	4	Lean (L), stem wound (M), epicormic branching (L), wrapped in chainlink fence	Retain (injure)
530	Silver Maple	*Acer saccharinum*	32	F-G	F-G	F-G		4.8	4	Stem wound (M), epicormic branching (L), wrapped in chainlink fence	Retain (injure)
531	Black Locust	*Robinia pseudoacacia*	4	F	G	G		1.2	4	Growing against building	Remove
532	Silver Maple	*Acer saccharinum*	31	F-G	F	F-G		4.8	4	Lean (VL), bowed (M), epicormic branching (M), stem wound (L), wrapped in chainlink fence	Retain (injure)
533	Silver Maple	*Acer saccharinum*	26	G	F-G	G		3.6	4	Lean (VL), asymmetrical crown (L), wrapped in chainlink fence	Remove
534	Silver Maple	*Acer saccharinum*	21	G	G	G		3.6	4	Lean (VL)	Remove
535	Sugar Maple	*Acer saccharum*	20.5	F	F	F	30	3.6	4	Deadwood (M), lean (L), asymmetrical crown (L)	Remove
536	Eastern White Cedar	*Thuja occidentalis*	19, 25	F	F	F		3.6	4	V-union at 1m, 1 dead stem at base, lost leader	Remove
537	Manitoba Maple	*Acer negundo*	31, 10.5	F	F	F		4.8	4	1 pruned stem at base, included fence (L), poor union at base, bowed (M)	Remove
538	Sugar Maple	*Acer saccharum*	26	G	G	G		3.6	4	Union at base, peeling bark, pruning wounds (L), asymmetrical crown (L)	Retain (injure)
539	Sugar Maple	*Acer saccharum*	13.5, 11	F	F-G	F		3.6	4	Stem wound (H), deadwood (M), epicormic branching (L), cavity (M), poor union at 2m	Retain
540	Manitoba Maple	*Acer negundo*	38	P-F	F	F		4.8	4	Coppice growth (L)	Retain (injure)
541	Sugar Maple	*Acer saccharum*	19	F-G	F-G	F-G		3.6	4	Asymmetrical crown (L), scale (M), growth deficit (L)	Remove
542	Sugar Maple	*Acer saccharum*	23.5	F-G	F	F		3.6	4	Deadwood (M), asymmetrical crown (M)	Remove
543	Sugar Maple	*Acer saccharum*	12	F-G	F	F-G		3.6	4	Crowded by Tree 544	Retain (injure)
544	Sugar Maple	*Acer saccharum*	34	G	G	G		4.8	4	Deadwood (L)	Retain (injure)

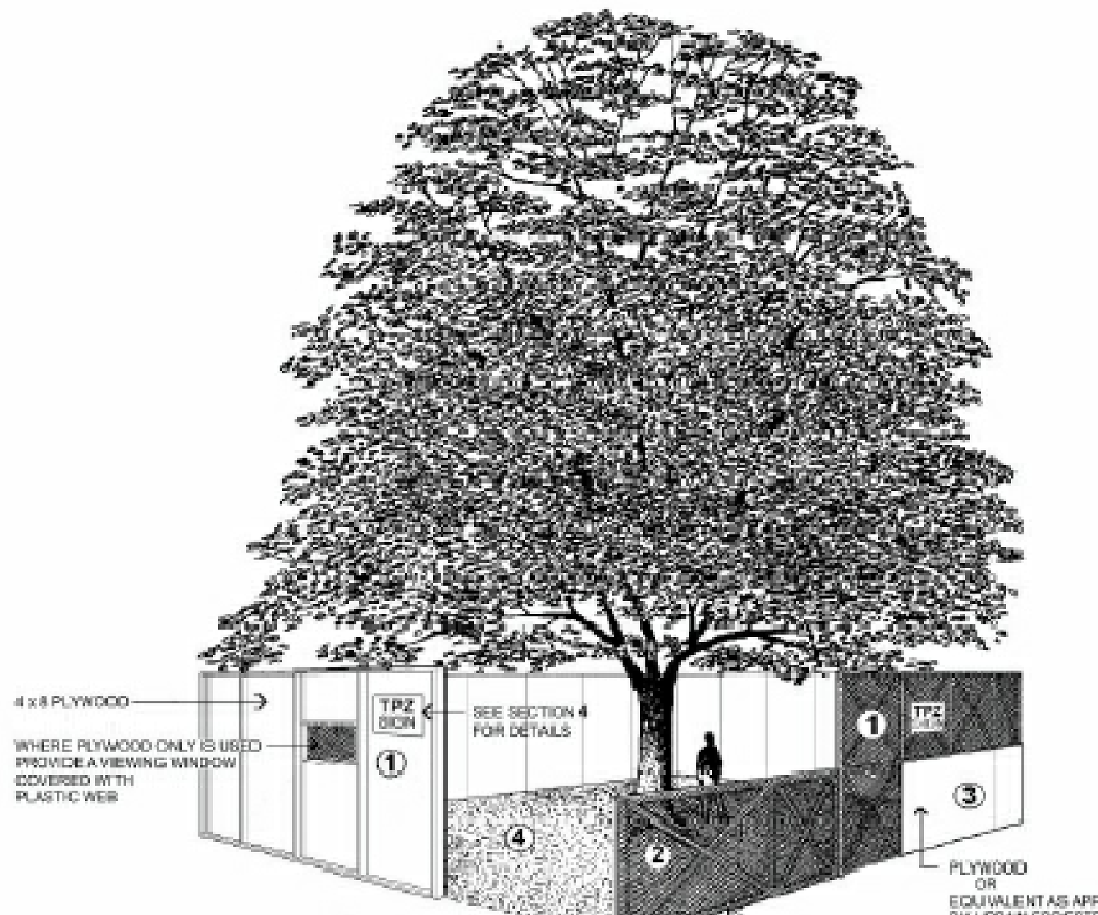
545	Sugar Maple	*Acer saccharum*	13	F-G	F-G	F-G		3.6	4	Asymmetrical crown (M), sweep (L)	Retain (injure)
546	Sugar Maple	*Acer saccharum*	10	F-G	G	G		3.6	4	Sweep (M)	Retain (injure)
547	Sugar Maple	*Acer saccharum*	28	F	F-G	F-G		3.6	4	Crook (M), seam (L), poor form (L)	Retain (injure)
548	Green Ash	*Fraxinus pennsylvanica*	5	G	G	G		1.2	4		Remove
549	Manitoba Maple	*Acer negundo*	40	P	P	P		4.8	4	Failed at 2m, epicormic branching (M)	Remove
550	Manitoba Maple	*Acer negundo*	30	F-G	G	G		4.8	4	Lean (L)	Retain (injure)
551	Eastern White Cedar	*Thuja occidentalis*	29.5	F-G	F-G	F-G		3.6	4	Crook (M), lean (VL), poor form (L)	Remove
552	Eastern White Cedar	*Thuja occidentalis*	17	G	G	G		3.6	4	Bowed (VL)	Remove
553	Eastern White Cedar	*Thuja occidentalis*	29.5, 20	F	F-G	F-G		3.6	4	Lean (M), v-union at 0.6m	Retain (injure)
554	Eastern White Cedar	*Thuja occidentalis*	17.5	F	F-G	F-G		3.6	4	Sweep (H), lean (M)	Remove
555	Eastern White Cedar	*Thuja occidentalis*	13	G	F-G	G		3.6	4	Crooks	Remove
556	Manitoba Maple	*Acer negundo*	30	F	P	F-G		4.8	4	Bowed (H), poor form (H)	Remove
557	Eastern White Cedar	*Thuja occidentalis*	21.5	G	G	G		3.6	4	Poor form (L)	Retain (injure)
558	Trembling Aspen	*Populus tremuloides*	23	G	F	F-G		3.6	4	Poor form (M)	Retain (injure)
559	Basswood	*Tilia americana*	23.5	G	G	G		3.6	4	Epicormic branching (L)	Retain (injure)
560	Basswood	*Tilia americana*	26	F-G	F-G	G		3.6	4	Coppice growth (L), lean (L)	Retain (injure)
561	Trembling Aspen	*Populus tremuloides*	14.5	G	G	G		3.6	4		Retain (injure)
562	Eastern White Cedar	*Thuja occidentalis*	23.5, 18	P	P	P-F		3.6	4	Split union at 1m, lost leaders	Remove
563	Eastern White Cedar	*Thuja occidentalis*	13	F-G	G	G		3.6	4	Sweep (M)	Remove
564	Basswood	*Tilia americana*	20.5	G	G	G		3.6	4		Remove
565	Basswood	*Tilia americana*	18.5	G	G	G		3.6	4	Coppice growth (L)	Remove
566	Manitoba Maple	*Acer negundo*	42	F	F	F		6.0	4	Pruning wounds (M) near base, bowed (M), deadwood (M), broken branches (L)	Remove
567	Trembling Aspen	*Populus tremuloides*	18	F-G	F	F-G		3.6	4	Poor form (M)	Remove
568	White Elm	*Ulmus americana*	46.5	G	F-G	F-G		6.0	4	Epicormic branching (M)	Retain (injure)
569	Basswood	*Tilia americana*	21	G	F-G	G		3.6	4	Coppice growth (M)	Remove
570	Silver Maple	*Acer saccharinum*	10, 6.5	G	F-G	G		3.6	4	Union at base, poor form (L)	Retain
571	Basswood	*Tilia americana*	~26	G	G	G		3.6	4		Retain

572	Largetooth Aspen	*Populus grandidentata*	8.5	F-G	G	G		1.2	4	Crook (M), sweep (M)	Retain
573	Tree-of-heaven	*Ailanthus altissima*	4, 2	F-G	G	G		1.2	4	Stem wound (M), clump of 2	Remove
574	White Elm	*Ulmus americana*	8, 10.5	F-G	F-G	F-G		3.6	4	Union at 0.1m	Remove
575	Eastern Hemlock	*Tsuga canadensis*	12	F-G	F	F		3.6	4	Sweep (L), asymmetrical crown (L)	Remove
576	Black Cherry	*Prunus serotina*	32.5	F-G	F-G	F-G		4.8	4	Union at 1.6m, sweep (L), deadwood (L), asymmetrical crown (L)	Retain
577	Sugar Maple	*Acer saccharum*	12.5, 6	G	F-G	F-G		3.6	4	Asymmetrical crown (M), union at base	Retain
578	Basswood	*Tilia americana*	14.5, 19, 8.5	F	F-G	F-G		3.6	4	Bowed (L), union at 0.2m, epicormic branching (L), stem wound (L)	Retain
579	White Elm	*Ulmus americana*	50	F-G	F	F-G		6.0	4	Asymmetrical crown (M)	Retain
580	Sugar Maple	*Acer saccharum*	12	F	G	F-G		3.6	4	Stem wound (H)	Retain
581	Sugar Maple	*Acer saccharum*	12, 9.5, 8.5	F-G	F-G	F-G		3.6	4	Union at base, asymmetrical crown (M)	Retain
582	Scots Pine	*Pinus sylvestris*	22.5	F	P-F	F		3.6	4	Lost leader, poor form (H)	Retain
583	Basswood	*Tilia americana*	11	F-G	F	F-G		3.6	4	Asymmetrical crown (M), lean (L)	Retain
584	Sugar Maple	*Acer saccharum*	12	G	F-G	F-G		3.6	4	Asymmetrical crown (L)	Retain
585	Ironwood	*Ostrya virginiana*	10.5	G	F-G	F-G		3.6	4	Asymmetrical crown (M)	Retain
586	Sugar Maple	*Acer saccharum*	5.5	G	F-G	F-G		1.2	4	Asymmetrical crown (L)	Retain
587	Sugar Maple	*Acer saccharum*	10.5	F	G	G		3.6	4	Stem wound (H)	Retain (injure)
588	Red Oak	*Quercus rubra*	34	F-G	G	G		4.8	4	Asymmetrical crown (L), lean (L)	Retain (injure)
589	Sugar Maple	*Acer saccharum*	12	G	F-G	G		3.6	4	Grapevine competition (M), asymmetrical crown (L)	Retain (injure)
590	Ironwood	*Ostrya virginiana*	6	G	G	G		1.2	4		Retain
591	Ironwood	*Ostrya virginiana*	12	G	F-G	F-G		3.6	4	Lean (L), asymmetrical crown (L)	Retain
592	Sugar Maple	*Acer saccharum*	8	G	G	G		1.2	4		Retain
593	Sugar Maple	*Acer saccharum*	12	G	F-G	F-G		3.6	4	Asymmetrical crown (M)	Retain
594	White Elm	*Ulmus americana*	15	F	F	F		3.6	4	Crook (M), asymmetrical crown (M), grapevine competition (L)	Retain (injure)
595	Sugar Maple	*Acer saccharum*	9.5	G	F-G	F-G		1.2	4	Asymmetrical crown (L)	Retain
596	Sugar Maple	*Acer saccharum*	29.5	G	F-G	F-G		3.6	4	Broken branches (M)	Retain
597	Sugar Maple	*Acer saccharum*	~25, 20	F	F-G	F-G		3.6	4	Asymmetrical crown (L), v-union at 2m with fused stems	Retain
598	Sugar Maple	*Acer saccharum*	21	G	G	G		3.6	4	Asymmetrical crown (M)	Retain

599	Sugar Maple	*Acer saccharum*	8	G	F	F-G		1.2	4		Retain
600	Sugar Maple	*Acer saccharum*	34	F	F-G	F-G		4.8	4	V-union at 2.5m	Retain
901	White Birch	*Betula papyrifera*	19	F-G	G	F-G		3.6	4	Stem wound (L), lean (L)	Retain
902	Basswood	*Tilia americana*	21	G	G	G		3.6	4	Coppice growth (L), lean (L)	Retain
903	Sugar Maple	*Acer saccharum*	10	G	F-G	F-G		3.6	4	Asymmetrical crown (L), stem wound (L)	Retain
904	Sugar Maple	*Acer saccharum*	23	F	F-G	F-G		3.6	4	V-union at 4m with included bark (H)	Retain
905	Sugar Maple	*Acer saccharum*	13	G	G	G		3.6	4		Retain
906	Sugar Maple	*Acer saccharum*	39.5	P	F-G	F-G		4.8	4	Split Union at 4m, => Hazard - remove or cable	Retain (injure)
907	Sugar Maple	*Acer saccharum*	25.5	F-G	F-G	F-G		3.6	4	Lean (L)	Retain (injure)
908	Apple species	*Malus spp.*	25	F	F	F		3.6	4	Epicormic branching (M), pruning wounds (L)	Remove
909	Sugar Maple	*Acer saccharum*	7	G	G	G		1.2	4		Remove
910	Sugar Maple	*Acer saccharum*	18	G	G	G		3.6	4		Remove
911	White Elm	*Ulmus americana*	23	G	G	G		3.6	4		Retain (injure)
912	Red Oak	*Quercus rubra*	17	F-G	F-G	G		3.6	4	Asymmetrical crown (L), poor form (L)	Retain (injure)
913	Manitoba Maple	*Acer negundo*	6.5, 5	F	F	F		1.2	4	Union at base, pruning wounds (M), epicormic branching (M)	Retain
A	Eastern White Cedar	*Thuja occidentalis*	~14, 9	G	G	G		3.6	4	Union at base	Retain
B	Manitoba Maple	*Acer negundo*	~38	F	F	F		4.8	4	Bowed (M), stem wound (M)	Retain (injure)
C	White Elm	*Ulmus americana*	~12	G	F-G	G		3.6	4	Deadwood (L), asymmetrical crown (M)	Retain
D	Sugar Maple	*Acer saccharum*	~20	G	G	G		3.6	4		Retain
E	Sugar Maple	*Acer saccharum*	~14	G	G	G		3.6	4		Retain
F	White Pine	*Pinus strobus*	~34	G	G	G		4.8	4		Retain
G	Sugar Maple	*Acer saccharum*	~9	G	G	G		1.2	4		Retain
H	Sugar Maple	*Acer saccharum*	~14	G	G	G		3.6	4		Retain
I	Norway Maple	*Acer platanoides*	~14	F-G	F-G	F-G		3.6	4	Sweep (L), crook (M), grapevine competition (L), asymmetrical crown (L)	Retain
M	Unknown		10.5	D	D	D		3.6	4		Remove (dead)
N	White Elm	*Ulmus americana*	~27	D	D	D		3.6	4		Remove (dead)
O	Hawthorne species	*Crataegus sp.*	17.5	F-G	G	F		3.6	4	Bowed (L)	Remove
P	Hawthorne species	*Crataegus sp.*	15	F-G	F-G	F-G		3.6	4	Bowed (M)	Retain (injure)

Q	Hawthorne species	*Crataegus sp.*	11.5	F-G	F-G	F-G		3.6	4	Bowed (M)	Retain (injure)
R	Eastern White Cedar	*Thuja occidentalis*	37	D	D	D		4.8	4	Lost leader	Remove (dead)
S	Hawthorne species	*Crataegus sp.*	12, 12	F	F	P-F	50	3.6	4	Union at base, bowed (L)	Remove
T	White Ash	*Fraxinus americana*	26	D	D	D		3.6	4	Cavities (H)	Remove (dead)
U	White Ash	*Fraxinus americana*	18	D	D	D		3.6	4	Marked red	Remove (dead)
V	Hawthorne species	*Crataegus sp.*	17	F	F	F		3.6	4	Bowed (M), epicormic branching (M)	Retain
W	Green Ash	*Crataegus sp.*	~15	D	D	D		3.6	4		Remove (dead)

Codes		
DBH	Diameter at Breast Height	*(cm)*
TI	Trunk Integrity	*(G, F, P)*
CS	Crown Structure	*(G, F, P)*
CV	Crown Vigor	*(G, F, P)*
CDB	Crown Die Back	*(%)*
Cat.	City of Toronto Tree Category	*1, 2, 3, 4, 5*
DL	Dripline	*(m)*
mTPZ	Minimum Preservation Zone	*(m)*
~ = estimate; (VL) = very light; (L) = light; (M) = moderate; (H) = heavy		



Tree Protection Barriers

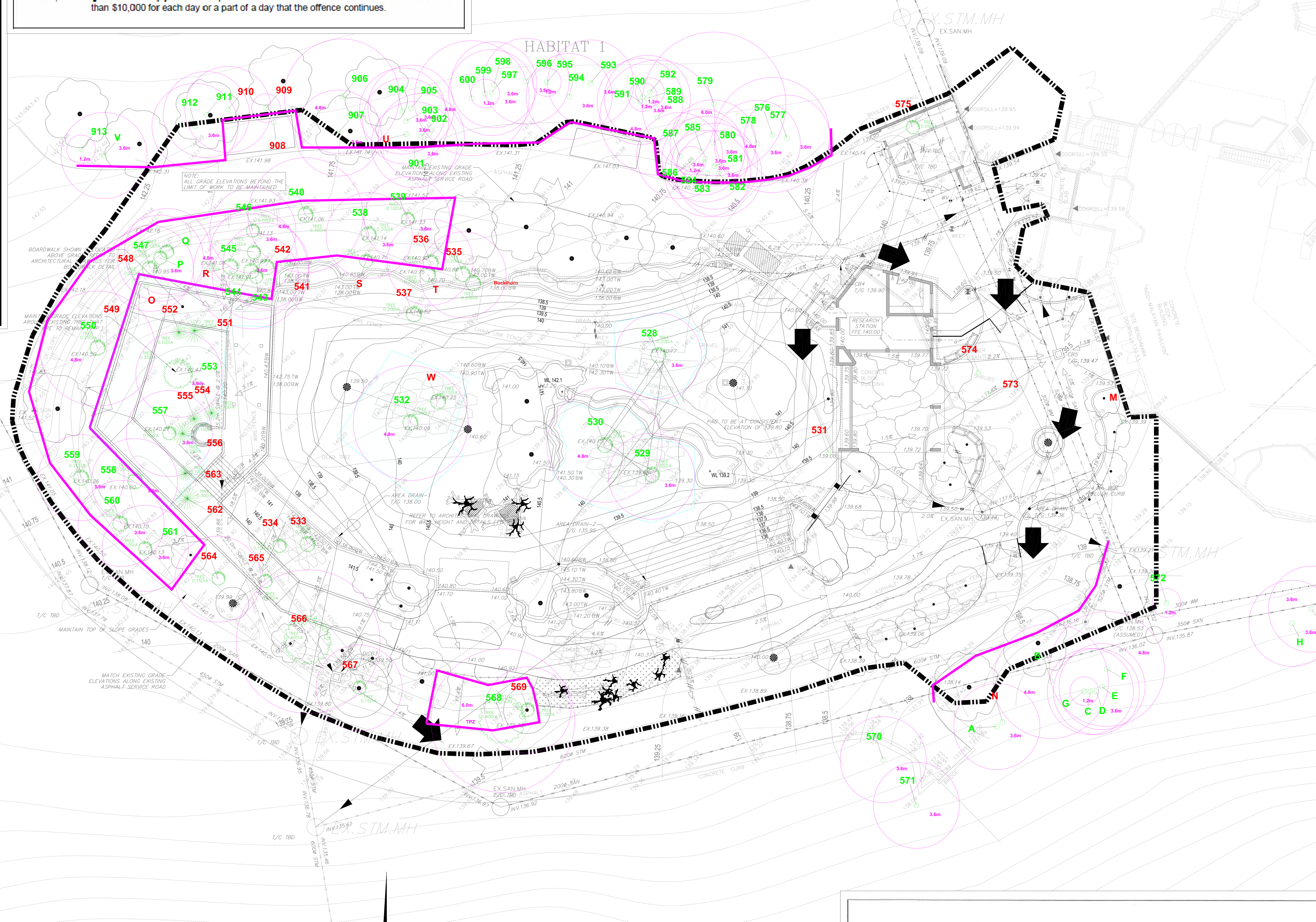
1. Tree protection barriers must be constructed with a solid wood frame clad with plywood or approved equivalent. Height of hoarding may be less than 8 ft. to accomodate any branches that may be lower.
2. Tree protection barriers for trees situated on the City road allowance where visibility must be maintained can be 1.2m (4ft.) high and consist of orange plastic web snow fencing on a wood frame made of 2 x 4s.
3. Where some excavate or fill has to be temporarily located near a tree protection barrier, plywood must be used to ensure no material enters the Tree Protection Zone.
4. No construction activity, grade changes, surface treatment or excavations of any kind is permitted within the Tree Protection Zone.

Note:
Sediment control fencing shall be installed in locations indicated in an Urban Forestry approved Tree Protection Plan. The sediment control fencing must be installed to Ontario Provicial Standards (OPSD-219.130) heavy duty silt fence barrier and to the satisfaction of Urban Forestry. See Detail TP- 2

TORONTO
Parks, Forestry and Recreation
Urban Forestry
February 2016 **Detail TP-1**

Ravine & Natural Feature Protection By-law

The Ravine & Natural Feature Protection By-law, Chapter 658 of the City of Toronto Municipal Code, regulates the injury and destruction of trees, dumping of refuse and changes to grade within protected areas.
Under this by-law protected trees may not be removed, injured or destroyed, and protected grades may not be altered, without written authorisation from Urban Forestry Ravine & Natural Feature Protection, on behalf of the General Manager of Parks, Forestry & Recreation.
Convictions of offences respecting the regulations in the Ravine and Natural Feature Protection By-law are subject to fines, and the landowner may be ordered by the court to restore the area to the satisfaction of the City. A person convicted of an offence under this Bylaw is liable to a minimum fine of $500 and a maximum fine of $100,000 for each tree destroyed, a maximum fine of $100,000 for any other offence committed under this chapter, and /or a Special Fine of $100,000. A person convicted of a continuing offence, including failure to comply with ravine permit conditions is liable to a maximum fine of not more than $10,000 for each day or a part of a day that the offence continues.



Special Mitigation Measures

Trees 538, 540, 543-546

A moat feature is proposed within the minimum tree protection zones (mTPZ's) of Trees 538, 540, and 543-546, which will require excavation. To ensure these trees respond well to the excavation, the following mitigation measures should be employed:

- The preservation fencing as shown on Figure 1a should be installed and maintained throughout construction.
- Excavation for the moat within the mTPZ's of these trees should occur using air spading technology.
- The work should be supervised by a certified Arborist. Exposed roots should be pruned in accordance with Good Arboricultural Standards, then covered with soil or damp burlap.

Trees 528-530 and 532

Trees 528-530 and 532 are located within the orangutan enclosure and will form part of the habitat features, particularly Trees 528-530, onto which climbing ropes for the orangutans will be installed. Trees 529, 530, and 532 currently exist within rock piles which will need to be removed. A building exists within the mTPZ of Tree 528. The following mitigation measures must be employed to ensure the trees respond well to construction.

- Horizontal hoarding (300mm of coarse wood chips laid beneath steel plates and plywood) should be installed within the mTPZ's to the furthest extent possible prior to demolition. This will allow equipment into the mTPZ's of trees for demolition while reducing compaction within the root zones of trees.
- The existing features within the mTPZ's of trees must be removed carefully to ensure the trees are not damaged during demolition. Adjacent to Tree 528, the sheds should be demolished by pulling them away from the existing tree.
- The rocks within the mTPZ's of Trees 529, 530, and 532 should also be removed carefully to avoid impacts to trees.
- After demolition, the subsurfaces (ie. the areas beneath the sheds and rocks) within the mTPZ's of trees can be remediated gently by hand grading. Quality topsoil can be added to bring the grades up to level with the surrounding grades and remove depressions that may be present after the sheds and rocks have been removed. Cutting should be avoided. All other grading should be kept outside of the TPZ's of these trees.
- The remaining horizontal hoarding should then be installed in all areas shown on Figure 1 to prevent compaction from passing equipment during the remainder of construction. Horizontal hoarding, as opposed to vertical hoarding, has been prescribed to allow access to the areas throughout construction.
- Fasteners to the trees to secure the proposed ropes should be installed by a certified Arborist in accordance with Good Arboricultural Standards and maintained regularly.
- A shallow stream and pool feature and a pole are proposed within the mTPZ's of Trees 529, 530, and 532.
    - Excavation for these features within the mTPZ's of these trees should occur using air spading technology.

○ The work should be supervised by a certified Arborist. Exposed roots should be pruned in accordance with Good Arboricultural Standards, then covered with soil or damp burlap.

Trees 543, 544, 547, 550, 553, 558, P, and Q

A boardwalk/viewing structure is proposed within the mTPZ's of Trees 543, 544, 547, 550, 553, and 558. The structures will be installed on posts. The following mitigation measures are required to ensure the trees respond well to the construction:

- Vertical and horizontal hoarding as indicated on Figure 1a should be installed and maintained throughout construction. A combination of the two hoarding types has been identified adjacent to these trees to allow equipment and person access to the boardwalk and viewing structure throughout construction.
- Posts for these features required within the mTPZ's of trees should first be dug by hand or using air spading. The work should be supervised by a certified Arborist.
- If structural roots are encountered, the holes should be filled and the posts relocated. Smaller roots can be pruned in accordance with Good Arboricultural Standards.
- The horizontal hoarding can be removed/adjusted where required to allow for post installation.
- Crown pruning may be required for the construction/use of the proposed boardwalk and viewing structure. All crown pruning should be conducted by a certified Arborist in accordance with Good Arboricultural Standards.

Trees 587, 588, 589, 594, 906, 907, 911, and 912

Along the northern limit of the existing service road north of Habitat 1, a new vehicle parking spot and a new pad for a generator are proposed. This will require some level of regrading and/or excavation for the installation of these features. To ensure these trees respond well to the work, the following mitigation measures should be employed:

- The preservation fencing as shown on Figure 1a should be installed and maintained throughout construction.
- Excavation for the features within the mTPZ's of these trees should occur using air spading technology.
- The work should be supervised by a certified Arborist. Exposed roots should be pruned in accordance with Good Arboricultural Standards, then covered with soil or damp burlap.

Tree 568

A playground, walkway, and grading area proposed within the mTPZ of Tree 568. The following mitigation measures must be employed to ensure the tree responds well to construction:

- The preservation fencing as shown on Figure 1 should be installed and maintained throughout construction.
- Excavation for the features within the mTPZ of this trees should occur using air spading technology.
- The work, including any hand grading, should be supervised by a certified Arborist. Exposed roots should be pruned in accordance with Good Arboricultural Standards, then covered with soil or damp burlap.

Trees 559, 560, 561, and B

The road, or portions of the road, will be removed within the mTPZ's of Trees 559, 560, 561, and B. The following mitigation measures must be employed to ensure these trees respond well to construction:

- The preservation fencing as shown on Figure 1a should be installed and maintained throughout construction.
- The existing asphalt within the mTPZ's of these trees should be removed by hand or using small equipment (ie. a skidsteer). If roots are encountered within the subsurface, it should be left intact.
- The areas can then be amended using topsoil and sod or seed.

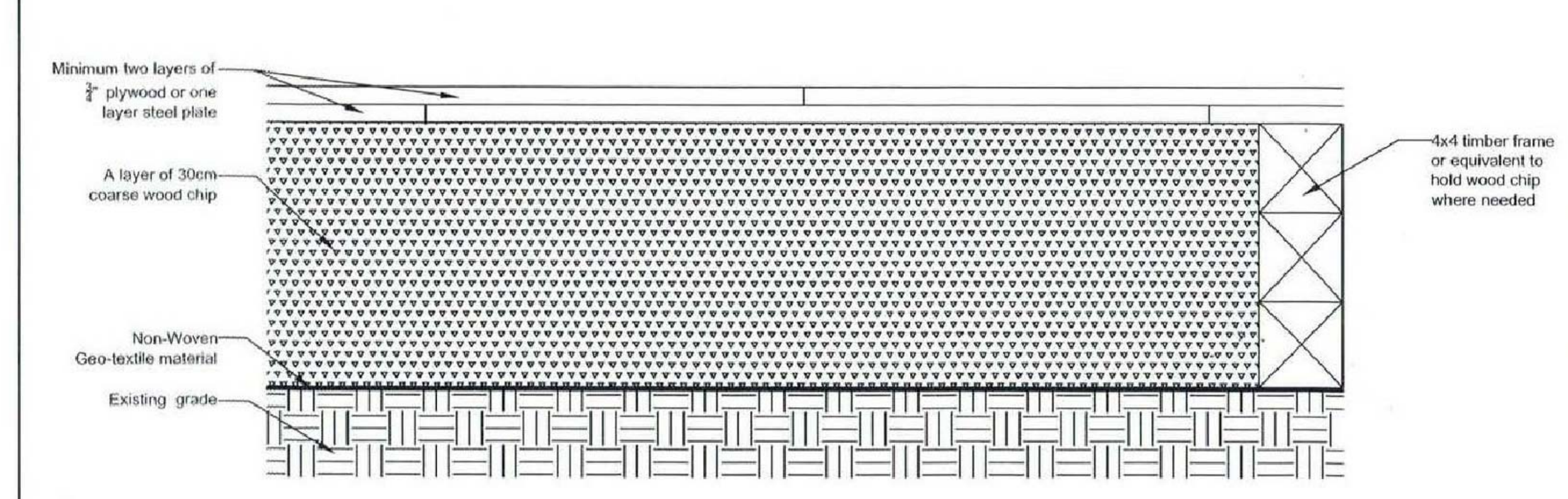
TORONTO
Parks, Forestry & Recreation

Tree Protection Zone (TPZ)

All construction related activities, including grade alteration, excavation, soil compaction, any materials or equipment storage, disposal of liquid and vehicular traffic are NOT permitted within this TPZ.

This tree protection barrier must remain in good condition and must not be removed or altered without authorization of City of Toronto, Urban Forestry.

Concerns or inquiries regarding this TPZ can be directed to:
311 or 311@toronto.ca



Horizontal Tree Protection (Wood Chip)

TORONTO
Urban Forestry Services
Parks and Recreation Division
December 2013 **Detail HTP - 1**

LEGEND

Tree Inventory

Refer to Table 1 of report dated 30 October 2019, revised 6 March 2020 for complete tree inventory information. All trees on and within 12 metres of the subject areas with the potential to be impacted were included in the inventory.

Tree Removals

The removal of 30 tree will be required to accommodate the proposed construction. Six dead trees are also identified for removal. Tree removals are indicated with RED labels.

Tree Preservation

The preservation of all other trees will be possible with the use of appropriate tree protection measures. Minimum tree preservation zones (mTPZ's) and required tree preservation hoarding are indicated in MAGENTA. mTPZ's indicate minimum distances for construction and disturbance adjacent to trees. Trees identified for preservation are indicated with GREEN labels.

Tree label (RED), removal recommended	X
Tree label (GREEN), preservation recommended	X
Minimum tree protection zone (with radius in metres, as measured from edge of stem)	xm
Tree preservation fencing	
Horizontal Hoarding	
Tree location estimated by KFCI	

TREE PROTECTION PLAN NOTES

- It is the applicants' responsibility to discuss potential impacts to trees located near or wholly on adjacent properties or on shared boundary lines with their neighbours. Should such trees be injured to the point of instability or death the applicant may be held responsible through civil action. The applicant would also be required to replace such trees to the satisfaction of Urban Forestry.
- Tree protection barriers shall be installed to standards as detailed in this document and to the satisfaction of Urban Forestry.
- Tree protection barriers must be installed using plywood clad hoarding (minimum 19mm or ¾" thick) or an equivalent approved by Urban Forestry.
- Where required, signs as specified in Section 4, Tree Protection Signage must be attached to all sides of the barrier.
- Prior to the commencement of any site activity such as site alteration, demolition or construction, the tree protection measures specified on this plan must be installed to the satisfaction of Urban Forestry.
- Once all tree/site protection measures have been installed, Urban Forestry staff must be contacted to arrange for an inspection of the site and approval of the tree/site protection requirements. Photographs that clearly show the installed tree/site protection shall be provided for Urban Forestry review.
- Where changes to the location of the approved TPZ or sediment control or where temporary access to the TPZ is proposed, Urban Forestry must be contacted to obtain approval prior to alteration.
- Tree protection barriers must remain in place and in good condition during demolition, construction and/or site disturbance, including landscaping, and must not be altered, moved or removed until authorized by Urban Forestry.
- No construction activities including grade changes, surface treatments or excavation of any kind are permitted within the area identified on the Tree Protection Plan or Site Plan as a minimum tree protection zone (TPZ). No root cutting is permitted. No storage of materials or fill is permitted within the TPZ. No movement or storage of vehicles or equipment is permitted within the TPZ. The area(s) identified as a TPZ must be protected and remain undisturbed at all times.
- All additional tree protection or preservation requirements, above and beyond the installation of tree protection barriers, must be undertaken or implemented as detailed in the Urban Forestry approved arborist report and/or the approved tree protection plan and to the satisfaction of Urban Forestry.
- If the minimum tree protection zone (TPZ) must be reduced to facilitate construction access, the tree protection barriers must be maintained at a lesser distance and the exposed portion of TPZ must be protected using a horizontal root protection method approved by Urban Forestry.
- Any roots or branches indicated on this plan which require pruning, as approved by Urban Forestry, must be pruned by an arborist. All pruning of tree roots and branches must be in accordance with good arboricultural practice. Roots that have received approval from Urban Forestry to be pruned must first be exposed using pneumatic (air) excavation, by hand digging or by a using low pressure hydraulic (water) excavation. The water pressure for hydraulic excavation must be low enough that root bark is not damaged or removed. This will allow a proper pruning cut and minimize tearing of the roots. The arborist retained to carry out crown or root pruning must contact Urban Forestry no less than three working days prior to conducting any specified work.
- The applicant/owner shall protect all by-law regulated trees in the area of consideration that have not been approved for removal throughout development works to the satisfaction of Urban Forestry.
- Convictions of offences respecting the regulations in the Street Tree By-law and Private Tree By-law are subject to fines. A person convicted of an offence under these by-laws is liable to a minimum fine of $500 and a maximum fine of $100,000 per tree, and /or a Special Fine of $100,000. The landowner may be ordered by the City to stop the contravening activity or ordered to undertake work to correct the contravention.
- Prior to site disturbance the owner must confirm that no migratory birds are making use of the site for nesting. The owner must ensure that the works are in conformance with the Migratory Bird Convention Act and that no migratory bird nests will be impacted by the proposed work no less than 48 hours prior to conducting any specified work.

No.	Issue/Revisions	Date	By
1	Report Submission	30 Oct. '19	CB
2	Report Revisions	6 Mar. '20	CB

Base Data: Tom. A Senkus (topo), Jones and Jones Architects and Landscape Architects, Ltd. (site plan)

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Client
Toronto Zoo
361A Old Finch Avenue
Toronto, ON M1B 5K7

Property
Toronto Zoo - Orangutan Enclosure, Habitat 1
Toronto, Ontario

Existing Conditions, Proposed Site Plan
Tree Inventory & Preservation Plan

Project	P2221	Figure 1
Date	30 October 2019	
Scale	1:200	

Tree Inventory and Preservation Plan Report
Toronto Zoo Orangutan Enclosure
Toronto, Ontario

prepared for

Toronto Zoo
361A Old Finch Avenue
Toronto, ON

prepared by

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30 October 2019

KUNTZ FORESTRY CONSULTING INC Project P2221

Introduction

Kuntz Forestry Consulting Inc. was retained by the Toronto Zoo to complete a Tree Inventory and Preservation Plan in support of a development application for a new orangutan enclosure at the Toronto Zoo. The subject area is adjacent to the Indo-Malaya Pavilion, located at the Toronto Zoo. The Zoo itself is located at 2000 Meadowvale Road in Toronto, northwest of Meadowvale Road and Sheppard Avenue East, within the Rouge National Urban Park.

The work plan for this tree preservation study included the following:

- Prepare inventory of the tree resources on and within 12 metres of the subject property areas with the potential to be impacted by the proposed work;
- Evaluate potential tree saving opportunities based on proposed development plans; and
- Document the findings in a Tree Inventory and Preservation Plan Report.

The results of the evaluation are provided below.

Policy Framework

The entire subject area is subject to the provisions of the City of Toronto Ravine and Natural Feature Protection (RNFP) By-law (Chapter 658 of the Municipal Code) as it is situated within the Ravine and Natural Features Protection Area.

The City of Toronto's Ravine Protection By-law prohibits and regulates the injury and destruction of trees, filling, grading, and dumping in ravines and associated wooded areas within the Ravine Protection Line. Trees are subject to the Ravine By-law regardless of species or diameter. The Urban Forestry Services defines a tree as any woody species that will grow to tree size (4.5m height).

Preliminary information is acquired on individual trees which are then categorized in compliance with the by-law in support of development applications (refer to Table 1). Tree categories range from one through five and are as follows:

> ***Categories***
> ***1.*** *Trees with diameters of 30 cm or more situated on private property on the subject site.*
> ***2.*** *Trees with diameters of 30 cm or more, situated on private property, within 6 m of the subject site.*
> ***3.*** *Trees of all diameters situated on City owned parkland within 6 m of the subject site.*
> ***4.*** *On lands designated under City of Toronto Municipal Code, Chapter 658, Ravine and Natural Feature Protection, trees of all diameters within 10 metres of any construction activity.*
> ***5.*** *Trees of all diameters situated within the City road allowance adjacent to the subject site.* (City of Toronto, 2008).

Methodology

Trees on and within 12 metres of the subject area with the potential to be impacted by the proposed development were included in the inventory. Trees were located using the topographic survey provided for the property, estimations made in-field, and aerial imagery. Trees were tagged using numbers 528-600 and 901-964. Trees that could not be tagged were

identified as Trees A-I. One polygon (group of trees) was identified as P1. See Table 1 for the results of the inventory and Figures 1a and 1b for their locations.

Tree resources were assessed utilizing the following parameters. Dripline was identified for trees adjacent to Habitat 2 for pruning considerations.

Tree # - number assigned to tree that corresponds to Table 1 and Figure 1.
Species - common and botanical names provided in the inventory table.
DBH - diameter (centimetres) at breast height, measured at 1.4 m above the ground.
Condition - condition of tree considering trunk integrity, crown structure, and crown vigour. Condition ratings include poor (P), fair (F) and good (G).
Dripline – radius of tree crown, as measured from stem to outermost reaches of branches.
Comments - additional relevant detail.

Existing Site Conditions

The subject areas include a former Gaur enclosure located west of the existing Indo-Malaya Pavilion (known as Habitat 1), and the ravine south of the Pavilion adjacent to the existing zipline feature and pedestrian bridge (known as Habitat 2). Tree resources within the subject area exist in the form of landscape and naturally occurring trees. Hardwood forest surrounds the subject areas. Refer to Figure 1 for the existing conditions.

Individual Tree Resources

The tree inventory was conducted on 23 October 2019. The inventory documented 146 trees and one polygon on and within 12 metres of the subject property. Refer to Table 1 for the full tree inventory and Figure 1 for the location of trees reported in the tree inventory.

Tree resources were comprised of Manitoba Maple (*Acer negundo*), Silver Maple (*Acer saccharinum*), Black Locust (*Robinia pseudoacacia*), Sugar Maple (*Acer saccharum*), Eastern White Cedar (*Thuja occidentalis*), Green Ash (*Fraxinus pennsylvanica*), Trembling Aspen (*Populus tremuloides*), Basswood (*Tilia americana*), White Elm (*Ulmus americana*), Largetooth Aspen (*Populus grandidentata*), Tree-of-heaven (*Ailanthus altissima*), Eastern Hemlock (*Tsuga canadensis*), Black Cherry (*Prunus serotina*), Scots Pine (*Pinus sylvestris*), Ironwood (*Ostrya virginiana*), Red Oak (*Quercus rubra*), White Birch (*Betula papyrifera*), Apple species (*Malus sp.*), White Pine (*Pinus strobus*), American Beech (*Fagus grandifolia*), White Ash (*Fraxinus americana*), Field Maple (*Acer campestre*), and Norway Maple (*Acer platanoides*).

Proposed Development

The demolition of the existing features within the enclosure and the construction of a new orangutan enclosure is proposed for Habitat 1, including a moat, viewing platforms, and habitat features. Much of the area will require regrading. Renovations within the Indo-Malaya Pavilion will also be occurring. South of the Pavilion within the Habitat 2 area, work includes the construction of a traverse cable for the orangutans with support towers on either end of the ravine. Refer to Figure 1 for the existing conditions and proposed site plan.

Discussion

The following sections provide a discussion and analysis of tree impacts and tree preservation relative to the proposed development and existing conditions.

Development Impacts/Tree Removals

The removal of Trees 531, 533-537, 541, 542, 548, 549, 551, 552, 554-556, 562-569, 573-575, 908-910, 922, 926, 928, 940, 943, 947, and 954-964 will be required to accommodate the proposed development. Refer to Figures 1a and 1b for the location of these trees. Within Habitat 1, trees will require removal to accommodate regarding of the habitat area, excavation for the moat along the peripheries of the site, the construction of habitat features, and the base for the generator.

Within Habitat 2, Trees 954-964 will require removal to accommodate working room adjacent to the support pole proposed along the southern limit of the ravine. Trees 922, 926, 928, 940, 942, 943, and 947 require removal to ensure clearance from the traverse cable for the orangutans, to ensure the orangutans cannot reach nearby trees and leave the habitat feature. Other trees may require crown pruning to achieve this objective as well (see *Tree Preservation* section below), but Trees 922, 926, 928, 940, 942, 943, and 947 have stems or significant amounts of crown that reach within the required clearance areas and therefore, whole tree removal is recommended. Some of these trees could be bucked to retain as wildlife habitat if desired.

In addition, Tree 924 is identified for removal due to its condition. It has been marked with red on site by the Zoo's maintenance Arborist who provides ongoing hazard tree monitoring and removal.

All trees identified for removal are Category 4 trees and are protected by the City's Ravine and Natural Feature Protection By-law.

Tree Preservation

The preservation of all other trees, identified as 528-530, 532, 538-540, 543-547, 550, 553, 557-561, 570-572, 576-600, 901-907, 911-921, 923, 925, 927, 929-939, 941, 944-946, 948-953, A-I, and P1 will be possible with the use of appropriate tree protection measures as indicated on Figures 1a and 1b. Tree protection measures will have to be implemented prior to demolition to ensure tree resources designated for retention are not impacted by the development. Refer to Figures 1a and 1b for the location of required tree preservation fencing, general Tree Protection Plan Notes, and the tree preservation fence detail.

Tree 906 has a splitting union and poses a hazard in its current state. While identified for preservation in the context of the development, it is recommended that it be cabled or removed to mitigate this hazard. KFCI did not identify markings from the Zoo's maintenance Arborist that would indicate it is on the list of trees to be monitored or removed.

Special Mitigation Measures, Habitat 1:

Trees 538, 540, 543-546

A moat feature is proposed within the minimum tree protection zones (mTPZ's) of Trees 538, 540, and 543-546, which will require excavation. To ensure these trees respond well to the excavation, the following mitigation measures should be employed:

- The preservation fencing as shown on Figure 1a should be installed and maintained throughout construction.
- Excavation for the moat within the mTPZ's of these trees should occur using air spading technology.
- The work should be supervised by a certified Arborist. Exposed roots should be pruned in accordance with Good Arboricultural Standards, then covered with soil or damp burlap.

Trees 528-530 and 532

Trees 528-530 and 532 are located within the orangutan enclosure and will form part of the habitat features, particularly Trees 528-530, onto which climbing ropes for the orangutans will be installed. Trees 529, 530, and 532 currently exist within rock piles which will need to be removed. A building exists within the mTPZ of Tree 528. The following mitigation measures must be employed to ensure the trees respond well to construction.

- Horizontal hoarding (300mm of coarse wood chips laid beneath steel plates and plywood) should be installed within the mTPZ's to the furthest extent possible prior to demolition. This will allow equipment into the mTPZ's of trees for demolition while reducing compaction within the root zones of trees.
- The existing features within the mTPZ's of trees must be removed carefully to ensure the trees are not damaged during demolition. Adjacent to Tree 528, the sheds should be demolished by pulling them away from the existing tree.
- The rocks within the mTPZ's of Trees 529, 530, and 532 should also be removed carefully to avoid impacts to trees.
- After demolition, the subsurfaces (ie. the areas beneath the sheds and rocks) within the mTPZ's of trees can be remediated gently by hand grading. Quality topsoil can be added to bring the grades up to level with the surrounding grades and remove depressions that may be present after the sheds and rocks have been removed. Cutting should be avoided. All other grading should be kept outside of the TPZ's of these trees.
- The remaining horizontal hoarding should then be installed in all areas shown on Figure 1 to prevent compaction from passing equipment during the remainder of construction. Horizontal hoarding, as opposed to vertical hoarding, has been prescribed to allow access to the areas throughout construction.
- Fasteners to the trees to secure the proposed ropes should be installed by a certified Arborist in accordance with Good Arboricultural Standards and maintained regularly.
- A shallow stream and pool feature and a pole are proposed within the mTPZ's of Trees 529, 530, and 532.
    - Excavation for these features within the mTPZ's of these trees should occur using air spading technology.

- The work should be supervised by a certified Arborist. Exposed roots should be pruned in accordance with Good Arboricultural Standards, then covered with soil or damp burlap.

Trees 543, 544, 547, 550, 553, and 558

A boardwalk/viewing structure is proposed within the mTPZ's of Trees 543, 544, 547, 550, 553, and 558. The structures will be installed on posts. The following mitigation measures are required to ensure the trees respond well to the construction:

- Vertical and horizontal hoarding as indicated on Figure 1a should be installed and maintained throughout construction. A combination of the two hoarding types has been identified adjacent to these trees to allow equipment and person access to the boardwalk and viewing structure throughout construction.
- Posts for these features required within the mTPZ's of trees should first be dug by hand or using air spading. The work should be supervised by a certified Arborist.
- If structural roots are encountered, the holes should be filled and the posts relocated. Smaller roots can be pruned in accordance with Good Arboricultural Standards.
- The horizontal hoarding can be removed/adjusted where required to allow for post installation.
- Crown pruning may be required for the construction/use of the proposed boardwalk and viewing structure. All crown pruning should be conducted by a certified Arborist in accordance with Good Arboricultural Standards.

Trees 587, 588, 589, 594, 906, 907, 911, and 912

Along the northern limit of the existing service road north of Habitat 1, a new vehicle parking spot and a new pad for a generator are proposed. This will require some level of regrading and/or excavation for the installation of these features. To ensure these trees respond well to the work, the following mitigation measures should be employed:

- The preservation fencing as shown on Figure 1a should be installed and maintained throughout construction.
- Excavation for the features within the mTPZ's of these trees should occur using air spading technology.
- The work should be supervised by a certified Arborist. Exposed roots should be pruned in accordance with Good Arboricultural Standards, then covered with soil or damp burlap.

Trees 559, 560, 561, and B

The road, or portions of the road, will be removed within the mTPZ's of Trees 559, 560, 561, and B. The following mitigation measures must be employed to ensure these trees respond well to construction:

- The preservation fencing as shown on Figure 1a should be installed and maintained throughout construction.
- The existing asphalt within the mTPZ's of these trees should be removed by hand or using small equipment (ie. a skidsteer). If roots are encountered within the subsurface, it should be left intact.

- The areas can then be amended using topsoil and sod or seed.

Special Mitigation Measures, Habitat 2:

To ensure the orangutans using Habitat 2 cannot reach nearby trees and leave the habitat feature, crown pruning of select trees may be required. Driplines of trees within Habitat 2 are shown on Figure 1b. Trees identified for retention whose driplines extend into the 6.1 clearance zones include Trees 914, 915, 918, 920, 921, 923, 925, 927, 929, 930, 931, 932, 939, 941, 944-946, and 948, although some of these trees may be low enough that they will not require crown pruning. Crown pruning should be done by a certified Arborist in accordance with Good Arboricultural Standards, understanding that some trees may require topping to a certain extent to achieve required clearances, including Trees 923 and 925.

Summary and Recommendations

Kuntz Forestry Consulting Inc. was retained by the Toronto Zoo to complete a Tree Inventory and Preservation Plan in support of a development application for a new orangutan enclosure at the Toronto Zoo. A tree inventory was conducted and reviewed in the context of the proposed site plan.

The findings of the study indicate a total of 146 trees and one tree polygon on and within 12 metres of the subject property. The removal of 47 trees will be required to accommodate the proposed development. One additional tree is identified for removal due to its condition. All other trees can be saved provided appropriate tree protection measures are installed prior to the development.

The following recommendations are suggested to minimize impact to trees identified for preservation. Refer to Figure 1 for the location of required tree preservation fencing, general Tree Protection Plan Notes, and the tree preservation fence detail.

- Tree protection barriers and fencing should be erected at locations as prescribed on Figure 1. All tree protection measures should follow the guidelines as set out in the tree preservation plan notes and the tree preservation fencing detail.

- No construction activity including surface treatments, excavations of any kind, storage of materials or vehicles, unless specifically outlined above, is permitted within the area identified on Figure 1 as a tree protection zone (TPZ at any time during or after construction.

- Special mitigation measures as described in the *Tree Preservation* section above will be required adjacent to all trees.

- Branches and roots that extend beyond prescribed tree protection zones that require pruning must be pruned by a qualified Arborist or other tree professional. All pruning of tree roots and branches must be in accordance with Good Arboricultural Standards.

- Site visits, pre, during, and post construction are recommended by either a certified consulting arborist (I.S.A.) or registered professional forester (R.P.F.) to ensure proper utilization of tree protection barriers. Trees should also be inspected for damage incurred during construction to ensure appropriate pruning or other measures are implemented.

Respectfully Submitted,

Kuntz Forestry Consulting Inc.

Celine Batterink

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Limitations of Assessment

Only the tree(s) identified in this report were included in the inventory. The assessment of the trees presented in this report has been made using accepted arboricultural techniques. These may include a visual examination taken from the ground of all the above-ground parts of the tree for structural defects, scars, external indications of decay such as fungal fruiting bodies, evidence of attack by insects, discoloured foliage, the condition of any visible root structures, the degree of lean (if any), the general condition of the trees and the identification of potentially hazardous trees or recommendations for removal (if applicable). Where trees could not be directly accessed (ie. due to obstructions, and/or on neighbouring properties), trees were assessed as accurately as possible from nearby vantage points.

Locations of trees provided in the report are determined as accurately as possible based on the best information available. If official survey information is not provided, tree location in the report may not be exact. In this case, if trees occur on or near property boundaries, an official site survey may be required to determine ownership utilizing specialized survey protocol to gain precise location.

Furthermore, recommendations made in this report are based on the site plans that have been provided at the time of reporting. These recommendations may no longer be applicable should changes be made to the site plan and/or grading, servicing, or landscaping plans following report submission.

Notwithstanding the recommendations and conclusions made in this report, it must be recognized that trees are living organisms, and their health and vigor constantly change over time. They are not immune to changes in site conditions or seasonal variations in the weather conditions. Any tree will fail if the forces applied to the tree exceed the strength of the tree or its parts.

Although every effort has been made to ensure that this assessment is reasonably accurate, the trees should be re-assessed periodically. The assessment presented in this report is valid at the time of inspection.

Table 1. Tree Inventory

Location: Toronto Zoo Orangutan Enclosure

Date: 23 October 2019 Surveyors: CB

Tree #	Common Name	Scientific Name	DBH	TI	CS	CV	CDB	DL	mTPZ	cat.	Comments	Action
528	Manitoba Maple	*Acer negundo*	27	F	F-G	F			3.6	4	Lean (L), epicormic branching (L), poor form (M), seam (L)	Retain
529	Silver Maple	*Acer saccharinum*	23	F-G	G	G			3.6	4	Lean (L), stem wound (M), epicormic branching (L), wrapped in chainlink fence	Retain
530	Silver Maple	*Acer saccharinum*	32	F-G	F-G	F-G			4.8	4	Stem wound (M), epicormic branching (L), wrapped in chainlink fence	Retain
531	Black Locust	*Robinia pseudoacacia*	4	F	G	G			1.2	4	Growing against building	Remove
532	Silver Maple	*Acer saccharinum*	31	F-G	F	F-G			4.8	4	Lean (VL), bowed (M), epicormic branching (M), stem wound (L), wrapped in chainlink fence	Retain
533	Silver Maple	*Acer saccharinum*	26	G	F-G	G			3.6	4	Lean (VL), asymmetrical crown (L), wrapped in chainlink fence	Remove
534	Silver Maple	*Acer saccharinum*	21	G	G	G			3.6	4	Lean (VL)	Remove
535	Sugar Maple	*Acer saccharum*	20.5	F	F	F	30		3.6	4	Deadwood (M), lean (L), asymmetrical crown (L)	Remove
536	Eastern White Cedar	*Thuja occidentalis*	19, 25	F	F	F			3.6	4	V-union at 1m, 1 dead stem at base, lost leader	Remove
537	Manitoba Maple	*Acer negundo*	31, 10.5	F	F	F			4.8	4	1 pruned stem at base, included fence (L), poor union at base, bowed (M)	Remove
538	Sugar Maple	*Acer saccharum*	26	G	G	G			3.6	4	Union at base, peeling bark, pruning wounds (L), asymmetrical crown (L)	Retain
539	Sugar Maple	*Acer saccharum*	13.5, 11	F	F-G	F			3.6	4	Stem wound (H), deadwood (M), epicormic branching (L), cavity (M), poor union at 2m	Retain
540	Manitoba Maple	*Acer negundo*	38	P-F	F	F			4.8	4	Coppice growth (L)	Retain
541	Sugar Maple	*Acer saccharum*	19	F-G	F-G	F-G			3.6	4	Asymmetrical crown (L), scale (M), growth deficit (L)	Remove

542	Sugar Maple	*Acer saccharum*	23.5	F-G	F	F			3.6	4	Deadwood (M), asymmetrical crown (M)	Remove
543	Sugar Maple	*Acer saccharum*	12	F-G	F	F-G			3.6	4	Crowded by Tree 544	Retain
544	Sugar Maple	*Acer saccharum*	34	G	G	G			4.8	4	Deadwood (L)	Retain
545	Sugar Maple	*Acer saccharum*	13	F-G	F-G	F-G			3.6	4	Asymmetrical crown (M), sweep (L)	Retain
546	Sugar Maple	*Acer saccharum*	10	F-G	G	G			3.6	4	Sweep (M)	Retain
547	Sugar Maple	*Acer saccharum*	28	F	F-G	F-G			3.6	4	Crook (M), seam (L), poor form (L)	Retain
548	Green Ash	*Fraxinus pennsylvanica*	5	G	G	G			1.2	4		Remove
549	Manitoba Maple	*Acer negundo*	40	P	P	P			4.8	4	Failed at 2m, epicormic branching (M)	Remove
550	Manitoba Maple	*Acer negundo*	30	F-G	G	G			4.8	4	Lean (L)	Retain
551	Eastern White Cedar	*Thuja occidentalis*	29.5	F-G	F-G	F-G			3.6	4	Crook (M), lean (VL), poor form (L)	Remove
552	Eastern White Cedar	*Thuja occidentalis*	17	G	G	G			3.6	4	Bowed (VL)	Remove
553	Eastern White Cedar	*Thuja occidentalis*	29.5, 20	F	F-G	F-G			3.6	4	Lean (M), v-union at 0.6m	Retain
554	Eastern White Cedar	*Thuja occidentalis*	17.5	F	F-G	F-G			3.6	4	Sweep (H), lean (M)	Remove
555	Eastern White Cedar	*Thuja occidentalis*	13	G	F-G	G			3.6	4	Crooks	Remove
556	Manitoba Maple	*Acer negundo*	30	F	P	F-G			4.8	4	Bowed (H), poor form (H)	Remove
557	Eastern White Cedar	*Thuja occidentalis*	21.5	G	G	G			3.6	4	Poor form (L)	Retain
558	Trembling Aspen	*Populus tremuloides*	23	G	F	F-G			3.6	4	Poor form (M)	Retain
559	Basswood	*Tilia americana*	23.5	G	G	G			3.6	4	Epicormic branching (L)	Retain
560	Basswood	*Tilia americana*	26	F-G	F-G	G			3.6	4	Coppice growth (L), lean (L)	Retain
561	Trembling Aspen	*Populus tremuloides*	14.5	G	G	G			3.6	4		Retain
562	Eastern White Cedar	*Thuja occidentalis*	23.5, 18	P	P	P-F			3.6	4	Split union at 1m, lost leaders	Remove
563	Eastern White Cedar	*Thuja occidentalis*	13	F-G	G	G			3.6	4	Sweep (M)	Remove
564	Basswood	*Tilia americana*	20.5	G	G	G			3.6	4		Remove
565	Basswood	*Tilia americana*	18.5	G	G	G			3.6	4	Coppice growth (L)	Remove

566	Manitoba Maple	*Acer negundo*	42	F	F	F			6.0	4	Pruning wounds (M) near base, bowed (M), deadwood (M), broken branches (L)	Remove
567	Trembling Aspen	*Populus tremuloides*	18	F-G	F	F-G			3.6	4	Poor form (M)	Remove
568	White Elm	*Ulmus americana*	46.5	G	F-G	F-G			6.0	4	Epicormic branching (M)	Remove
569	Basswood	*Tilia americana*	21	G	F-G	G			3.6	4	Coppice growth (M)	Remove
570	Silver Maple	*Acer saccharinum*	10, 6.5	G	F-G	G			3.6	4	Union at base, poor form (L)	Retain
571	Basswood	*Tilia americana*	~26	G	G	G			3.6	4		Retain
572	Largetooth Aspen	*Populus grandidentata*	8.5	F-G	G	G			1.2	4	Crook (M), sweep (M)	Retain
573	Tree-of-heaven	*Ailanthus altissima*	4, 2	F-G	G	G			1.2	4	Stem wound (M), clump of 2	Remove
574	White Elm	*Ulmus americana*	8, 10.5	F-G	F-G	F-G			3.6	4	Union at 0.1m	Remove
575	Eastern Hemlock	*Tsuga canadensis*	12	F-G	F	F			3.6	4	Sweep (L), asymmetrical crown (L)	Remove
576	Black Cherry	*Prunus serotina*	32.5	F-G	F-G	F-G			4.8	4	Union at 1.6m, sweep (L), deadwood (L), asymmetrical crown (L)	Retain
577	Sugar Maple	*Acer saccharum*	12.5, 6	G	F-G	F-G			3.6	4	Asymmetrical crown (M), union at base	Retain
578	Basswood	*Tilia americana*	14.5, 19, 8.5	F	F-G	F-G			3.6	4	Bowed (L), union at 0.2m, epicormic branching (L), stem wound (L)	Retain
579	White Elm	*Ulmus americana*	50	F-G	F	F-G			6.0	4	Asymmetrical crown (M)	Retain
580	Sugar Maple	*Acer saccharum*	12	F	G	F-G			3.6	4	Stem wound (H)	Retain
581	Sugar Maple	*Acer saccharum*	12, 9.5, 8.5	F-G	F-G	F-G			3.6	4	Union at base, asymmetrical crown (M)	Retain
582	Scots Pine	*Pinus sylvestris*	22.5	F	P-F	F			3.6	4	Lost leader, poor form (H)	Retain
583	Basswood	*Tilia americana*	11	F-G	F	F-G			3.6	4	Asymmetrical crown (M), lean (L)	Retain
584	Sugar Maple	*Acer saccharum*	12	G	F-G	F-G			3.6	4	Asymmetrical crown (L)	Retain
585	Ironwood	*Ostrya virginiana*	10.5	G	F-G	F-G			3.6	4	Asymmetrical crown (M)	Retain
586	Sugar Maple	*Acer saccharum*	5.5	G	F-G	F-G			1.2	4	Asymmetrical crown (L)	Retain
587	Sugar Maple	*Acer saccharum*	10.5	F	G	G			3.6	4	Stem wound (H)	Retain
588	Red Oak	*Quercus rubra*	34	F-G	G	G			4.8	4	Asymmetrical crown (L), lean (L)	Retain
589	Sugar Maple	*Acer saccharum*	12	G	F-G	G			3.6	4	Grapevine competition (M), asymmetrical crown (L)	Retain

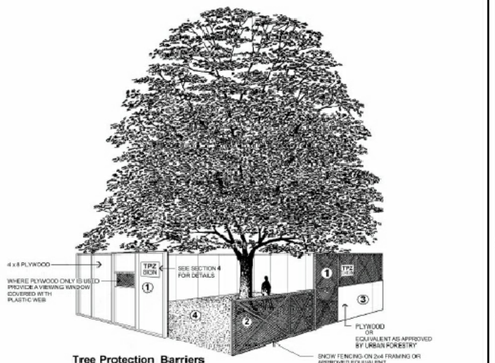
590	Ironwood	*Ostrya virginiana*	6	G	G	G			1.2	4		Retain
591	Ironwood	*Ostrya virginiana*	12	G	F-G	F-G			3.6	4	Lean (L), asymmetrical crown (L)	Retain
592	Sugar Maple	*Acer saccharum*	8	G	G	G			1.2	4		Retain
593	Sugar Maple	*Acer saccharum*	12	G	F-G	F-G			3.6	4	Asymmetrical crown (M)	Retain
594	White Elm	*Ulmus americana*	15	F	F	F			3.6	4	Crook (M), asymmetrical crown (M), grapevine competition (L)	Retain
595	Sugar Maple	*Acer saccharum*	9.5	G	F-G	F-G			1.2	4	Asymmetrical crown (L)	Retain
596	Sugar Maple	*Acer saccharum*	29.5	G	F-G	F-G			3.6	4	Broken branches (M)	Retain
597	Sugar Maple	*Acer saccharum*	~25, 20	F	F-G	F-G			3.6	4	Asymmetrical crown (L), v-union at 2m with fused stems	Retain
598	Sugar Maple	*Acer saccharum*	21	G	G	G			3.6	4	Asymmetrical crown (M)	Retain
599	Sugar Maple	*Acer saccharum*	8	G	F	F-G			1.2	4		Retain
600	Sugar Maple	*Acer saccharum*	34	F	F-G	F-G			4.8	4	V-union at 2.5m	Retain
901	White Birch	*Betula papyrifera*	19	F-G	G	F-G			3.6	4	Stem wound (L), lean (L)	Retain
902	Basswood	*Tilia americana*	21	G	G	G			3.6	4	Coppice growth (L), lean (L)	Retain
903	Sugar Maple	*Acer saccharum*	10	G	F-G	F-G			3.6	4	Asymmetrical crown (L), stem wound (L)	Retain
904	Sugar Maple	*Acer saccharum*	23	F	F-G	F-G			3.6	4	V-union at 4m with included bark (H)	Retain
905	Sugar Maple	*Acer saccharum*	13	G	G	G			3.6	4		Retain
906	Sugar Maple	*Acer saccharum*	39.5	P	F-G	F-G			4.8	4	Split Union at 4m, => Hazard - remove or cable	Retain
907	Sugar Maple	*Acer saccharum*	25.5	F-G	F-G	F-G			3.6	4	Lean (L)	Retain
908	Apple species	*Malus spp.*	25	F	F	F			3.6	4	Epicormic branching (M), pruning wounds (L)	Remove
909	Sugar Maple	*Acer saccharum*	7	G	G	G			1.2	4		Remove
910	Sugar Maple	*Acer saccharum*	18	G	G	G			3.6	4		Remove
911	White Elm	*Ulmus americana*	23	G	G	G			3.6	4		Retain
912	Red Oak	*Quercus rubra*	17	F-G	F-G	G			3.6	4	Asymmetrical crown (L), poor form (L)	Retain
913	Manitoba Maple	*Acer negundo*	6.5, 5	F	F	F			1.2	4	Union at base, pruning wounds (M), epicormic branching (M)	Retain
914	Sugar Maple	*Acer saccharum*	72.5	G	G	F-G		8	9.6	4	Previously tagged 204	Retain
915	White Elm	*Ulmus americana*	19.5	G	F-G	F-G		10	3.6	4	Previously tagged 257, asymmetrical crown (L)	Retain
916	Sugar Maple	*Acer saccharum*	70	F-G	F-G	F-G		10	8.4	4	Poor form (L), previously tagged 259	Retain

917	White Elm	*Ulmus americana*	14	G	F-G	F-G		3.5	3.6	4	Asymmetrical crown (L), growing against railing	Retain
918	White Elm	*Ulmus americana*	6	G	G	G		2	1.2	4		Retain
919	Tree-of-heaven	*Ailanthus altissima*	16.5	F-G	F-G	G		5	3.6	4	Asymmetrical crown (M), lean (L)	Retain
920	Eastern White Cedar	*Thuja occidentalis*	16	F	F	F		5	3.6	4	Bowed (M), stem wound (M), crown touching building	Retain
921	Eastern White Cedar	*Thuja occidentalis*	22	F-G	F-G	F-G		2.5	3.6	4	Previously tagged 172, stem wound (M)	Retain
922	Sugar Maple	*Acer saccharum*	25	G	G	G		4.5	3.6	4	Previously tagged 203	Remove
923	Sugar Maple	*Acer saccharum*	17	G	G	G		2.5	3.6	4	Previously tagged 174	Retain
924	Sugar Maple	*Acer saccharum*	32.5	F	F	P		9	4.8	4	Previously tagged 201, marked for removal (declining)	Remove (condition)
925	Sugar Maple	*Acer saccharum*	14.5	G	G	G		2	3.6	4		Retain
926	Sugar Maple	*Acer saccharum*	40	F	F-G	F-G		8	4.8	4	Deadwood (M), asymmetrical crown (L), stem wound (L), lean (L)	Remove
927	Basswood	*Tilia americana*	26.5, 21	F-G	F-G	F-G		3	3.6	4	V-unon at 0.4m, asymmetrical crown (L), growing against walk	Retain
928	White Pine	*Pinus strobus*	38	F-G	F-G	F	20	5.5	4.8	4	Previoulsy tagged 202, deadwood (M)	Remove
929	Sugar Maple	*Acer saccharum*	5.5	G	G	G		2.5	1.2	4		Retain
930	Sugar Maple	*Acer saccharum*	4	G	F	G		2	1.2	4	Asymmetrical crown (M)	Retain
931	White Elm	*Ulmus americana*	18	G	P-F	G		11	3.6	4	Asymmetrical crown (H)	Retain
932	Sugar Maple	*Acer saccharum*	9	G	G	G		3	1.2	4		Retain
933	Eastern Hemlock	*Tsuga canadensis*	22.5	F	P-F	P-F	50		3.6	4		Retain
934	White Elm	*Ulmus americana*	4.5	G	G	G			1.2	4		Retain
935	Green Ash	*Fraxinus pennsylvanica*	13	F	F	F			3.6	4	Bowed (M)	Retain
936	White Pine	*Pinus strobus*	31	F-G	F-G	F-G	20		4.8	4	Asymmetrical crown (M)	Retain
937	Sugar Maple	*Acer saccharum*	18	F	F	F	20		3.6	4	Asymmetrical crown (M)	Retain
938	Sugar Maple	*Acer saccharum*	37.5	F-G	F-G	F-G		3	4.8	4	Lean (L), asymmetrical crown (L)	Retain
939	Sugar Maple	*Acer saccharum*	7	G	G	G		2	1.2	4		Retain
940	Sugar Maple	*Acer saccharum*	21.5	G	F-G	G		3	3.6	4	Asymmetrical crown (L)	Remove
941	Sugar Maple	*Acer saccharum*	8.5	G	G	G		1	1.2	4		Retain
942	American Beech	*Fagus grandifolia*	18, 30, 36	F	F-G	F-G		8	4.8	4	Poor union at 0.5m with cavity	Remove

943	Sugar Maple	*Acer saccharum*	11.5	G	G	G		3	3.6	4		Remove
944	Sugar Maple	*Acer saccharum*	6	F-G	G	G		2	1.2	4	Sweep (M)	Retain
945	American Beech	*Fagus grandifolia*	6	G	F-G	G		3	1.2	4	Asymmetrical crown (L)	Retain
946	Sugar Maple	*Acer saccharum*	5	G	G	G		2	1.2	4		Retain
947	Black Cherry	*Prunus serotina*	35	F-G	F-G	F-G		4	4.8	4	Sweep (M)	Remove
948	Manitoba Maple	*Acer negundo*	24	F	F	F		4	3.6	4	Bowed (M)	Retain
949	White Birch	*Betula papyrifera*	28.5	F	F	F		8	3.6	4	Bowed (L)	Retain
950	White Elm	*Ulmus americana*	19	G	F-G	G		5	3.6	4	Bowed (L)	Retain
951	Sugar Maple	*Acer saccharum*	26.5	F	G	F-G		4	3.6	4	Fused with 952, stem wound (M)	Retain
952	White Birch	*Betula papyrifera*	23	F	F	F-G		4	3.6	4	Bowed (M)	Retain
953	Basswood	*Tilia americana*	9, 7	G	G	G		3	1.2	4	Union at 0.1m	Retain
954	Manitoba Maple	*Acer negundo*	14	F-G	G	G		3	3.6	4	Sweep (L)	Remove
955	Sugar Maple	*Acer saccharum*	11.5	G	F-G	G		1.5	3.6	4	Asymmetrical crown (L)	Remove
956	Sugar Maple	*Acer saccharum*	13, 11	F-G	G	G		3.5	3.6	4	Union at base	Remove
957	White Ash	*Fraxinus americana*	9.5	F	P	P		3.5	1.2	4	Emerald Ash Borer, asymmetrical crown (L)	Remove
958	Sugar Maple	*Acer saccharum*	15.5	F	F	P-F	50	2.5	3.6	4	1 dead stem, stem wound (M)	Remove
959	White Ash	*Fraxinus americana*	14, 7	F	P	P		2	3.6	4	Union at base, Emerald Ash Borer	Remove
960	White Ash	*Fraxinus americana*	10.5, 5.5	F	P	P		2	3.6	4	Union at base, Emerald Ash Borer	Remove
961	White Ash	*Fraxinus americana*	8	F	P	P		2	1.2	4	Emerald Ash Borer	Remove
962	White Birch	*Betula papyrifera*	28	F	F	F-G		4	3.6	4	Lean (M), poor form (M)	Remove
963	Sugar Maple	*Acer saccharum*	9	G	G	G		2	1.2	4		Remove
964	White Ash	*Fraxinus americana*	9	F	P	P		2	1.2	4	Emerald Ash Borer	Remove
P1	Field Maple	*Acer campestre*	<5	G	G	G			1.2	4	5 trees	Retain
A	Eastern White Cedar	*Thuja occidentalis*	~14, 9	G	G	G			3.6	4	Union at base	Retain
B	Manitoba Maple	*Acer negundo*	~38	F	F	F			4.8	4	Bowed (M), stem wound (M)	Retain
C	White Elm	*Ulmus americana*	~12	G	F-G	G			3.6	4	Deadwood (L), asymmetrical crown (M)	Retain
D	Sugar Maple	*Acer saccharum*	~20	G	G	G			3.6	4		Retain
E	Sugar Maple	*Acer saccharum*	~14	G	G	G			3.6	4		Retain
F	White Pine	*Pinus strobus*	~34	G	G	G			4.8	4		Retain
G	Sugar Maple	*Acer saccharum*	~9	G	G	G			1.2	4		Retain

H	Sugar Maple	*Acer saccharum*	~14	G	G	G			3.6	4		Retain
I	Norway Maple	*Acer platanoides*	~14	F-G	F-G	F-G			3.6	4	Sweep (L), crook (M), grapevine competition (L), asymmetrical crown (L)	Retain

Codes		
DBH	Diameter at Breast Height	*(cm)*
TI	Trunk Integrity	*(G, F, P)*
CS	Crown Structure	*(G, F, P)*
CV	Crown Vigor	*(G, F, P)*
CDB	Crown Die Back	*(%)*
Cat.	City of Toronto Tree Category	*1, 2, 3, 4, 5*
DL	Dripline	*(m)*
mTPZ	Minimum Preservation Zone	*(m)*
~ = estimate; (VL) = very light; (L) = light; (M) = moderate; (H) = heavy		



Tree Protection Barriers

1. Tree protection barriers must be constructed with a solid wood frame clad with plywood or approved equivalent. Height of hoarding may be less than 8 ft. to accomodate any branches that may be lower.
2. Tree protection barriers for trees situated on the City road allowance where visibility must be maintained can be 1.2m (4ft.) high and consist of orange plastic web snow fencing on a wood frame made of 2 x 4s .
3. Where some excavate or fill has to be temporarily located near a tree protection barrier, plywood must be used to ensure no material enters the Tree Protection Zone.
4. No construction activity, grade changes, surface treatment or excavations of any kind is permitted within the Tree Protection Zone.

Note:
Sediment control fencing shall be installed in locations indicated in an Urban Forestry approved Tree Protection Plan. The sediment control fencing must be installed to Ontario Provicial Standards (OPSD-219.130) heavy duty silt fence barrier and to the satisfaction of Urban Forestry. See Detail TP-2

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Urban Forestry — Parks, Forestry and Recreation
February 2016 — **Detail TP-1**

TORONTO
Parks, Forestry & Recreation

Tree Protection Zone (TPZ)

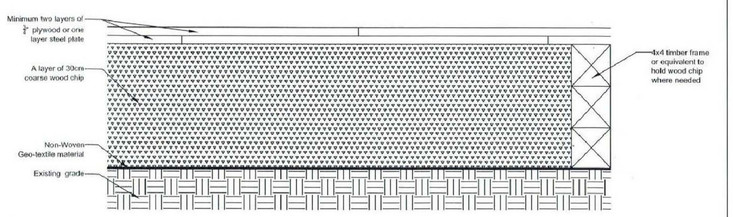
All construction related activities, including grade alteration, excavation, soil compaction, any materials or equipment storage, disposal of liquid and vehicular traffic are NOT permitted within this TPZ.

This tree protection barrier must remain in good condition and must not be removed or altered without authorization of City of Toronto, Urban Forestry.

Concerns or inquiries regarding this TPZ can be directed to:
311 or 311@toronto.ca

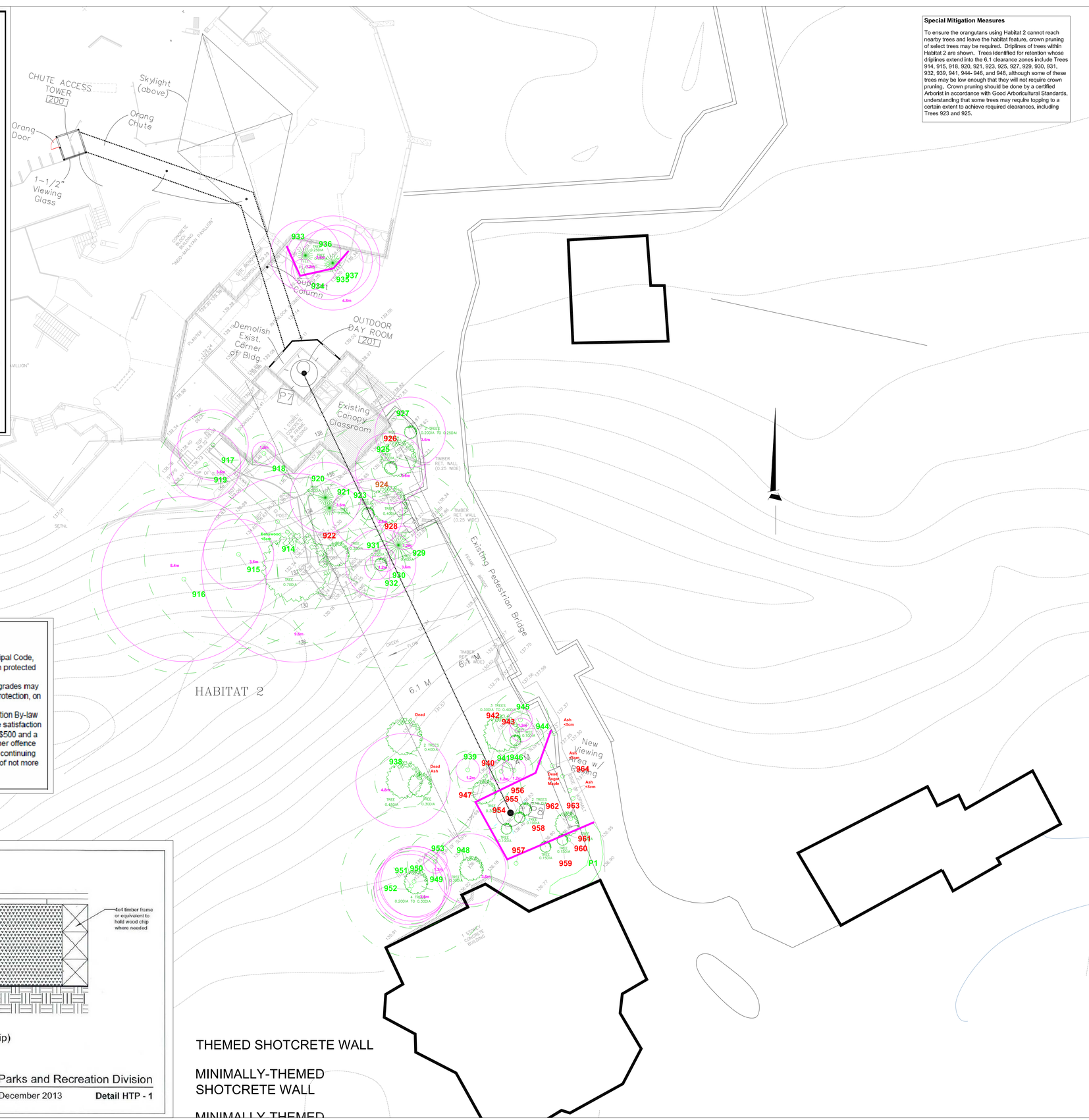
Ravine & Natural Feature Protection By-law

The Ravine & Natural Feature Protection By-law, Chapter 658 of the City of Toronto Municipal Code, regulates the injury and destruction of trees, dumping of refuse and changes to grade within protected areas.
Under this by-law protected trees may not be removed, injured or destroyed, and protected grades may not be altered, without written authorisation from Urban Forestry Ravine & Natural Feature Protection, on behalf of the General Manager of Parks, Forestry & Recreation.
Convictions of offences respecting the regulations in the Ravine and Natural Feature Protection By-law are subject to fines, and the landowner may be ordered by the court to restore the area to the satisfaction of the City. A person convicted of an offence under this Bylaw is liable to a minimum fine of $500 and a maximum fine of $100,000 for each tree destroyed, a maximum fine of $100,000 for any other offence committed under this chapter, and /or a Special Fine of $100,000. A person convicted of a continuing offence, including failure to comply with ravine permit conditions is liable to a maximum fine of not more than $10,000 for each day or a part of a day that the offence continues.



Horizontal Tree Protection (Wood Chip)

TORONTO
Urban Forestry Services — Parks and Recreation Division
December 2013 — **Detail HTP - 1**



Special Mitigation Measures

To ensure the orangutans using Habitat 2 cannot reach nearby trees and leave the habitat feature, crown pruning of select trees may be required. Driplines of trees within Habitat 2 are shown. Trees identified for retention whose driplines extend into the 6.1 clearance zones include Trees 914, 915, 918, 920, 921, 923, 925, 927, 929, 930, 931, 932, 939, 941, 944- 946, and 948, although some of these trees may be low enough that they will not require crown pruning. Crown pruning should be done by a certified Arborist in accordance with Good Arboricultural Standards, understanding that some trees may require toppling to a certain extent to achieve required clearances, including Trees 923 and 925.

LEGEND

Tree Inventory

Refer to Table 1 of report dated 30 October 2019 for complete tree inventory information. All trees on and within 12 metres of the subject areas with the potential to be impacted were included in the inventory.

Tree Removals

The removal of 47 tree will be required to accommodate the proposed construction. One tree is identified for removal due to its condition. Tree removals are indicated with RED and ORANGE labels.

Tree Preservation

The preservation of all other trees will be possible with the use of appropriate tree protection measures. Minimum tree preservation zones (mTPZ's) and required tree preservation hoarding are indicated in MAGENTA. mTPZ's indicate minimum distances for construction and disturbance adjacent to trees. Trees identified for preservation are indicated with GREEN labels.

Tree label (RED), removal recommended	X
Tree label (GREEN), preservation recommended	X
Tree label (ORANGE), removal recommended due to condition	X
Minimum tree protection zone (with radius in metres, as measured from edge of stem)	xm
Tree preservation fencing	
Dripline	
Tree location estimated by KFCI	

TREE PROTECTION PLAN NOTES

- It is the applicants' responsibility to discuss potential impacts to trees located near or wholly on adjacent properties or on shared boundary lines with their neighbours. Should such trees be injured to the point of instability or death the applicant may be held responsible through civil action. The applicant would also be required to replace such trees to the satisfaction of Urban Forestry.
- Tree protection barriers shall be installed to standards as detailed in this document and to the satisfaction of Urban Forestry.
- Tree protection barriers must be installed using plywood clad hoarding (minimum 19mm or ¾" thick) or an equivalent approved by Urban Forestry.
- Where required, signs as specified in Section 4, Tree Protection Signage must be attached to all sides of the barrier.
- Prior to the commencement of any site activity such as site alteration, demolition or construction, the tree protection measures specified on this plan must be installed to the satisfaction of Urban Forestry.
- Once all tree/site protection measures have been installed, Urban Forestry staff must be contacted to arrange for an inspection of the site and approval of the tree/site protection requirements. Photographs that clearly show the installed tree/site protection shall be provided for Urban Forestry review.
- Where changes to the location of the approved TPZ or sediment control or where temporary access to the TPZ is proposed, Urban Forestry must be contacted to obtain approval prior to alteration.
- Tree protection barriers must remain in place and in good condition during demolition, construction and/or site disturbance, including landscaping, and must not be altered, moved or removed until authorized by Urban Forestry.
- No construction activities including grade changes, surface treatments or excavation of any kind are permitted within the area identified on the Tree Protection Plan or Site Plan as a minimum tree protection zone (TPZ). No root cutting is permitted. No storage of materials or fill is permitted within the TPZ. No movement or storage of vehicles or equipment is permitted within the TPZ. The area(s) identified as a TPZ must be protected and remain undisturbed at all times.
- All additional tree protection or preservation requirements, above and beyond the installation of tree protection barriers, must be undertaken or implemented as detailed in the Urban Forestry approved arborist report and/or the approved tree protection plan and to the satisfaction of Urban Forestry.
- If the minimum tree protection zone (TPZ) must be reduced to facilitate construction access, the tree protection barriers must be maintained at a lesser distance and the exposed portion of TPZ must be protected using a horizontal root protection method approved by Urban Forestry.
- Any roots or branches indicated on this plan which require pruning, as approved by Urban Forestry, must be pruned by an arborist. All pruning of tree roots and branches must be in accordance with good arboricultural practice. Roots that have received approval from Urban Forestry to be pruned must first be exposed using pneumatic (air) excavation, by hand digging or by a using low pressure hydraulic (water) excavation. The water pressure for hydraulic excavation must be low enough that root bark is not damaged or removed. This will allow a proper pruning cut and minimize tearing of the roots. The arborist retained to carry out crown or root pruning must contact Urban Forestry no less than three working days prior to conducting any specified work.
- The applicant/owner shall protect all by-law regulated trees in the area of consideration that have not been approved for removal throughout development works to the satisfaction of Urban Forestry.
- Convictions of offences respecting the regulations in the Street Tree By-law and Private Tree By-law are subject to fines. A person convicted of an offence under these by-laws is liable to a minimum fine of $500 and a maximum fine of $100,000 per tree, and /or a Special Fine of $100,000. The landowner may be ordered by the City to stop the contravening activity or ordered to undertake work to correct the contravention.
- Prior to site disturbance the owner must confirm that no migratory birds are making use of the site for nesting. The owner must ensure that the works are in conformance with the Migratory Bird Convention Act and that no migratory bird nests will be impacted by the proposed work no less than 48 hours prior to conducting any specified work.

No.	Issue/Revisions	Date	By
1	Report Submission	30 Oct. '19	CB

Base Data: Tom. A Senkus (topo), Jones and Jones Architects and Landscape Architects, Ltd. (site plan)

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Client
Toronto Zoo
361A Old Finch Avenue
Toronto, ON M1B 5K7

Property
Toronto Zoo - Orangutan Enclosure, Habitat 2
Toronto, Ontario

Existing Conditions, Proposed Site Plan
Tree Inventory & Preservation Plan

Project	P2221
Date	30 October 2019
Scale	1:200
Figure	1b