toronto
ZOO
MASTER PLAN

APPENDIX 4.
COSTING SUMMARY

FEBRUARY, 2022

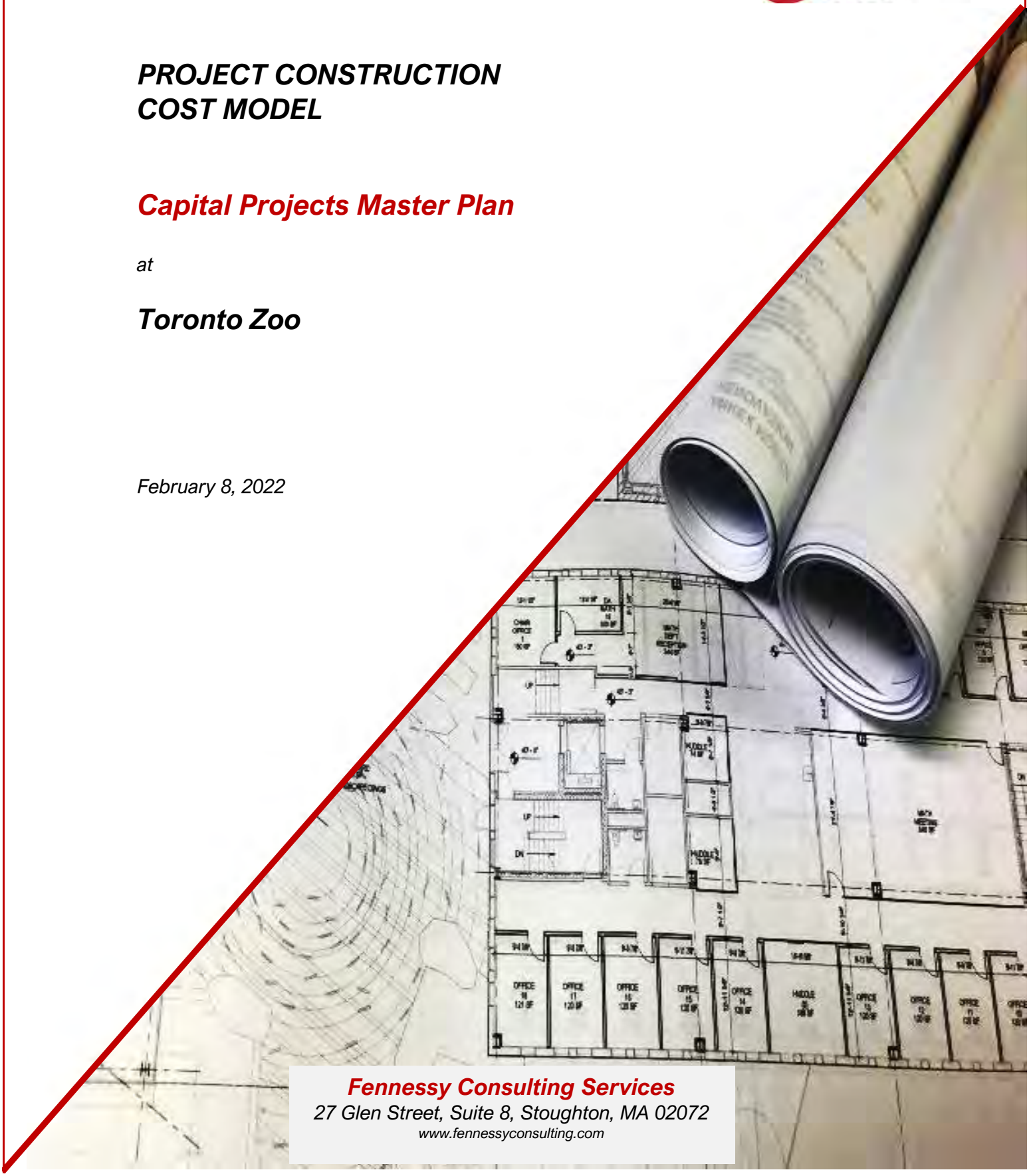
PROJECT CONSTRUCTION COST MODEL

Capital Projects Master Plan

at

Toronto Zoo

February 8, 2022



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February 8, 2022

Leona Mitchell
Director, Facilities & Infrastructure
Toronto Zoo
361A Old Finch Avenue
Canada

TORONTO ZOO - Capital Projects Master Plan, Toronto, Canada

Dear Leona:

Please find enclosed our Construction Cost Report for the above referenced project based on master plan design information prepared by you and your design team, dated on December 6, 2021.

All costs in Canadian Dollars

	Const. Start	Area (m2)	Construction Cost	Project Cost
1. The Conservation Campus II	Jul-23	4,321	$37,323,514	$45,534,687
2. New Indoor Winter Viewing and Holding	Jul-23	4,299	$28,643,648	$34,945,250
3. Jaguar Habitat Expansion	Jul-23	628	$17,150,076	$20,923,093
4. African Rainforest Pavilion Refurbishment (Gorillanc	Jul-23	7,082	$26,184,717	$31,945,355
5. The Saving Species Sanctuary	Jul-23	600	$9,338,731	$11,393,252
6. Wilderness North and Art Walk	Jul-23	477	$8,933,331	$10,898,664
7. Nutrition Centre and Restaurant	Jul-23	1,486	$18,451,315	$22,510,604
8. Americas Pavilion Redevelopment	Jul-23	1,831	$44,042,996	$53,732,455
9. The Safari Meander	Jul-23		$29,587,628	$36,096,907
10. Forage Farm, Café and Demonstration Site	Jul-23	545	$6,137,002	$7,487,143
11. The Daycare	Jul-23	489	$7,151,047	$8,724,278
12. Tigerline, Sumatran Tiger Habitat + Holding	Jul-23	813	$20,658,127	$25,202,916
13. Zoo Brewery and Malayan Woods Renewal	Jul-23	868	$7,768,877	$9,478,030
14. The Winter Zoo	Jul-23		$2,763,130	$3,371,018
15. Core Woods Picnic Area	Jul-23		$270,671	$330,219
16. Sumatran Tiger Boardwalk and Habitat	Jul-23			By others
17. Red Panda Climate - Controlled Viewing Bldg.	Jul-23	21	$259,490	$316,578
TOTAL PROJECT COST			***$264,664,300***	***$322,890,449***

Bidding conditions are expected to reflect competitive bidding to prequalified general contractors and sub-contractors, open specifications for materials and manufactures.

This estimate of construction costs includes all direct construction costs, general contractor's overhead and profit and design contingency. Cost escalation assumes start dates indicated above.

Excluded from the estimate are all animal acquisition, staff training costs and hazardous materials/waste disposal costs. All other soft costs such as: construction contingency, loose furnishings and equipment, designer fees, moving, administrative and financing costs have been include as a 20% soft cost multiplier.

The estimate is based on prevailing union rates for construction (not necessarily unionized contractors) in this market and represents a reasonable opinion of cost. It is not a prediction of the successful bid from a contractor as bids will vary due to fluctuating market conditions, errors and omissions, proprietary specifications, lack or surplus of bidders, perception of risk, etc. Consequently the estimate is expected to fall within the range of bids from a number of competitive contractors or subcontractors, however we do not warrant that bids or negotiated prices will not vary from the final construction cost estimate.

If you have any questions or require further analysis please do not hesitate to contact us.

Sincerely,

Seamus Fennessy

Seamus Fennessy MRICS
Principal/Owner

Enclosures

Contents

Executive Summary

The Project

This project in Toronto, Canada comprises of a master plan to improve the existing zoo. A total of seventeen significant program changes/improvements are identified, sixteen of which are addressed in this cost report. They range in complexity form large buildings with exhibits to smaller site interventions.

Financial Status

Our construction cost model for the entire project is in the order of ***$264.7MM****. Within this total we are including $37.5MM of contingencies and $18.5MM of future price escalation to the projected construction schedule. Adding project soft costs increases this total to* ***$322.9MM****.*

Risk

A formal risk analysis has not been performed for this project. Some risk factors to be considered at this time include:

- *Design Contingency*
- *Escalation/Market risk*
- *Construction/Payment default*
- *Approvals process/Funding*

Design Contingency

This construction cost model is based on master plan documentation. Due to this incomplete nature of the design we have utilized historic data and personal experience to complete this cost model. To help alleviate possible cost increases as a result of design completion we recommend a ***design contingency of 18%.*** *We have included this contingency in our cost model. As design progresses this contingency will reduce.*

Escalation/Market Risk

North America has come through the worst of the economic impact that materialized with Covid 19. However it is still with us and still having major impacts on construction costs. Outside of the general and well documented issues relating to the supply chain (material shortages, containers in wrong locations and a worldwide shortage of truck drivers) and labour shortages the industry demand itself grew substantially in 2021 and is expected to continue that growth in 2022.

The continuing higher material prices, shortages of key materials and lack of skilled labour will all contribute to inflationary pressures on construction prices. However the pace of inflation is likely to ease as the economy returns to a more normal and sustainable level of output later in the year.

For these reasons we are continuing to recommend an annual escalation factor of 5-6% for 2022 dropping to 4.5- 5% in 2023. We have ***included an escalation factor of 7.5%*** *in this cost report. As we move closer to bid date we will continue to review and adjust the escalation factor as appropriate. It is possible that a higher escalation factor will be required for later years.*

Construction/Payment Default

There is a real risk of contractors, subcontractors and material suppliers ceasing to exist due to their inability to honour low bids as material and labour prices increase. We highly recommend that each project has adequate protection in the form of sub guard (preferred) or bonding for both performance and payment. The current estimate includes for subcontractor bonding within the unit rates.

Approvals Process/Funding.

For the purpose of this report we have included both of these categories together. The risk here is that the funding and approvals process will take significantly longer than expected and hence subject this project to increases in price escalation. We have not included any such pressures in this cost model.

Peer/Comparable Projects

We at Fennessy Consulting Services do not like to compare individual projects against some perceived cost/sf. Our reasoning for this is based on the fact that no two projects are the same and as such a typical cost/sf is not all that applicable or reliable. We treat each project as a unique entity.

As a quality control measure we make comparisons of the various building component costs in this estimate against others. We make this comparison to verify that nothing is out of the ordinary. If we come across an abnormal component cost we double check this cost to ensure its accuracy.

Cost Estimate Prepared From	*Dated*	*Received*
Documentation issued for		
Master Plan	*6-Dec-21*	*27-Jan-22*
Discussions with the Project Architect and Engineers		

Conditions of Construction

The pricing is based on the following general conditions of construction

- *A start date of July 2023*
- *The general contract will be competitively bid to qualified general contractors and main subcontractors*
- *There will not be small business set aside requirements*
- *The contractor will be required to pay union wage rates but does not need to be unionized*
- *There are no phasing requirements*
- *The construction manager will have full access to the site during normal business hours*

The Cost Plan is based on the following conditions:

The costs in this report covers construction costs only calculated at current bidding price level (reflecting the current projected construction schedule) with a separate allowance for cost escalation.

Cost escalation is included to the mid point of the construction schedule. Unit rates in the body of the report include appropriate escalation allowances to deliver specific trades within the prescribed schedule if the project were to commence today.

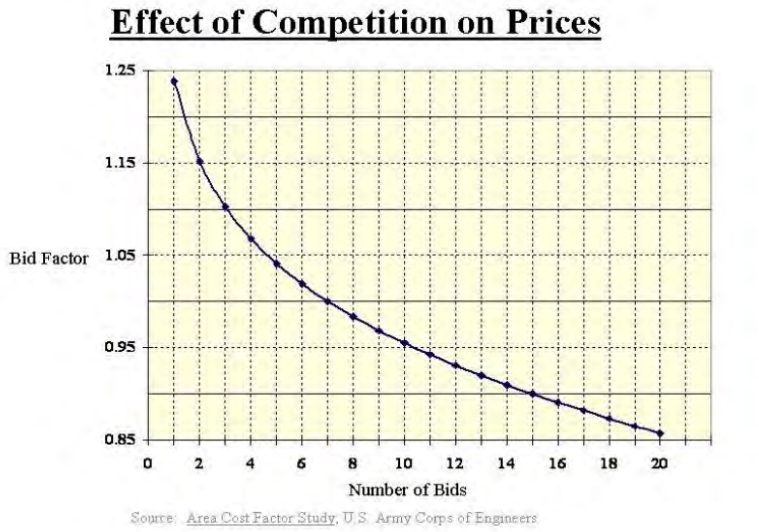
Cost associated with additional escalation required for future start date are included as a below the line markup. This report has included this additional escalation to the scheduled start date of construction noted in this report.

Bidding Process - Market Conditions

This document is based on the measurement and pricing of quantities wherever information is provided and/or reasonable assumptions for other work not covered in the drawings or specifications, as stated within this document. Unit rates have been obtained from historical records and/or discussion with contractors. The unit rates reflect current bid costs in the area.

All unit rates relevant to subcontractor work include the subcontractors' overhead and profit unless otherwise stated. The mark-ups cover the costs of field overhead, home office overhead and profit and range from 15% to 25% of the cost for a particular item of work.

Pricing reflects probable construction costs obtainable in the project locality on the date of this statement of probable costs. This estimate is a determination of fair market value for the construction of this project. It is not a prediction of low bid. Pricing assumes competitive bidding for every portion of the construction work for all subcontractors and general contractors, with a minimum of 5 bidders for all items of work. Experience and research indicates that a fewer number of bidders may result in higher bids, conversely an increased number of bidders may result in more competitive bids.



Exclusions

The following cost items have been excluded from this report. Many of these will in fact be required and should be budgeted within the "Soft Cost" component of the project budget

- *Hazardous material handling, disposal and abatement*
- *Compression of schedule, premium or shift work, and restrictions on the contractor's working hours*
- *Assessments, taxes, finance, legal and development charges*
- *Environmental impact mitigation*
- *Builder's risk, project wrap-up and other owner provided insurance program*
- *Land and easement acquisition*
- *Animal acquisition*
- *Cost escalation beyond a start date of July 2023*

Areas Calculation

	First Floor Area	Second Floor Area	Third Floor Area	Fourth & Fifth Floor Area	Total SF	Total M2
1. The Conservation Campus II						
1.1 Event Spaces and Transportation Hub	9,000				**9,000**	**836**
1.2 Hotel	2,500	15,253	7,872	11,875	**37,500**	**3,485**
1.3 Orangutan line	705				**705 LF**	**215 M**
1.4 Entrance Area/Plaza	131,300				**131,300**	**12,203**
2. New Indoor Winter Viewing and Holding						
2.1 Winter Holding Phase 1	25,000	5,000	500		**30,500**	**2,835**
2.2 Winter Holding Phase 2	14,250	1,500			**15,750**	**1,464**
3. Jaguar Habitat Expansion						
3.1 Jaguar/Flamingo Holding	6,760				**6,760**	**628**
3.2 Jaguar/Flamingo Habitat	25,240				**25,240**	**2,346**
3.3 Jaguar/Flamingo Tube	492				**492 LF**	**150 M**
4. African Rainforest Pavilion Refurbishment (Gorilland)						
4.1 Gorilland Structure Modification	22,467	53,733			**76,200**	**7,082**
4.2 Gorilla Tubes	1,489				**1,489 LF**	**454 M**
4.3 Gorilland Site (outside bldg.)	12,800				**12,800**	**1,190**
5. The Saving Species Sanctuary						
5.1 Sanctuary Structure	6,460				**6,460**	**600**
5.2 Sanctuary Site	74,744				**74,744**	**6,946**
6. Wilderness North and Art Walk						
6.1 Wilderness North Yurts	3,280				**3,280**	**305**
6.2 Wilderness North Pavilion	1,850				**1,850**	**172**
6.3 Wilderness North Artwalk	24,000				**24,000**	**2,230**
7. Nutrition Centre and Restaurant						
7.1 Greenhouse and Production Centre	3,900	3,900	200		**8,000**	**743**
7.2 Restaurant	3,900	3,900	200		**8,000**	**743**
7.3 Plaza	8,525				**8,525**	**792**
7.4 Courtyards	2,430				**2,430**	**226**
8. Americas Pavilion Redevelopment						
8.1 Americas Pavilion Structure	19,700				**19,700**	**1,831**
8.2 Americas Pavilion Site	2,200				**2,200**	**204**
9. The Safari Meander						
9.1 The Safari Meander Animal Bridge	8,000				**8,000**	**743**
9.2 The Safari Meander Bush Camp (10#)	30,000				**30,000**	**2,788**
9.3 The Safari Meander Site	317,088				**317,088**	**29,469**
10. Forage Farm, Café and Demonstration Site						
10.1 Café	3,770				**3,770**	**350**
10.2 Storage Shed	2,100				**2,100**	**195**
10.3 Forage Farm and Plaza	114,000				**114,000**	**10,595**
11. The Daycare						
11.1 The Daycare Building	5,260				**5,260**	**489**
11.2 The Daycare Site (plaza, dock & yard)	18,700				**18,700**	**1,738**
12. Tigerline, Sumatran Tiger Habitat + Holding						
12.1 Tigerline & Habitat Expansion Phase 1	29,431				**29,431**	**2,735**
12.2 Tigerline & Habitat Expansion Phase 2	27,310				**27,310**	**2,538**
12.3 Habitat Expansion & Structure Phase 3	8,750				**8,750**	**813**

	First Floor Area	Second Floor Area	Third Floor Area	Fourth & Fifth Floor Area	Total SF	Total M2
13. Zoo Brewery and Malayan Woods Renewal						
13.1 Malayan Woods Pavilion Renovation	5,300				**5,300**	**493**
13.2 Brewery Building	4,030				**4,030**	**375**
13.3 Brewery Plaza	3,500				**3,500**	**325**
14. The Winter Zoo						
14.1 Winter Zoo Mobile Structures (assumed 12#)	3,000				**3,000**	**279**
14.2 Winter Zoo Site	28,800				**28,800**	**2,677**
15. Core Woods Picnic Area						
15.1 Picnic Area Access	38,500				**38,500**	**3,578**
16. Sumatran Tiger Boardwalk and Habitat						**By others**
16.1 Sumatran Tiger Boardwalk and Habitat						
17. Red Panda Climate - Controlled Viewing Bldg.						
17.1 Red Panda Viewing Building					**225**	**21**

Overall Summary

All costs in Canadian Dollars

	Trade Costs	Markups	Contingency	Escalation	Total Construction	Soft Costs	PROJECT TOTAL
1. The Conservation Campus II	**$25,194,786**	**$4,228,560**	**$5,296,202**	**$2,603,966**	**$37,323,514**	**$8,211,173**	**$45,534,687**
1.1 Event Spaces and Transportation Hub	$3,859,073	$647,687	$811,217	$398,848	$5,716,825	$1,257,702	$6,974,527
1.2 Hotel	$14,283,180	$2,397,213	$3,002,471	$1,476,215	$21,159,079	$4,654,997	$25,814,076
1.3 Orangutan line	$2,729,760	$458,148	$573,823	$282,130	$4,043,861	$889,649	$4,933,510
1.4 Entrance Area/Plaza	$4,322,773	$725,512	$908,691	$446,773	$6,403,749	$1,408,825	$7,812,574
2. New Indoor Winter Viewing and Holding	**$19,335,548**	**$3,245,176**	**$4,064,530**	**$1,998,394**	**$28,643,648**	**$6,301,602**	**$34,945,250**
2.1 Winter Holding Phase 1	$12,805,458	$2,149,200	$2,691,838	$1,323,487	$18,969,983	$4,173,396	$23,143,379
2.2 Winter Holding Phase 2	$6,530,090	$1,095,976	$1,372,692	$674,907	$9,673,665	$2,128,206	$11,801,871
3. Jaguar Habitat Expansion	**$11,576,950**	**$1,943,015**	**$2,433,594**	**$1,196,517**	**$17,150,076**	**$3,773,017**	**$20,923,093**
3.1 Jaguar/Flamingo Holding	$8,180,390	$1,372,954	$1,719,602	$845,471	$12,118,417	$2,666,052	$14,784,469
3.2 Jaguar/Flamingo Habitat	$2,028,776	$340,499	$426,470	$209,681	$3,005,426	$661,194	$3,666,620
3.3 Jaguar/Flamingo Tube	$1,367,784	$229,562	$287,522	$141,365	$2,026,233	$445,771	$2,472,004
4. African Rainforest Pavilion Refurbishment (Gorilland)	**$17,675,675**	**$2,966,593**	**$3,715,608**	**$1,826,841**	**$26,184,717**	**$5,760,638**	**$31,945,355**
4.1 Gorilland Structure Modification	$13,436,677	$2,255,141	$2,824,527	$1,388,726	$19,905,071	$4,379,116	$24,284,187
4.2 Gorilla Tubes	$3,963,718	$665,250	$833,214	$409,664	$5,871,846	$1,291,806	$7,163,652
4.3 Gorilland Site (outside bldg.)	$275,280	$46,202	$57,867	$28,451	$407,800	$89,716	$497,516
5. The Saving Species Sanctuary	**$6,303,997**	**$1,058,030**	**$1,325,165**	**$651,539**	**$9,338,731**	**$2,054,521**	**$11,393,252**
5.1 Sanctuary Structure	$4,992,900	$837,982	$1,049,559	$516,033	$7,396,474	$1,627,224	$9,023,698
5.2 Sanctuary Site	$1,311,097	$220,048	$275,606	$135,506	$1,942,257	$427,297	$2,369,554
6. Wilderness North and Art Walk	**$6,030,335**	**$1,012,101**	**$1,267,639**	**$623,256**	**$8,933,331**	**$1,965,333**	**$10,898,664**
6.1 Wilderness North Yurts	$2,937,825	$493,069	$617,561	$303,634	$4,352,089	$957,460	$5,309,549
6.2 Wilderness North Pavilion	$1,062,867	$178,387	$223,426	$109,851	$1,574,531	$346,397	$1,920,928
6.3 Wilderness North Artwalk	$2,029,643	$340,645	$426,652	$209,771	$3,006,711	$661,476	$3,668,187

Overall Summary

All costs in Canadian Dollars

	Trade Costs	Markups	Contingency	Escalation	Total Construction	Soft Costs	PROJECT TOTAL
7. Nutrition Centre and Restaurant	**$12,455,336**	**$2,090,439**	**$2,618,239**	**$1,287,301**	**$18,451,315**	**$4,059,289**	**$22,510,604**
7.1 Greenhouse and Production Centre	$6,040,080	$1,013,736	$1,269,687	$624,263	$8,947,766	$1,968,509	$10,916,275
7.2 Restaurant	$5,632,268	$945,290	$1,183,960	$582,114	$8,343,632	$1,835,599	$10,179,231
7.3 Plaza	$555,186	$93,180	$116,706	$57,380	$822,452	$180,939	$1,003,391
7.4 Courtyards	$227,802	$38,233	$47,886	$23,544	$337,465	$74,242	$411,707
8. Americas Pavilion Redevelopment	**$29,730,691**	**$4,989,842**	**$6,249,696**	**$3,072,767**	**$44,042,996**	**$9,689,459**	**$53,732,455**
8.1 Americas Pavilion Structure	$29,172,711	$4,896,193	$6,132,403	$3,015,098	$43,216,405	$9,507,609	$52,724,014
8.2 Americas Pavilion Site	$557,980	$93,649	$117,293	$57,669	$826,591	$181,850	$1,008,441
9. The Safari Meander	**$19,972,770**	**$3,352,124**	**$4,198,481**	**$2,064,253**	**$29,587,628**	**$6,509,279**	**$36,096,907**
9.1 The Safari Meander Animal Bridge	$12,502,883	$2,098,417	$2,628,234	$1,292,215	$18,521,749	$4,074,785	$22,596,534
9.2 The Safari Meander Bush Camp (10#)	$314,898	$52,851	$66,195	$32,546	$466,490	$102,628	$569,118
9.3 The Safari Meander Site	$7,154,989	$1,200,856	$1,504,052	$739,492	$10,599,389	$2,331,866	$12,931,255
10. Forage Farm, Café and Demonstration Site	**$4,142,708**	**$695,291**	**$870,840**	**$428,163**	**$6,137,002**	**$1,350,141**	**$7,487,143**
10.1 Café	$2,391,469	$401,371	$502,711	$247,166	$3,542,717	$779,398	$4,322,115
10.2 Storage Shed	$825,652	$138,574	$173,561	$85,334	$1,223,121	$269,087	$1,492,208
10.3 Forage Farm and Plaza	$925,587	$155,346	$194,568	$95,663	$1,371,164	$301,656	$1,672,820
11. The Daycare	**$4,827,228**	**$810,176**	**$1,014,733**	**$498,910**	**$7,151,047**	**$1,573,231**	**$8,724,278**
11.1 The Daycare Building	$4,080,109	$684,784	$857,681	$421,693	$6,044,267	$1,329,739	$7,374,006
11.2 The Daycare Site (plaza, dock & yard)	$747,119	$125,392	$157,052	$77,217	$1,106,780	$243,492	$1,350,272
12. Tigerline, Sumatran Tiger Habitat + Holding	**$13,945,018**	**$2,340,459**	**$2,931,386**	**$1,441,264**	**$20,658,127**	**$4,544,789**	**$25,202,916**
12.1 Tigerline & Habitat Expansion Phase 1	$1,761,455	$295,634	$370,276	$182,052	$2,609,417	$574,072	$3,183,489
12.2 Tigerline & Habitat Expansion Phase 2	$3,197,693	$536,684	$672,188	$330,492	$4,737,057	$1,042,153	$5,779,210
12.3 Habitat Expansion & Structure Phase 3	$8,985,870	$1,508,141	$1,888,922	$928,720	$13,311,653	$2,928,564	$16,240,217

Overall Summary

All costs in Canadian Dollars

	Trade Costs	Markups	Contingency	Escalation	Total Construction	Soft Costs	PROJECT TOTAL
13. Zoo Brewery and Malayan Woods Renewal	***$5,200,744***	***$872,867***	***$1,093,250***	***$602,016***	***$7,768,877***	***$1,709,153***	***$9,478,030***
13.1 Malayan Woods Pavilion Renovation	*$1,603,764*	*$269,168*	*$337,128*	*$185,645*	*$2,395,705*	*$527,055*	*$2,922,760*
13.2 Brewery Building	*$3,277,539*	*$550,085*	*$688,972*	*$379,394*	*$4,895,990*	*$1,077,118*	*$5,973,108*
13.3 Brewery Plaza	*$319,441*	*$53,614*	*$67,150*	*$36,977*	*$477,182*	*$104,980*	*$582,162*
14. The Winter Zoo	***$2,000,856***	***$177,410***	***$392,088***	***$192,776***	***$2,763,130***	***$607,888***	***$3,371,018***
14.1 Winter Zoo Mobile Structures (assumed 12#)	*$943,800*	*$0*	*$169,884*	*$83,526*	*$1,197,210*	*$263,386*	*$1,460,596*
14.2 Winter Zoo Site	*$1,057,056*	*$177,410*	*$222,204*	*$109,250*	*$1,565,920*	*$344,502*	*$1,910,422*
15. Core Woods Picnic Area	***$182,714***	***$30,665***	***$38,408***	***$18,884***	***$270,671***	***$59,548***	***$330,219***
15.1 Picnic Area Access	*$182,714*	*$30,665*	*$38,408*	*$18,884*	*$270,671*	*$59,548*	*$330,219*
16. Sumatran Tiger Boardwalk and Habitat							***By others***
17. Red Panda Climate - Controlled Viewing Bldg.	***$173,711***	***$29,155***	***$36,516***	***$20,108***	***$259,490***	***$57,088***	***$316,578***
17.1 Red Panda Viewing Building	*$173,711*	*$29,155*	*$36,516*	*$20,108*	*$259,490*	*$57,088*	*$316,578*
TOTAL PROJECT COST	***$178,749,067***	***$29,841,903***	***$37,546,375***	***$18,526,955***	***$264,664,300***	***$58,226,149***	***$322,890,449***

1.1 EVENT SPACES AND TRANSPORTATION HUB

	Quantity	Unit	Rate	Total	Quantity	Unit	Rate	Total
Trade Costs								
Foundations								
Strip footings at exterior, including foundation wall	600	LF	330.27	198,162	183	M	1,082.85	198,162
Column footings at exterior, including piers/pilasters	18	EA	2,178.00	39,204	18	EA	2,178.00	39,204
Column footings at interior, including piers	6	EA	2,057.00	12,342	6	EA	2,057.00	12,342
Slab on grade								
Standard slab on grade	9,000	SF	10.10	90,932	836	M2	108.77	90,932
Exterior walls								
Interior backup - masonry	6,240	SF	39.20	163,466	580	M2	281.84	163,466
Exterior skin - stone and stucco	6,240	SF	90.75	566,280	580	M2	976.34	566,280
Miscellaneous								
Scaffolding to exterior wall	9,600	SF	4.84	46,464	892	M2	52.09	46,464
Windows								
Aluminum windows	3,060	SF	112.53	344,342	284	M2	1,212.47	344,342
Aluminum curtain wall	300	SF	174.24	52,272	28	M2	1,866.86	52,272
Louvers	100	SF	81.07	8,107	9	M2	900.78	8,107
Exterior doors								
Hollow metal doors or wood doors, frame and hardware	1	LVLS	2,904.00	2,904	1	LVLS	2,904.00	2,904
Aluminum doors	4	LVLS	4,840.00	19,360	4	LVLS	4,840.00	19,360
Overhead doors	2	EA	15,000.00	14,520	2	EA	7,260.00	14,520
Door operators	1	EA	6,050.00	6,050	1	EA	6,050.00	6,050
Roofing								
Canopy roofing system								
Allowance	1	LS	37,510.00	37,510	1	LS	37,510.00	37,510
Partitions								
Partitions, predominantly drywall	9,000	SF GFA	21.78	196,020	836	M2 GFA	234.47	196,020
Interior doors								
Interior metal or wood doors, complete	15	LVLS	2,904.00	43,560	15	LVLS	2,904.00	43,560
Specialties								
Specialties	9,000	SF GFA	4.84	43,560	836	M2 GFA	52.11	43,560
Allowance for miscellaneous metals	9,000	SF GFA	2.54	22,869	836	M2 GFA	27.36	22,869
Miscellaneous sealants throughout building	9,000	SF GFA	0.36	3,267	836	M2 GFA	3.91	3,267

	Quantity	Unit	Rate	Total	Quantity	Unit	Rate	Total
Finishes								
Wall finishes	9,000	SF GFA	18.15	163,350	836	M2 GFA	195.39	163,350
Floor finishes	9,000	SF GFA	36.30	326,700	836	M2 GFA	390.79	326,700
Ceiling finishes	9,000	SF GFA	18.15	163,350	836	M2 GFA	195.39	163,350
MEP systems								
Plumbing, complete	9,000	SF GFA	9.68	87,120	836	M2 GFA	104.21	87,120
Hvac, complete	9,000	SF GFA	62.92	566,280	836	M2 GFA	677.37	566,280
Fire protection, complete	9,000	SF GFA	6.66	59,895	836	M2 GFA	71.64	59,895
Electrical, complete	9,000	SF GFA	42.35	381,150	836	M2 GFA	455.92	381,150
Fixed furnishings								
Miscellaneous casework	9,000	SF GFA	3.63	32,670	836	M2 GFA	39.08	32,670
Entry mat	100	SF	49.61	4,961	9	M2	551.22	4,961
Window treatment	3,360	SF	17.54	58,951	312	M2	188.95	58,951
Utilities								
Mechanical								
Water	1	LS	12,100.00	12,100	1	LS	12,100.00	12,100
Sanitary	1	LS	18,150.00	18,150	1	LS	18,150.00	18,150
Storm water	1	LS	48,400.00	48,400	1	LS	48,400.00	48,400
Gas	1	LS	6,050.00	6,050	1	LS	6,050.00	6,050
Electrical								
Services	1	LS	9,075.00	9,075	1	LS	9,075.00	9,075
Telecommunication	1	LS	9,680.00	9,680	1	LS	9,680.00	9,680
Subtotal				**$3,859,073**				**$3,859,073**
Markups								
General conditions and project requirements								
General conditions and requirements	9.00%		3,859,073	347,317	9.00%		3,859,073	347,317
Bond and Insurance	2.00%		4,206,390	84,128	2.00%		4,206,390	84,128
Building permit	1.00%		4,290,518	42,905	1.00%		4,290,518	42,905
Overhead and Profit								
Prime contractor's head office overhead and profit (Fee)	4.00%		4,333,423	173,337	4.00%		4,333,423	173,337
Subtotal				**$647,687**				**$647,687**
Contingencies/Escalation								
Contingencies								
Design contingency	18.00%		4,506,760	811,217	18.00%		4,506,760	811,217
GMP contingency	0.00%		5,317,977		0.00%		5,317,977	

	Quantity	Unit	Rate	Total	Quantity	Unit	Rate	Total
Escalation								
Escalation to Start Date (July 2023)	7.50%		5,317,977	398,848	7.50%		5,317,977	398,848
Subtotal				**$1,210,065**				**$1,210,065**
ESTIMATED CONTRACT AWARD				**$5,716,825**				**$5,716,825**

1.2 HOTEL

Trade Costs								
Foundations								
Strip footings at exterior, including foundation wall	370	LF	330.27	122,200	113	M	1,081.42	122,200
Column footings at exterior, including piers/pilasters	12	EA	2,299.00	27,588	12	EA	2,299.00	27,588
Column footings at interior, including piers	5	EA	2,178.00	10,890	5	EA	2,178.00	10,890
Slab on grade								
Standard slab on grade	2,500	SF	10.10	25,259	232	M2	108.88	25,259
Slab on grade, at loading dock	200	SF	8.59	1,718	19	M2	90.42	1,718
Elevator/Escalator pit	2	EA	13,794.00	27,588	2	EA	13,794.00	27,588
Floor construction								
Steel construction, including metal decking	22,247	SF	45.98	1,022,917	2,068	M2	494.64	1,022,917
Concrete topping to floors	22,247	SF	7.26	161,513	2,068	M2	78.10	161,513
Miscellaneous								
Fireproofing and fire stopping	22,247	SF	2.78	61,913	2,068	M2	29.94	61,913
Equipment pads	1	LS	1,876.00	1,876	1	LS	1,876.00	1,876
Roof construction								
Steel construction, including metal decking	15,253	SF	45.98	701,333	1,418	M2	494.59	701,333
Miscellaneous								
Fireproofing	15,253	SF	2.78	42,449	1,418	M2	29.94	42,449
Exterior walls								
Interior backup - metal stud	17,092	SF	26.26	448,784	1,588	M2	282.61	448,784
Exterior skin								
Stucco to upper levels	17,092	SF	27.53	470,500	1,588	M2	296.28	470,500
Miscellaneous								
Scaffolding to exterior wall	22,232	SF	4.84	107,603	2,066	M2	52.08	107,603

1. The Conservation Campus II

	Quantity	Unit	Rate	Total	Quantity	Unit	Rate	Total
Windows								
Aluminum windows/curtainwall	4,840	SF	121.00	585,640	450	M2	1,301.42	585,640
Aluminum curtain wall	300	SF	174.24	52,272	28	M2	1,866.86	52,272
Louvers	100	SF	81.07	8,107	9	M2	900.78	8,107
Exterior doors								
Hollow metal doors or wood doors, frame and hardware	2	LVLS	2,904.00	5,808	2	LVLS	2,904.00	5,808
Aluminum doors	4	LVLS	4,840.00	19,360	4	LVLS	4,840.00	19,360
Door operators	1	EA	6,050.00	6,050	1	EA	6,050.00	6,050
Roofing								
Membrane roofing	15,253	SF	35.09	535,228	1,418	M2	377.45	535,228
Roof pavers	5,033	SF	26.62	133,978	468	M2	286.28	133,978
Canopy roofing system								
Allowance	1	LS	37,510.00	37,510	1	LS	37,510.00	37,510
Roof openings								
Roof hatch/ vents	1	LS	2,783.00	2,783	1	LS	2,783.00	2,783
Partitions								
Partitions, predominantly drywall	37,500	SF GFA	26.44	991,444	3,485	M2 GFA	284.49	991,444
Interior doors								
Interior metal or wood doors, complete	150	LVLS	3,025.00	453,750	150	LVLS	3,025.00	453,750
Specialties								
Specialties	37,500	SF GFA	7.50	281,325	3,485	M2 GFA	80.72	281,325
Allowance for miscellaneous metals	37,500	SF GFA	2.54	95,288	3,485	M2 GFA	27.34	95,288
Miscellaneous sealants throughout building	37,500	SF GFA	0.36	13,613	3,485	M2 GFA	3.91	13,613
Staircases								
Feature staircase	1	FLT	62,315.00	62,315	1	FLT	62,315.00	62,315
Egress/Internal circulation staircases	8	FLT	27,467.00	219,736	8	FLT	27,467.00	219,736
Miscellaneous steps and ladders	1	LS	3,751.00	3,751	1	LS	3,751.00	3,751
Stair finishes								
Feature staircases	1	FLT	9,075.00	9,075	1	FLT	9,075.00	9,075
Egress staircases	8	FLT	3,146.00	25,168	8	FLT	3,146.00	25,168
Finishes								
Wall finishes	37,500	SF GFA	15.37	576,263	3,485	M2 GFA	165.36	576,263
Floor finishes	37,500	SF GFA	9.74	365,269	3,485	M2 GFA	104.81	365,269
Ceiling finishes	37,500	SF GFA	11.01	412,913	3,485	M2 GFA	118.48	412,913
Conveying								
Passenger elevators, 5 stop	2	EA	243,210.00	486,420	2	ea	243,210.00	486,420
MEP systems								
Plumbing, complete	37,500	SF GFA	33.88	1,270,500	3,485	M2 GFA	364.56	1,270,500

	Quantity	Unit	Rate	Total	Quantity	Unit	Rate	Total
Hvac, complete	37,500	SF GFA	59.90	2,246,063	3,485	M2 GFA	644.49	2,246,063
Fire protection, complete	37,500	SF GFA	7.50	281,325	3,485	M2 GFA	80.72	281,325
Electrical, complete	37,500	SF GFA	32.43	1,216,050	3,485	M2 GFA	348.94	1,216,050
Equipment								
Food service equipment								
Bar	1	LS	50,215.00	50,215	1	LS	50,215.00	50,215
Fixed furnishings								
Miscellaneous casework	37,500	SF GFA	5.20	195,113	3,485	M2 GFA	55.99	195,113
Entry mat	100	SF	60.50	6,050	9	M2	672.22	6,050
Window treatment	5,140	SF	17.54	90,181	478	M2	188.66	90,181
Utilities								
Mechanical								
Water	1	LS	37,752.00	37,752	1	LS	37,752.00	37,752
Sanitary	1	LS	62,920.00	62,920	1	LS	62,920.00	62,920
Storm water	1	LS	138,545.00	138,545	1	LS	138,545.00	138,545
Gas	1	LS	8,954.00	8,954	1	LS	8,954.00	8,954
Electrical								
Services	1	LS	47,069.00	47,069	1	LS	47,069.00	47,069
Telecommunication	1	LS	15,246.00	15,246	1	LS	15,246.00	15,246
Subtotal				**$14,283,180**				**$14,283,180**
Markups								
General conditions and project requirements								
General conditions and requirements	9.00%		14,283,180	1,285,486	9.00%		14,283,180	1,285,486
Bond and Insurance	2.00%		15,568,666	311,373	2.00%		15,568,666	311,373
Building permit	1.00%		15,880,039	158,800	1.00%		15,880,039	158,800
Overhead and Profit								
Prime contractor's head office overhead and profit (Fee)	4.00%		16,038,839	641,554	4.00%		16,038,839	641,554
Subtotal				**$2,397,213**				**$2,397,213**
Contingencies/Escalation								
Contingencies								
Design contingency	18.00%		16,680,393	3,002,471	18.00%		16,680,393	3,002,471
GMP contingency	0.00%		19,682,864		0.00%		19,682,864	

	Quantity	Unit	Rate	Total	Quantity	Unit	Rate	Total
Escalation								
Escalation to Start Date (July 2023)	7.50%		19,682,864	1,476,215	7.50%		19,682,864	1,476,215
Subtotal				**$4,478,686**				**$4,478,686**
ESTIMATED CONTRACT AWARD				**$21,159,079**				**$21,159,079**

1.3 ORANGUTAN LINE

Trade Costs								
Elevated primate line								
Based on similar at Philadelphia Zoo.	705	LF	3,872.00	2,729,760	215	M	12,696.56	2,729,760
Subtotal				**$2,729,760**				**$2,729,760**
Markups								
General conditions and project requirements								
General conditions and requirements	9.00%		2,729,760	245,678	9.00%		2,729,760	245,678
Bond and Insurance	2.00%		2,975,438	59,509	2.00%		2,975,438	59,509
Building permit	1.00%		3,034,947	30,349	1.00%		3,034,947	30,349
Overhead and Profit								
Prime contractor's head office overhead and profit (Fee)	4.00%		3,065,296	122,612	4.00%		3,065,296	122,612
Subtotal				**$458,148**				**$458,148**
Contingencies/Escalation								
Contingencies								
Design contingency	18.00%		3,187,908	573,823	18.00%		3,187,908	573,823
GMP contingency	0.00%		3,761,731		0.00%		3,761,731	
Escalation								
Escalation to Start Date (July 2023)	7.50%		3,761,731	282,130	7.50%		3,761,731	282,130
Subtotal				**$855,953**				**$855,953**
ESTIMATED CONTRACT AWARD				**$4,043,861**				**$4,043,861**

	Quantity	Unit	Rate	Total	Quantity	Unit	Rate	Total
1.4 ENTRANCE AREA/PLAZA								
Trade Costs								
Site preparation								
Site preparation								
Site set up, clearance	131,300	SF	0.18	23,831	12,203	M2 GFA	1.95	23,831
Pavement demolition	57,250	SF	1.51	86,591	5,321	M2 GFA	16.27	86,591
Existing building demolition	19,200	SF	9.98	191,664	1,784	M2 GFA	107.43	191,664
Earthwork								
Strip topsoil - store	1,524	CY	12.46	18,993	1,158	M3	16.40	18,993
Cut to fill - general grading	4,863	CY	12.46	60,608	452	M3	134.09	60,608
Fine grading	14,589	SY	1.88	27,362	1,356	M2	20.18	27,362
Paving								
Decorative/Themed concrete paving	58,300	SF	14.04	818,299	5,418	M2	151.03	818,299
Trolley roadway	5,400	SF	6.90	37,244	502	M2	74.19	37,244
Site development								
Allow for site walls, furnishings etc.	1	LS	62,315.00	62,315	1	LS	62,315.00	62,315
Allow for goat trail	750	LF	998.25	748,688	229	M	3,269.38	748,688
Relocate carousel	1	LS	49,852.00	49,852	1	LS	49,852.00	49,852
Landscaping								
Respread existing topsoil	1,524	CY	12.46	18,993	142	M3	133.75	18,993
Trees	40	EA	3,146.00	125,840	40	EA	3,146.00	125,840
Shrubs and ground cover	56,100	SF	28.07	1,574,839	5,214	M2	302.04	1,574,839
Irrigation	56,100	SF	1.88	105,216	5,214	M2	20.18	105,216
Exhibits								
Artificial rockwork/mud work								
Rockwork	1	LS	127,050.00	127,050	1	LS	127,050.00	127,050
Natural exhibit construction								
Natural boulders	10	EA	810.70	8,107	10	EA	810.70	8,107
Natural deadfall	1	LS	25,410.00	25,410	1	LS	25,410.00	25,410
Artificial exhibit construction								
Artificial deadfall	1	LS	62,315.00	62,315	1	LS	62,315.00	62,315
Exhibit signage	1	LS	24,926.00	24,926	1	LS	24,926.00	24,926

	Quantity	Unit	Rate	Total	Quantity	Unit	Rate	Total
Utilities								
Storm drainage	1	LS	62,315.00	62,315	1	LS	40,000.00	62,315
Electrical								
Lighting	1	LS	62,315.00	62,315	1	LS	51,500.00	62,315
Subtotal				**$4,322,773**				**$4,322,773**
Markups								
General conditions and project requirements								
General conditions and requirements	9.00%		4,322,773	389,050	9.00%		4,322,773	389,050
Bond and Insurance	2.00%		4,711,823	94,236	2.00%		4,711,823	94,236
Building permit	1.00%		4,806,059	48,061	1.00%		4,806,059	48,061
Overhead and Profit								
Prime contractor's head office overhead and profit (Fee)	4.00%		4,854,120	194,165	4.00%		4,854,120	194,165
Subtotal				**$725,512**				**$725,512**
Contingencies/Escalation								
Contingencies								
Design contingency	18.00%		5,048,285	908,691	18.00%		5,048,285	908,691
GMP contingency	0.00%		5,956,976		0.00%		5,956,976	
Escalation								
Escalation to Start Date (July 2023)	7.50%		5,956,976	446,773	7.50%		5,956,976	446,773
Subtotal				**$1,355,464**				**$1,355,464**
ESTIMATED CONTRACT AWARD				**$6,403,749**				**$6,403,749**

2.1 WINTER HOLDING PHASE 1

	Quantity	Unit	Rate	Total	Quantity	Unit	Rate	Total
Trade Costs								
Foundations								
Strip footings at exterior, including foundation wa	900	LF	330.27	297,243	274	M	1,084.83	297,243
Strip footings and walls at elevation changes throughout facility	100	LF	330.27	33,027	30	M	1,100.90	33,027
Column footings at exterior, including piers/pilasters	22	EA	2,178.00	47,916	22	EA	2,178.00	47,916
Column footings at interior, including piers	8	EA	2,057.00	16,456	8	EA	2,057.00	16,456
Slab on grade								
Standard slab on grade	25,000	SF	10.10	252,588	2,323	M2	108.73	252,588
Elevator/Escalator pit	2	EA	13,915.00	27,830	2	EA	13,915.00	27,830
Water pools, complete	1	EA	24,200.00	24,200	1	EA	24,200.00	24,200
Floor construction								
Steel construction, including metal decking	5,500	SF	50.82	279,510	511	M2	546.99	279,510
Concrete topping to floors	5,500	SF	7.26	39,930	511	M2	78.14	39,930
Demountable platforms etc. for events conversio	1,000	SF	68.97	68,970	93	M2	741.61	68,970
Miscellaneous								
Fireproofing and fire stopping	5,500	SF	2.78	15,307	511	M2	29.95	15,307
Roof construction								
Steel construction, including metal decking	25,000	SF	50.82	1,270,500	2,323	M2	546.92	1,270,500
Concrete topping to roof	25,000	SF	7.26	181,500	2,323	M2	78.13	181,500
Miscellaneous								
Fireproofing	25,000	SF	2.78	69,575	2,323	M2	29.95	69,575
Exterior walls								
Interior backup - masonry	10,608	SF	47.43	503,159	986	M2	510.30	503,159
Exterior skin - unknown	10,608	SF	36.30	385,070	986	M2	390.54	385,070
Miscellaneous								
Rail at roof level	125	LF	423.50	52,938	38	M	1,393.11	52,938
Scaffolding to exterior wall	13,656	SF	3.63	49,571	1,269	M2	39.06	49,571
Windows								
Aluminum curtain wall	3,048	SF	151.25	461,010	283	M2	1,629.01	461,010
Exterior doors								
Aluminum doors, double leaf	6	LVL	4,840.00	29,040	6	LVLS	4,840.00	29,040
Overhead doors	4	EA	8,470.00	33,880	4	EA	8,470.00	33,880
Door operators	2	EA	6,050.00	12,100	2	EA	6,050.00	12,100

2. New Indoor Winter Viewing and Holding

	Quantity	Unit	Rate	Total	Quantity	Unit	Rate	Total
Roofing								
TPO roof membrane, sedium trays	25,000	SF	60.50	1,512,500	2,323	M2	651.10	1,512,500
TPO roof membrane with pavers	1,000	SF	66.55	66,550	93	M2	715.59	66,550
Roof openings								
Roof hatch/ vents	1	LS	3,146.00	3,146	1	LS	3,146.00	3,146
Partitions								
Partitions,, animal barriers, rails, complete	30,500	SF GFA	24.20	738,100	2,835	M2	260.35	738,100
Interior doors								
Interior doors, shift gates etc.	30,500	SF GFA	7.26	221,430	30,500	LVLS	7.26	221,430
Specialties								
Specialties	30,500	SF GFA	1.82	55,358	2,835	M2 GFA	19.53	55,358
Allowance for miscellaneous metals	30,500	SF GFA	2.54	77,501	2,835	M2 GFA	27.34	77,501
Miscellaneous sealants throughout building	30,500	SF GFA	0.44	13,286	2,835	M2 GFA	4.69	13,286
Staircases								
Feature staircase	2	FLT	54,450.00	108,900	2	FLT	54,450.00	108,900
Egress/Internal circulation staircases	2	FLT	27,467.00	54,934	2	FLT	27,467.00	54,934
Miscellaneous steps and ladders	1	LS	3,751.00	3,751	1	LS	3,751.00	3,751
Stair finishes								
Feature staircases	2	FLT	9,075.00	18,150	2	FLT	9,075.00	18,150
Egress staircases	2	FLT	3,146.00	6,292	2	FLT	3,146.00	6,292
Finishes								
Wall finishes	30,500	SF GFA	1.88	57,203	2,835	M2 GFA	20.18	57,203
Floor finishes	30,500	SF GFA	3.75	114,406	2,835	M2 GFA	40.35	114,406
Ceiling finishes	30,500	SF GFA	3.15	95,953	2,835	M2 GFA	33.85	95,953
Demountable acoustic panels	3,050	SF	60.50	184,525	283	M2	652.03	184,525
Conveying								
Passenger elevators 3 stops	2	EA	187,550.00	375,100	2	STPS	187,550.00	375,100
MEP systems								
Plumbing, complete	30,500	SF GFA	21.78	664,290	2,835	M2 GFA	234.32	664,290
Hvac, complete	30,500	SF GFA	62.92	1,919,060	2,835	M2 GFA	676.92	1,919,060
Fire protection, complete	30,500	SF GFA	7.26	221,430	2,835	M2 GFA	78.11	221,430
Electrical, complete	30,500	SF GFA	36.30	1,107,150	2,835	M2 GFA	390.53	1,107,150
Equipment								
Animal equipment such as pit scales etc.	1	LS	60,500.00	60,500	1	LS	60,500.00	60,500
Warming kitchen equipment	1	LS	90,750.00	90,750	1	LS	90,750.00	90,750
Loading dock equipment	1	LS	15,004.00	15,004	1	LS	15,004.00	15,004

2. New Indoor Winter Viewing and Holding

	Quantity	Unit	Rate	Total	Quantity	Unit	Rate	Total
Maintenance equipment	1	LS	24,200.00	24,200	1	LS	24,200.00	24,200
Residential appliances	1	LS	9,075.00	9,075	1	LS	9,075.00	9,075
Fixed furnishings								
Miscellaneous casework	30,500	SF	1.21	36,905	2,835	M2	13.02	36,905
Window treatment	3,048	SF	18.15	55,321	283	M2	195.48	55,321
Site preparation								
Site preparation								
Site set up, clearance	37,500	SF	0.54	20,419	3,485	M2 GFA	5.86	20,419
Pavement demolition	20,000	SF	1.51	30,250	1,859	M2 GFA	16.27	30,250
Existing building demolition	1,200	SF	8.47	10,164	112	M2 GFA	90.75	10,164
Earthwork								
Strip topsoil - store	486	CY	12.46	6,057	369	M3	16.41	6,057
Cut to fill - general grading	4,167	CY	12.46	51,933	387	M3	134.19	51,933
Fine grading	4,167	SY	1.88	7,815	387	M2	20.19	7,815
Paving								
Decorative/Themed concrete paving	5,000	SF	14.04	70,180	465	M2	150.92	70,180
Site development								
Allow for site walls, furnishings etc.	12,500	SF	2.54	31,763	12,500	LS	2.54	31,763
Landscaping								
Respread existing topsoil	486	CY	12.46	6,057	45	M3	134.60	6,057
Trees	6	EA	3,146.00	18,876	6	EA	3,146.00	18,876
Shrubs and ground cover	3,125	SF	6.05	18,906	290	M2	65.19	18,906
Lawn areas	9,375	SF	2.54	23,822	871	M2	27.35	23,822
Irrigation	12,500	SF	1.88	23,444	1,162	M2	20.18	23,444
Exhibits (within and around building)								
Artificial rockwork/mud work								
Rockwork	1	LS	60,500.00	60,500	1	LS	60,500.00	60,500
Natural exhibit construction								
Natural boulders	5	EA	847.00	4,235	5	EA	847.00	4,235
Natural deadfall	1	LS	60,500.00	60,500	1	LS	60,500.00	60,500
Artificial exhibit construction								
Artificial deadfall	1	LS	24,200.00	24,200	1	LS	24,200.00	24,200
Exhibit signage	1	LS	12,100.00	12,100	1	LS	12,100.00	12,100

2. New Indoor Winter Viewing and Holding

	Quantity	Unit	Rate	Total	Quantity	Unit	Rate	Total
Utilities								
Mechanical								
Water	1	LS	24,200.00	24,200	1	LS	24,200.00	24,200
Sanitary	1	LS	36,300.00	36,300	1	LS	36,300.00	36,300
Storm water	1	LS	90,750.00	90,750	1	LS	90,750.00	90,750
Gas	1	LS	9,075.00	9,075	1	LS	9,075.00	9,075
Electrical								
Services	1	LS	56,144.00	56,144	1	LS	56,144.00	56,144
Telecommunication	1	LS	14,520.00	14,520	1	LS	14,520.00	14,520
Site lighting	1	LS	31,158.00	31,158	1	LS	31,158.00	31,158
Subtotal				**$12,805,458**				**$12,805,458**
Markups								
General conditions and project requirements								
General conditions and requirements	9.00%		12,805,458	1,152,491	9.00%		12,805,458	1,152,491
Bond and Insurance	2.00%		13,957,949	279,159	2.00%		13,957,949	279,159
Building permit	1.00%		14,237,108	142,371	1.00%		14,237,108	142,371
Overhead and Profit								
Prime contractor's head office overhead and profit (Fee)	4.00%		14,379,479	575,179	4.00%		14,379,479	575,179
Subtotal				**$2,149,200**				**$2,149,200**
Contingencies/Escalation								
Contingencies								
Design contingency	18.00%		14,954,658	2,691,838	18.00%		14,954,658	2,691,838
GMP contingency	0.00%		17,646,496		0.00%		17,646,496	
Escalation								
Escalation to Start Date (July 2023)	7.50%		17,646,496	1,323,487	7.50%		17,646,496	1,323,487
Subtotal				**$4,015,325**				**$4,015,325**
ESTIMATED CONTRACT AWARD				**$18,969,983**				**$18,969,983**

2.2 WINTER HOLDING PHASE 2

	Quantity	Unit	Rate	Total	Quantity	Unit	Rate	Total
Trade Costs								
Foundations								
Strip footings at exterior, including foundation wa	364	LF	330.27	120,218	111	M	1,083.05	120,218
Strip footings and walls at elevation changes throughout facility	57	LF	330.26	18,825	17	M	1,107.35	18,825
Column footings at exterior, including piers/pilasters	10	EA	2,178.00	21,780	10	EA	2,178.00	21,780
Column footings at interior, including piers	6	EA	2,057.00	12,342	6	EA	2,057.00	12,342
Slab on grade								
Standard slab on grade	14,250	SF	10.10	143,975	1,324	M2	108.74	143,975
Water pools, complete	1	EA	18,150.00	18,150	1	EA	18,150.00	18,150
Floor construction								
Steel construction, including metal decking	1,500	SF	50.82	76,230	139	M2	548.42	76,230
Concrete topping to floors	1,500	SF	7.26	10,890	139	M2	78.35	10,890
Demountable platforms etc. for events conversio	500	SF	68.97	34,485	46	M2	749.67	34,485
Miscellaneous								
Fireproofing and fire stopping	1,500	SF	2.78	4,175	139	M2	30.04	4,175
Roof construction								
Steel construction, including metal decking	14,250	SF	50.82	724,185	1,324	M2	546.97	724,185
Concrete topping to roof	14,250	SF	7.26	103,455	1,324	M2	78.14	103,455
Miscellaneous								
Fireproofing	14,250	SF	2.78	39,658	1,324	M2	29.95	39,658
Exterior walls								
Interior backup - masonry	5,770	SF	47.43	273,683	536	M2	510.60	273,683
Exterior skin - unknown	5,770	SF	36.30	209,451	536	M2	390.77	209,451
Miscellaneous								
Rail at roof level	125	LF	423.50	52,938	38	M	1,393.11	52,938
Scaffolding to exterior wall	7,608	SF	4.84	36,823	707	M2	52.08	36,823
Windows								
Aluminum curtain wall	1,838	SF	151.25	277,998	171	M2	1,625.72	277,998
Exterior doors								
Aluminum doors, double leaf	4	LVL	4,840.00	19,360	4	LVLS	4,840.00	19,360
Overhead doors	2	EA	8,470.00	16,940	2	EA	8,470.00	16,940
Door operators	2	EA	6,050.00	12,100	2	EA	6,050.00	12,100

2. New Indoor Winter Viewing and Holding

	Quantity	Unit	Rate	Total	Quantity	Unit	Rate	Total
Roofing								
TPO roof membrane, sedium trays	13,500	SF	60.50	816,750	1,255	M2	650.80	816,750
TPO roof membrane with pavers	750	SF	66.55	49,913	70	M2	713.04	49,913
Partitions								
Partitions,, animal barriers, rails, complete	15,750	SF GFA	24.20	381,150	1,464	M2	260.35	381,150
Interior doors								
Interior doors, shift gates etc.	15,750	SF GFA	7.26	114,345	15,750	LVLS	7.26	114,345
Specialties								
Specialties	15,750	SF GFA	1.81	28,586	1,464	M2 GFA	19.53	28,586
Allowance for miscellaneous metals	15,750	SF GFA	2.54	40,021	1,464	M2 GFA	27.34	40,021
Miscellaneous sealants throughout building	15,750	SF GFA	0.44	6,861	1,464	M2 GFA	4.69	6,861
Staircases								
Egress/Internal circulation staircases	2	FLT	27,467.00	54,934	2	FLT	27,467.00	54,934
Miscellaneous steps and ladders	1	LS	3,751.00	3,751	1	LS	3,751.00	3,751
Stair finishes								
Egress staircases	2	FLT	3,146.00	6,292	2	FLT	3,146.00	6,292
Finishes								
Wall finishes	15,750	SF GFA	1.88	29,540	1,464	M2 GFA	20.18	29,540
Floor finishes	15,750	SF GFA	3.75	59,078	1,464	M2 GFA	40.35	59,078
Ceiling finishes	15,750	SF GFA	3.15	49,550	1,464	M2 GFA	33.85	49,550
Demountable acoustic panels	1,575	SF	60.50	95,288	146	M2	652.66	95,288
MEP systems								
Plumbing, complete	15,750	SF GFA	21.78	343,035	1,464	M2 GFA	234.31	343,035
Hvac, complete	15,750	SF GFA	62.92	990,990	1,464	M2 GFA	676.91	990,990
Fire protection, complete	15,750	SF GFA	7.87	123,874	1,464	M2 GFA	84.61	123,874
Electrical, complete	15,750	SF GFA	36.30	571,725	1,464	M2 GFA	390.52	571,725
Equipment								
Animal equipment such as pit scales etc.	1	LS	30,250.00	30,250	1	LS	30,250.00	30,250
Maintenance equipment	1	LS	18,150.00	18,150	1	LS	18,150.00	18,150
Residential appliances	1	LS	9,075.00	9,075	1	LS	9,075.00	9,075
Fixed furnishings								
Miscellaneous casework	15,750	SF	1.21	19,058	1,464	M2	13.02	19,058
Window treatment	1,838	SF	18.15	33,360	171	M2	195.09	33,360

2. New Indoor Winter Viewing and Holding

	Quantity	Unit	Rate	Total	Quantity	Unit	Rate	Total
Site preparation								
Site preparation								
Site set up, clearance	21,375	SF	0.54	11,639	1,987	M2 GFA	5.86	11,639
Pavement demolition	7,500	SF	1.51	11,344	697	M2 GFA	16.28	11,344
Earthwork								
Strip topsoil - store	385	CY	12.46	4,799	293	M3	16.38	4,799
Cut to fill - general grading	2,375	CY	12.46	29,600	221	M3	133.94	29,600
Fine grading	2,375	SY	1.88	4,454	221	M2	20.15	4,454
Paving								
Decorative/Themed concrete paving	3,000	SF	14.04	42,108	279	M2	150.92	42,108
Site development								
Allow for site walls, furnishings etc.	12,500	SF	2.54	31,763	12,500	LS	2.54	31,763
Landscaping								
Respread existing topsoil	385	CY	12.46	4,799	36	M3	133.31	4,799
Trees	6	EA	3,146.00	18,876	6	EA	3,146.00	18,876
Shrubs and ground cover	3,125	SF	12.46	38,947	290	M2	134.30	38,947
Lawn areas	9,375	SF	2.54	23,822	871	M2	27.35	23,822
Irrigation	12,500	SF	1.88	23,444	1,162	M2	20.18	23,444
Exhibits (within and around building)								
Artificial rockwork/mud work								
Rockwork	1	LS	60,500.00	60,500	1	LS	60,500.00	60,500
Natural exhibit construction								
Natural boulders	4	EA	847.00	3,388	4	EA	847.00	3,388
Artificial exhibit construction								
Exhibit signage	1	LS	6,050.00	6,050	1	LS	6,050.00	6,050
Utilities								
Mechanical								
Sanitary	1	LS	36,300.00	36,300	1	LS	36,300.00	36,300
Storm water	1	LS	60,500.00	60,500	1	LS	60,500.00	60,500
Electrical								
Site lighting	1	LS	14,520.00	14,520	1	LS	14,520.00	14,520
Subtotal				**$6,530,090**				**$6,530,090**

2. New Indoor Winter Viewing and Holding

	Quantity	Unit	Rate	Total	Quantity	Unit	Rate	Total
Markups								
General conditions and project requirements								
General conditions and requirements	9.00%		6,530,090	587,708	9.00%		6,530,090	587,708
Bond and Insurance	2.00%		7,117,798	142,356	2.00%		7,117,798	142,356
Building permit	1.00%		7,260,154	72,602	1.00%		7,260,154	72,602
Overhead and Profit								
Prime contractor's head office overhead and profit (Fee)	4.00%		7,332,756	293,310	4.00%		7,332,756	293,310
Subtotal				**$1,095,976**				**$1,095,976**
Contingencies/Escalation								
Contingencies								
Design contingency	18.00%		7,626,066	1,372,692	18.00%		7,626,066	1,372,692
GMP contingency	0.00%		8,998,758		0.00%		8,998,758	
Escalation								
Escalation to Start Date (July 2023)	7.50%		8,998,758	674,907	7.50%		8,998,758	674,907
Subtotal				**$2,047,599**				**$2,047,599**
ESTIMATED CONTRACT AWARD				**$9,673,665**				**$9,673,665**

	Quantity	Unit	Rate	Total	Quantity	Unit	Rate	Total
3.1 JAGUAR/FLAMINGO HOLDING								
Trade Costs								
Foundations								
Strip footings at exterior, including foundation wa	458	LF	330.27	151,263	140	M	1,080.45	151,263
Strip footings at retaining wall	162	LF	467.36	75,713	49	M	1,545.16	75,713
Column footings at exterior, including piers/pilasters	26	EA	2,178.00	56,628	26	EA	2,178.00	56,628
Column footings at interior, including piers	8	EA	2,057.00	16,456	8	EA	2,057.00	16,456
Slab on grade								
Standard slab on grade	6,760	SF	10.10	68,300	628	M2	108.76	68,300
Water pools, complete	1	EA	25,410.00	25,410	1	EA	25,410.00	25,410
Retaining wall earthwork								
Backfill at ramp	431	CY	48.40	20,860	330	M3	63.21	20,860
Retaining wall								
Retaining walls, complete	2,234	SF	67.76	151,376	208	M2	727.77	151,376
Roof construction								
Steel construction, including metal decking	15,750	SF	73.81	1,162,508	1,464	M2	794.06	1,162,508
Concrete topping to roof	15,750	SF	7.26	114,345	1,464	M2	78.10	114,345
Miscellaneous								
Fireproofing	15,750	SF	2.78	43,832	1,464	M2	29.94	43,832
Exterior walls								
Interior backup - masonry	2,114	SF	47.19	99,760	196	M2	508.98	99,760
Exterior skin - themed rockwork	37,545	SF	93.47	3,509,425	3,489	M2	1,005.85	3,509,425
Miscellaneous								
Animal barrier	350	LF	314.60	110,110	107	M	1,029.07	110,110
Scaffolding to exterior wall	37,918	SF	3.63	137,642	3,524	M2	39.06	137,642
Windows								
Windows	373	SF	127.05	47,390	35	M2	1,354.00	47,390
Exterior doors								
Metal doors and animal/shift doors	1	LS	9,680.00	9,680	1	M2 GFA	9,680.00	9,680
Roofing								
Waterproofing insulation, etc.	6,760	SF	49.61	335,364	628	M2	534.02	335,364
Protection slab	6,760	SF	7.26	49,078	628	M2	78.15	49,078
Partitions								
Partitions,, animal barriers, rails, complete	6,760	SF GFA	29.95	202,445	628	M2 GFA	322.36	202,445

3. Jaguar Habitat Expansion

	Quantity	Unit	Rate	Total	Quantity	Unit	Rate	Total
Interior doors								
Interior doors, shift gates etc.	6,760	SF GFA	14.10	95,292	628	M2 GFA	151.74	95,292
Specialties								
Specialties	6,760	SF GFA	0.91	6,135	628	M2 GFA	9.77	6,135
Allowance for miscellaneous metals	6,760	SF GFA	2.42	16,359	628	M2 GFA	26.05	16,359
Miscellaneous sealants throughout building	6,760	SF GFA	0.42	2,863	628	M2 GFA	4.56	2,863
Finishes								
Wall finishes	6,760	SF GFA	3.75	25,357	628	M2 GFA	40.38	25,357
Floor finishes	6,760	SF GFA	2.54	17,177	628	M2 GFA	27.35	17,177
MEP systems								
Plumbing, animal water, floor drains and food prep sink	6,760	SF GFA	15.00	101,427	628	M2 GFA	161.51	101,427
Hvac, heat and ventilation only	6,760	SF GFA	22.39	151,323	628	M2 GFA	240.96	151,323
Fire protection, complete	6,760	SF GFA	7.50	50,714	628	M2 GFA	80.75	50,714
Electrical, complete	6,760	SF GFA	27.53	186,086	628	M2 GFA	296.32	186,086
Equipment								
Residential appliances	1	LS	6,292.00	6,292	1	LS	6,292.00	6,292
Fixed furnishings								
Miscellaneous casework	1	LS	6,171.00	6,171	1	LS	6,171.00	6,171
Window treatment	373	SF	24.81	9,253	35	M2	264.37	9,253
Exhibits								
Themed and landscaped roof	44,000	SF	62.32	2,741,860	4,089	M2 GFA	670.55	2,741,860
Mechanical								
Water	1	LS	25,410.00	25,410	1	LS	25,410.00	25,410
Sanitary	1	LS	43,560.00	43,560	1	LS	43,560.00	43,560
Electrical								
Services	1	LS	25,410.00	25,410	1	LS	25,410.00	25,410
Subtotal				**$9,898,274**				**$9,898,274**
Markups								
General conditions and project requirements								
General conditions and requirements	9.00%		9,898,274	890,845	9.00%		9,898,274	890,845
Bond and Insurance	2.00%		10,789,119	215,782	2.00%		10,789,119	215,782
Building permit	1.00%		11,004,901	110,049	1.00%		11,004,901	110,049

	Quantity	Unit	Rate	Total	Quantity	Unit	Rate	Total
Overhead and Profit								
Prime contractor's head office overhead and profit (Fee)	4.00%		11,114,950	444,598	4.00%		11,114,950	444,598
Subtotal				**$1,661,274**				**$1,661,274**
Contingencies/Escalation								
Contingencies								
Design contingency	18.00%		11,559,548	2,080,719	18.00%		11,559,548	2,080,719
GMP contingency	0.00%		13,640,267		0.00%		13,640,267	
Escalation								
Escalation to Start Date (July 2023)	7.50%		13,640,267	1,023,020	7.50%		13,640,267	1,023,020
Subtotal				**$3,103,739**				**$3,103,739**
ESTIMATED CONTRACT AWARD				**$14,663,287**				**$14,663,287**
3.2 JAGUAR/FLAMINGO HABITAT								
Trade Costs								
Site preparation								
Site preparation								
Site set up, clearance including demolition of existing habitat	32,000	SF	1.88	60,016	2,974	M2 GFA	20.18	60,016
Remove existing paving	536	SF	1.63	876	50	M2 GFA	17.52	876
Existing building demolition	4,432	SF	12.46	55,237	412	M2 GFA	134.07	55,237
Earthwork								
Strip topsoil - store	751	CY	12.46	9,359	571	M3	16.39	9,359
Cut to fill - general grading	3,556	CY	12.46	44,319	330	M3	134.30	44,319
Fine grading	3,556	SY	1.88	6,670	330	M2	20.21	6,670
Paving								
Decorative/Themed concrete paving	600	SF	14.04	8,422	56	M2	150.39	8,422
Site development								
Allow for site walls, furnishings etc.	25,240	SF	2.54	64,135	2,346	M2	27.34	64,135

3. Jaguar Habitat Expansion

	Quantity	Unit	Rate	Total	Quantity	Unit	Rate	Total
Animal barriers								
Mesh wall	100	LF	471.90	47,190	30	M	1,573.00	47,190
Landscaping								
Respread existing topsoil	751	CY	12.46	9,359	70	M3	133.70	9,359
Trees	10	EA	3,146.00	31,460	10	EA	3,146.00	31,460
Shrubs and ground cover	8,329	SF	12.71	105,821	774	M2	136.72	105,821
Animal grazing	6,310	SF	0.97	6,108	586	M2	10.42	6,108
Irrigation	25,240	SF	1.88	47,338	2,346	M2	20.18	47,338
Exhibits (within and around building)								
Artificial rockwork/mud work								
Waterway construction, including rockwork/mud work	3,800	SF	102.85	390,830	353	M2	1,107.17	390,830
Life support systems	75,000	GAL	11.19	839,438	75,000	LITER	11.19	839,438
Other rockwork (not on roof)	1	LS	93,170.00	93,170	1	LS	93,170.00	93,170
Natural exhibit construction								
Natural boulders	10	EA	847.00	8,470	10	EA	847.00	8,470
Natural deadfall	1	LS	25,410.00	25,410	1	LS	25,410.00	25,410
Artificial exhibit construction								
Artificial deadfall	1	LS	62,315.00	62,315	1	LS	62,315.00	62,315
Exhibit signage	1	LS	25,410.00	25,410	1	LS	25,410.00	25,410
Utilities								
Mechanical								
Water	1	LS	18,755.00	18,755	1	LS	18,755.00	18,755
Sanitary	1	LS	37,510.00	37,510	1	LS	37,510.00	37,510
Electrical								
Site lighting	1	LS	31,158.00	31,158	1	LS	31,158.00	31,158
Subtotal				**$2,028,776**				**$2,028,776**
Markups								
General conditions and project requirements								
General conditions and requirements	9.00%		2,028,776	182,590	9.00%		2,028,776	182,590
Bond and Insurance	2.00%		2,211,366	44,227	2.00%		2,211,366	44,227
Building permit	1.00%		2,255,593	22,556	1.00%		2,255,593	22,556

	Quantity	Unit	Rate	Total	Quantity	Unit	Rate	Total
Overhead and Profit								
Prime contractor's head office overhead and profit (Fee)	4.00%		2,278,149	91,126	4.00%		2,278,149	91,126
Subtotal				**$340,499**				**$340,499**
Contingencies/Escalation								
Contingencies								
Design contingency	18.00%		2,369,275	426,470	18.00%		2,369,275	426,470
GMP contingency	0.00%		2,795,745		0.00%		2,795,745	
Escalation								
Escalation to Start Date (July 2023)	7.50%		2,795,745	209,681	7.50%		2,795,745	209,681
Subtotal				**$636,151**				**$636,151**
ESTIMATED CONTRACT AWARD				**$3,005,426**				**$3,005,426**
3.3 JAGUAR/FLAMINGO TUBE								
Trade Costs								
Paving								
Decorative/Themed concrete paving, including preparation and making good landscaping	2,400	SF	24.20	58,080	223	M2	260.45	58,080
Elevated big cat line								
Based on similar at Philadelphia Zoo.	492	LF	2,662.00	1,309,704	150	M	8,731.36	1,309,704
Subtotal				**$1,367,784**				**$1,367,784**
Markups								
General conditions and project requirements								
General conditions and requirements	9.00%		1,367,784	123,101	9.00%		1,367,784	123,101
Bond and Insurance	2.00%		1,490,885	29,818	2.00%		1,490,885	29,818
Building permit	1.00%		1,520,703	15,207	1.00%		1,520,703	15,207
Overhead and Profit								
Prime contractor's head office overhead and profit (Fee)	4.00%		1,535,910	61,436	4.00%		1,535,910	61,436
Subtotal				**$229,562**				**$229,562**

3. Jaguar Habitat Expansion

	Quantity	Unit	Rate	Total	Quantity	Unit	Rate	Total
Contingencies/Escalation								
Contingencies								
Design contingency	*18.00%*		*1,597,346*	*287,522*	*18.00%*		*1,597,346*	*287,522*
GMP contingency	*0.00%*		*1,884,868*		*0.00%*		*1,884,868*	
Escalation								
Escalation to Start Date (July 2023)	*7.50%*		*1,884,868*	*141,365*	*7.50%*		*1,884,868*	*141,365*
Subtotal				***$428,887***				***$428,887***
ESTIMATED CONTRACT AWARD				***$2,026,233***				***$2,026,233***

4. African Rainforest Pavilion Refurbishment (Gorilland)

	Quantity	Unit	Rate	Total	Quantity	Unit	Rate	Total
4.1 GORILLAND STRUCTURE MODIFICATION								
Trade Costs								
Foundations								
New flooring at portion of building to remain	166	LF	330.27	54,825	51	M	1,075.00	54,825
Strip footings at junction with exhibit spaces, including retaining/foundations wall	1,000	LF	556.60	556,600	305	M	1,824.92	556,600
Underpin existing column footings at junction with habitat areas	33	LOC	17,303.00	570,999	33	EA	17,303.00	570,999
Underpin other interior columns to facilitate elevation changes	20	LOC	17,303.00	346,060	20	EA	17,303.00	346,060
Slab on grade								
New slab on grade within existing structure (assumed 30%)	26,867	SF	12.58	338,095	2,497	M2	135.40	338,095
Additional fill to make up levels within existing building	1,194	CY	99.70	119,047	913	M3	130.39	119,047
Additional earthwork								
Excavate to reduce levels under building, remove	1,194	CY	174.48	208,332	913	M3	228.18	208,332
Exterior walls								
Patch/infill exterior enclosure at removed building	1,500	SF	186.95	280,418	139	M2	2,017.40	280,418
New exterior wall at partially demolished building	2,490	SF	127.05	316,355	231	M2	1,369.50	316,355
Roofing								
Patching roofing at building partially demolished	1	LS	18,755.00	18,755	1	LS	18,755.00	18,755
Partitions								
Partitions,, animal barriers, rails, complete	53,733	SF GFA	29.95	1,609,169	4,994	M2	322.22	1,609,169
Interior doors								
Interior doors, shift gates etc.	53,733	SF GFA	14.10	757,447	53,733	LVLS	14.10	757,447
Specialties								
Specialties	53,733	SF GFA	0.97	52,013	4,994	M2 GFA	10.42	52,013
Allowance for miscellaneous metals	53,733	SF GFA	2.54	136,535	4,994	M2 GFA	27.34	136,535
Miscellaneous sealants throughout building	53,733	SF GFA	0.42	22,756	4,994	M2 GFA	4.56	22,756
Finishes								
Wall finishes	53,733	SF GFA	1.88	100,776	4,994	M2 GFA	20.18	100,776
Floor finishes, including moisture mitigation	53,733	SF GFA	3.75	201,552	4,994	M2 GFA	40.36	201,552
Ceiling finishes	53,733	SF GFA	3.15	169,044	4,994	M2 GFA	33.85	169,044
Demountable acoustic panels	10,747	SF	60.50	650,194	999	M2	650.84	650,194

4. African Rainforest Pavilion Refurbishment (Gorilland)

	Quantity	Unit	Rate	Total	Quantity	Unit	Rate	Total
MEP systems (assumed 50% replacement)								
Plumbing, complete	53,733	SF GFA	15.00	806,210	4,994	M2 GFA	161.44	806,210
Hvac, complete	53,733	SF GFA	37.51	2,015,525	4,994	M2 GFA	403.59	2,015,525
Fire protection, complete	53,733	SF GFA	3.75	201,552	4,994	M2 GFA	40.36	201,552
Electrical, complete	53,733	SF GFA	29.95	1,609,169	4,994	M2 GFA	322.22	1,609,169
Equipment								
Animal equipment such as pit scales etc.	1	LS	62,315.00	62,315	1	LS	62,315.00	62,315
Fixed furnishings								
Miscellaneous casework (50% replacement)	53,733	SF	1.33	71,518	4,994	M2	14.32	71,518
Selective demolition								
Interior demolitions	53,733	SF GFA	8.71	468,122	4,994	M2 GFA	93.74	468,122
Slab on grade demolition	26,867	SF	15.00	403,113	2,497	M2	161.44	403,113
Remove portion of existing building	7,000	SF	12.46	87,241	651	M2	134.01	87,241
Demolition within exhibit areas	22,467	SF	9.98	224,277	2,088	M2	107.41	224,277
Exhibits								
Rockwork, artificial exhibits, landscaping, life support systems, etc. in habitat areas	22,467	SF	43.56	978,663	2,088	M2	468.71	978,663
Subtotal				**$13,436,677**				**$13,436,677**
Markups								
General conditions and project requirements								
General conditions and requirements	9.00%		13,436,677	1,209,301	9.00%		13,436,677	1,209,301
Bond and Insurance	2.00%		14,645,978	292,920	2.00%		14,645,978	292,920
Building permit	1.00%		14,938,898	149,389	1.00%		14,938,898	149,389
Overhead and Profit								
Prime contractor's head office overhead and profit (Fee)	4.00%		15,088,287	603,531	4.00%		15,088,287	603,531
Subtotal				**$2,255,141**				**$2,255,141**
Contingencies/Escalation								
Contingencies								
Design contingency	18.00%		15,691,818	2,824,527	18.00%		15,691,818	2,824,527
GMP contingency	0.00%		18,516,345		0.00%		18,516,345	

	Quantity	Unit	Rate	Total	Quantity	Unit	Rate	Total
Escalation								
Escalation to Start Date (July 2023)	7.50%		18,516,345	1,388,726	7.50%		18,516,345	1,388,726
Subtotal				**$4,213,253**				**$4,213,253**
ESTIMATED CONTRACT AWARD				**$19,905,071**				**$19,905,071**

4.2 GORILLA TUBES

Trade Costs								
Elevated tube								
360 Pathway -similar to Philadelphia Zoo	1,489	LF	2,662.00	3,963,718	454	M	8,730.66	3,963,718
Subtotal				**$3,963,718**				**$3,963,718**
Markups								
General conditions and project requirements								
General conditions and requirements	9.00%		3,963,718	356,735	9.00%		3,963,718	356,735
Bond and Insurance	2.00%		4,320,453	86,409	2.00%		4,320,453	86,409
Building permit	1.00%		4,406,862	44,069	1.00%		4,406,862	44,069
Overhead and Profit								
Prime contractor's head office overhead and profit (Fee)	4.00%		4,450,931	178,037	4.00%		4,450,931	178,037
Subtotal				**$665,250**				**$665,250**
Contingencies/Escalation								
Contingencies								
Design contingency	18.00%		4,628,968	833,214	18.00%		4,628,968	833,214
GMP contingency	0.00%		5,462,182		0.00%		5,462,182	
Escalation								
Escalation to Start Date (July 2023)	7.50%		5,462,182	409,664	7.50%		5,462,182	409,664
Subtotal				**$1,242,878**				**$1,242,878**
ESTIMATED CONTRACT AWARD				**$5,871,846**				**$5,871,846**

4. African Rainforest Pavilion Refurbishment (Gorilland)

	Quantity	Unit	Rate	Total	Quantity	Unit	Rate	Total
4.3 GORILLAND SITE (OUTSIDE BLDG.)								
Trade Costs								
Site preparation								
Site preparation								
Site set up, clearance and demolition	12,800	SF	0.54	6,970	1,190	M2 GFA	5.86	6,970
Earthwork								
Strip topsoil - store	56	CY	12.46	698	43	M3	16.23	698
Cut to fill - general grading	474	CY	12.46	5,907	44	M3	134.25	5,907
Fine grading	333	SY	1.87	624	31	M2	20.13	624
Paving								
Decorative/Themed concrete paving	6,000	SF	14.04	84,216	558	M2	150.92	84,216
Animal surface	7,220	SF	3.75	27,082	671	M2	40.36	27,082
Site development								
Animal barriers - fence	206	LF	314.60	64,808	19	M2	3,410.95	64,808
Landscaping								
Respread existing topsoil	56	CY	12.46	698	5	M3	139.60	698
Trees	4	EA	3,146.00	12,584	4	EA	3,146.00	12,584
Mixed understory	1	LS	9,378.00	9,378		M2	#DIV/0!	9,378
Exhibits								
Allowance	1	LS	62,315.00	62,315	1	LS	62,315.00	62,315
Subtotal				**$275,280**				**$275,280**
Markups								
General conditions and project requirements								
General conditions and requirements	9.00%		275,280	24,775	9.00%		275,280	24,775
Bond and Insurance	2.00%		300,055	6,001	2.00%		300,055	6,001
Building permit	1.00%		306,056	3,061	1.00%		306,056	3,061
Overhead and Profit								
Prime contractor's head office overhead and profit (Fee)	4.00%		309,117	12,365	4.00%		309,117	12,365
Subtotal				**$46,202**				**$46,202**

4. African Rainforest Pavilion Refurbishment (Gorilland)

	Quantity	Unit	Rate	Total	Quantity	Unit	Rate	Total
Contingencies/Escalation								
Contingencies								
Design contingency	18.00%		321,482	57,867	18.00%		321,482	57,867
GMP contingency	0.00%		379,349		0.00%		379,349	
Escalation								
Escalation to Start Date (July 2023)	7.50%		379,349	28,451	7.50%		379,349	28,451
Subtotal				**$86,318**				**$86,318**
ESTIMATED CONTRACT AWARD				**$407,800**				**$407,800**

5.1 SANCTUARY STRUCTURE

	Quantity	Unit	Rate	Total	Quantity	Unit	Rate	Total
Trade Costs								
Foundations								
Strip footings at exterior, including foundation wa	500	LF	330.27	165,135	152	M	1,086.41	165,135
Column footings at exterior, including piers/pilasters	15	EA	2,420.00	36,300	15	EA	2,420.00	36,300
Column footings at interior, including piers	1	EA	2,299.00	2,299	1	EA	2,299.00	2,299
Slab on grade								
Standard slab on grade	6,460	SF	10.10	65,269	600	M2	108.78	65,269
Water pools, complete	1	EA	49,852.00	49,852	1	EA	49,852.00	49,852
Roof construction								
Steel construction, including metal decking	6,460	SF	45.98	297,031	600	M2	495.05	297,031
Concrete topping to roof	6,460	SF	7.26	46,900	600	M2	78.17	46,900
Miscellaneous								
Fireproofing	6,460	SF	2.72	17,587	600	M2	29.31	17,587
Exterior walls								
Interior backup - masonry	8,460	SF	47.43	401,275	786	M2	510.53	401,275
Exterior skin - unknown	8,460	SF	72.60	614,196	786	M2	781.42	614,196
Miscellaneous								
Scaffolding to exterior wall	11,280	SF	4.84	54,595	1,048	M2	52.09	54,595
Windows								
Aluminum curtain wall	2,820	SF	174.24	491,357	262	M2	1,875.41	491,357
Exterior doors								
Aluminum doors, complete	6	LVLS	4,840.00	29,040	6	LVLS	4,840.00	29,040
Animal doors	8	EA	4,719.00	37,752	8	EA	4,719.00	37,752
Door operators	1	EA	6,050.00	6,050	1	EA	6,050.00	6,050
Roofing								
Roof membrane with green roof (sedum trays)	6,460	SF	44.77	289,214	600	M2	482.02	289,214
Partitions								
Partitions,, animal barriers, rails, complete	6,460	SF GFA	29.95	193,461	600	M2	322.44	193,461
Interior doors								
Interior doors, shift gates etc.	6,460	SF GFA	14.22	91,845	6,460	LVLS	14.22	91,845
Specialties								
Specialties	6,460	SF GFA	0.97	6,253	600	M2 GFA	10.42	6,253
Allowance for miscellaneous metals	6,460	SF GFA	2.54	16,415	600	M2 GFA	27.36	16,415

	Quantity	Unit	Rate	Total	Quantity	Unit	Rate	Total
Miscellaneous sealants throughout building	6,460	SF GFA	0.42	2,736	600	M2 GFA	4.56	2,736
Finishes								
Wall finishes	6,460	SF GFA	5.75	37,129	600	M2 GFA	61.88	37,129
Floor finishes	6,460	SF GFA	17.55	113,341	600	M2 GFA	188.90	113,341
Ceiling finishes	6,460	SF GFA	15.00	96,926	600	M2 GFA	161.54	96,926
MEP systems								
Plumbing, complete	6,460	SF GFA	29.95	193,461	600	M2 GFA	322.44	193,461
Hvac, complete	6,460	SF GFA	65.34	422,096	600	M2 GFA	703.49	422,096
Fire protection, complete	6,460	SF GFA	7.50	48,463	600	M2 GFA	80.77	48,463
Electrical, complete	6,460	SF GFA	47.80	308,756	600	M2 GFA	514.59	308,756
Equipment								
Animal equipment such as pit scales etc.	1	LS	62,315.00	62,315	1	LS	62,315.00	62,315
Loading dock equipment	1	LS	25,894.00	25,894	1	LS	25,894.00	25,894
Maintenance equipment	1	LS	37,510.00	37,510	1	LS	37,510.00	37,510
Residential appliances	1	LS	3,146.00	3,146	1	LS	3,146.00	3,146
Fixed furnishings								
Miscellaneous casework	6,460	SF	2.54	16,415	600	M2	27.36	16,415
Window treatment	2,820	SF	24.93	70,291	262	M2	268.29	70,291
Exhibits								
Rockwork, artificial exhibits, landscaping, life support systems, etc. in habitat areas	6,460	SF	50.82	328,297	600	M2	547.16	328,297
Utilities								
Mechanical								
Water	1	LS	49,852.00	49,852	1	LS	49,852.00	49,852
Sanitary	1	LS	81,070.00	81,070	1	LS	81,070.00	81,070
Storm water	1	LS	93,473.00	93,473	1	LS	93,473.00	93,473
Gas	1	LS	15,004.00	15,004	1	LS	15,004.00	15,004
Electrical								
Services	1	LS	56,144.00	56,144	1	LS	56,144.00	56,144
Telecommunication	1	LS	18,755.00	18,755	1	LS	18,755.00	18,755
Subtotal				**$4,992,900**				**$4,992,900**

	Quantity	Unit	Rate	Total	Quantity	Unit	Rate	Total
Markups								
General conditions and project requirements								
General conditions and requirements	9.00%		4,992,900	449,361	9.00%		4,992,900	449,361
Bond and Insurance	2.00%		5,442,261	108,845	2.00%		5,442,261	108,845
Building permit	1.00%		5,551,106	55,511	1.00%		5,551,106	55,511
Overhead and Profit								
Prime contractor's head office overhead and profit (Fee)	4.00%		5,606,617	224,265	4.00%		5,606,617	224,265
Subtotal				**$837,982**				**$837,982**
Contingencies/Escalation								
Contingencies								
Design contingency	18.00%		5,830,882	1,049,559	18.00%		5,830,882	1,049,559
GMP contingency	0.00%		6,880,441		0.00%		6,880,441	
Escalation								
Escalation to Start Date (July 2023)	7.50%		6,880,441	516,033	7.50%		6,880,441	516,033
Subtotal				**$1,565,592**				**$1,565,592**
ESTIMATED CONTRACT AWARD				**$7,396,474**				**$7,396,474**

5.2 SANCTUARY SITE

Trade Costs								
Site preparation								
Site preparation								
Site set up, clearance and demolition	81,204	SF	0.60	49,128	7,547	M2 GFA	6.51	49,128
Temporary water cut off at pond	250	LF	310.97	77,743	76	M	1,022.93	77,743
Earthwork								
Strip topsoil - store	359	CY	12.47	4,475	273	M3	16.39	4,475
Cut to fill	3,008	CY	12.46	37,488	280	M3	133.89	37,488
Fine grading	9,023	SY	1.57	14,193	839	M2	16.92	14,193

	Quantity	Unit	Rate	Total	Quantity	Unit	Rate	Total
Paving								
Roadway/pedestrian pavement	2,300	SF	13.98	32,144	214	M2	150.21	32,144
Animal surface and grassland	74,744	SF	2.54	189,924	6,946	M2	27.34	189,924
Site development								
Animal barriers/fence	1,330	LF	62.32	82,879	439	M	188.79	82,879
Other site development and features	1	LS	31,158.00	31,158	1	LS	31,158.00	31,158
Landscaping								
Respread existing topsoil	359	CY	12.47	4,475	33	M3	135.61	4,475
Trees	20	EA	3,146.00	62,920	20	EA	3,146.00	62,920
Mixed understory	1	LS	24,926.00	24,926	1	LS	24,926.00	24,926
Wetlands development	1	LS	187,550.00	187,550	1	LS	187,550.00	187,550
Irrigation	74,744	SF	1.33	99,484	6,946	M2	14.32	99,484
Exhibits								
Allowance including water pools and life support systems	1	LS	375,100.00	375,100	1	LS	375,100.00	375,100
Utilities								
Electrical								
Lighting	1	LS	37,510.00	37,510	1	LS	31,000.00	37,510
Subtotal				**$1,311,097**				**$1,311,097**
Markups								
General conditions and project requirements								
General conditions and requirements	9.00%		1,311,097	117,999	9.00%		1,311,097	117,999
Bond and Insurance	2.00%		1,429,096	28,582	2.00%		1,429,096	28,582
Building permit	1.00%		1,457,678	14,577	1.00%		1,457,678	14,577
Overhead and Profit								
Prime contractor's head office overhead and profit (Fee)	4.00%		1,472,255	58,890	4.00%		1,472,255	58,890
Subtotal				**$220,048**				**$220,048**
Contingencies/Escalation								
Contingencies								
Design contingency	18.00%		1,531,145	275,606	18.00%		1,531,145	275,606
GMP contingency	0.00%		1,806,751		0.00%		1,806,751	

	Quantity	Unit	Rate	Total	Quantity	Unit	Rate	Total
Escalation								
Escalation to Start Date (July 2023)	*7.50%*		*1,806,751*	*135,506*	*7.50%*		*1,806,751*	*135,506*
Subtotal				***$411,112***				***$411,112***
ESTIMATED CONTRACT AWARD				***$1,942,257***				***$1,942,257***

6. Wilderness North and Art Walk

6.1 WILDERNESS NORTH YURTS

	Quantity	Unit	Rate	Total	Quantity	Unit	Rate	Total
Trade Costs								
Foundations								
Concrete pad	3,280	SF	11.34	37,188	305	M2	121.93	37,188
Enclosure								
Yurt	8	EA	49,852.00	398,816	1	EA	398,816.00	398,816
Partitions								
Restroom partition	1,024	SF	18.69	19,143	95	M2	201.51	19,143
Interior doors								
Interior doors,	8	EA	1,869.50	14,956	8	EA	1,869.50	14,956
Specialties								
Specialties	8	LS	934.75	7,478	1	M2 GFA	7,478.00	7,478
MEP systems								
Plumbing, complete	24	FIX	8,100.96	194,423	2	M2 GFA	97,211.50	194,423
Hvac, split system cooling	8	LS	5,608.38	44,867	1	M2 GFA	44,867.00	44,867
Electrical, complete	8	LS	3,738.88	29,911	1	M2 GFA	29,911.00	29,911
Utilities								
Mechanical								
Water	8	LS	18,694.50	149,556	8	LS	18,694.50	149,556
Sanitary	8	LS	14,955.63	119,645	8	LS	14,955.63	119,645
Electrical								
Services and lighting	8	LS	9,347.25	74,778	8	LS	9,347.25	74,778
Site preparation								
Site preparation								
Site set up, clearance and demolition	42,626	SF	1.25	53,125	3,962	M2 GFA	13.41	53,125
Earthwork								
Strip topsoil - store	1,184	CY	12.46	14,756	900	M3	16.40	14,756
Fill to make up levels after retaining wall construction	6,315	CY	37.39	236,112	587	M3	402.24	236,112
Fine grading	4,736	SY	1.88	8,883	440	M2	20.19	8,883
Paving								
Paths to yurts	3,856	SF	13.98	53,890	358	M2	150.53	53,890
Site development								
Foundation to retaining wall	936	LF	62.32	58,327	285	M	204.66	58,327
Retaining wall	5,616	SF	72.29	405,955	522	M2	777.69	405,955

6. Wilderness North and Art Walk

	Quantity	Unit	Rate	Total	Quantity	Unit	Rate	Total
Animal rail at retaining wall	2,200	LF	373.89	822,558	671	M	1,225.87	822,558
Landscaping								
Respread existing topsoil	1,184	CY	12.46	14,756	110	M3	134.15	14,756
Trees	20	EA	3,115.75	62,315	20	EA	3,115.75	62,315
Mixed understory	1	LS	24,926.00	24,926	1	LS	24,926.00	24,926
Irrigation	42,626	SF	1.56	66,535	3,962	M2	16.79	66,535
Exhibits								
Allowance	1	LS	24,926.00	24,926	1	LS	24,926.00	24,926
Subtotal				**$2,937,825**				**$2,937,825**
Markups								
General conditions and project requirements								
General conditions and requirements	9.00%		2,937,825	264,404	9.00%		2,937,825	264,404
Bond and Insurance	2.00%		3,202,229	64,045	2.00%		3,202,229	64,045
Building permit	1.00%		3,266,274	32,663	1.00%		3,266,274	32,663
Overhead and Profit				-				
Prime contractor's head office overhead and profit (Fee)	4.00%		3,298,937	131,957	4.00%		3,298,937	131,957
Subtotal				**$493,069**				**$493,069**
				-				
Contingencies/Escalation				-				
Contingencies				-				
Design contingency	18.00%		3,430,894	617,561	18.00%		3,430,894	617,561
GMP contingency	0.00%		4,048,455	-	0.00%		4,048,455	
Escalation				-				
Escalation to Start Date (July 2023)	7.50%		4,048,455	303,634	7.50%		4,048,455	303,634
Subtotal				**$921,195**				**$921,195**
ESTIMATED CONTRACT AWARD				**$4,352,089**				**$4,352,089**

	Quantity	Unit	Rate	Total	Quantity	Unit	Rate	Total
6.2 WILDERNESS NORTH PAVILION								
Trade Costs								
Architectural pavilion								
Complete building - pricing based on similar structure designed and constructed at Confluence Park in San Antonio TX.	1,850	SF	355.14	657,000	1,051	M2	625.12	657,000
Site preparation								
Site preparation								
Site set up, clearance and demolition	12,500	SF	1.21	15,125	1,162	M2 GFA	13.02	15,125
Earthwork								
Strip topsoil - store	347	CY	12.46	4,325	264	M3	16.38	4,325
Fill to make up levels after retaining wall construction	1,852	CY	37.51	69,469	172	M3	403.89	69,469
Fine grading	1,389	SY	1.88	2,605	129	M2	20.19	2,605
Paving								
Access walkways	4,820	SF	14.04	67,654	448	M2	151.01	67,654
Site development								
Foundation to retaining wall	250	LF	62.32	15,579	76	M	204.99	15,579
Retaining wall	1,250	SF	72.60	90,750	116	M2	782.33	90,750
Animal rail at retaining wall	250	LF	375.10	93,775	76	M	1,233.88	93,775
Landscaping								
Respread existing topsoil	347	CY	12.46	4,325	32	M3	135.16	4,325
Trees	4	EA	3,146.00	12,584	4	EA	3,146.00	12,584
Mixed understory	1	LS	6,232.00	6,232		M2	#DIV/0!	6,232
Irrigation	12,500	SF	1.88	23,444	1,162	M2	20.18	23,444
Subtotal				**$1,062,867**				**$1,062,867**
Markups								
General conditions and project requirements								
General conditions and requirements	9.00%		1,062,867	95,658	9.00%		1,062,867	95,658
Bond and Insurance	2.00%		1,158,525	23,171	2.00%		1,158,525	23,171
Building permit	1.00%		1,181,696	11,817	1.00%		1,181,696	11,817

	Quantity	Unit	Rate	Total	Quantity	Unit	Rate	Total
Overhead and Profit								
Prime contractor's head office overhead and profit (Fee)	4.00%		1,193,513	47,741	4.00%		1,193,513	47,741
Subtotal				**$178,387**				**$178,387**
Contingencies/Escalation								
Contingencies								
Design contingency	18.00%		1,241,254	223,426	18.00%		1,241,254	223,426
GMP contingency	0.00%		1,464,680		0.00%		1,464,680	
Escalation								
Escalation to Start Date (July 2023)	7.50%		1,464,680	109,851	7.50%		1,464,680	109,851
Subtotal				**$333,277**				**$333,277**
ESTIMATED CONTRACT AWARD				**$1,574,531**				**$1,574,531**

6.3 WILDERNESS NORTH ARTWALK

Trade Costs								
Site preparation								
Site preparation								
Site set up, clearance and demolition	24,000	SF	2.54	60,984	2,230	M2	27.35	60,984
Allow for water cut-off at overlook	1	LS	6,232.00	6,232	1	LS	6,232.00	6,232
Earthwork								
Strip topsoil - store	667	CY	12.46	8,313	507	M3	16.40	8,313
Fill to make up levels after retaining wall construction	444	CY	37.51	16,654	41	M3	406.20	16,654
Fine grading	2,667	SY	1.88	5,002	248	M2	20.17	5,002
Paving								
Access walkways	15,000	SF	14.04	210,540	1,394	M2	151.03	210,540
Beach	4,500	SF	75.02	337,590	418	M2	807.63	337,590
Vehicle bridge	1	LS	42,048.00	42,048	1	LS	42,048.00	42,048
Rails	100	LF	502.15	50,215	30	M	1,673.83	50,215

6. Wilderness North and Art Walk

	Quantity	Unit	Rate	Total	Quantity	Unit	Rate	Total
Site development								
Foundation to retaining wall	218	LF	62.32	13,585	66	M	205.83	13,585
Retaining wall	654	SF	72.60	47,480	61	M2	778.36	47,480
Animal barriers	3,000	LF	254.10	762,300	915	M	833.11	762,300
Landscaping								
Respread existing topsoil	667	CY	12.46	8,313	62	M3	134.08	8,313
Trees	20	EA	3,146.00	62,920	20	EA	3,146.00	62,920
Mixed understory	1	LS	12,705.00	12,705	1	LS	12,705.00	12,705
Irrigation	24,000	SF	1.88	45,012	2,230	M2	20.18	45,012
Animal care structures (similar to Fresno Zoo)								
River otter/raccoons	215	SF	381.15	81,947	20	M2	4,097.35	81,947
Eagle/Beaver	161	SF	435.60	70,132	15	M2	4,675.47	70,132
Utilities								
Water connections	2	EA	12,463.00	24,926	2	EA	12,463.00	24,926
Sanitary connections	2	EA	22,385.00	44,770	2	EA	22,385.00	44,770
Site lighting	25	EA	4,719.00	117,975	25	EA	4,719.00	117,975
Subtotal				**$2,029,643**				**$2,029,643**
Markups								
General conditions and project requirements								
General conditions and requirements	9.00%		2,029,643	182,668	9.00%		2,029,643	182,668
Bond and Insurance	2.00%		2,212,311	44,246	2.00%		2,212,311	44,246
Building permit	1.00%		2,256,557	22,566	1.00%		2,256,557	22,566
Overhead and Profit								
Prime contractor's head office overhead and profit (Fee)	4.00%		2,279,123	91,165	4.00%		2,279,123	91,165
Subtotal				**$340,645**				**$340,645**
Contingencies/Escalation								
Contingencies								
Design contingency	18.00%		2,370,288	426,652	18.00%		2,370,288	426,652
GMP contingency	0.00%		2,796,940		0.00%		2,796,940	

6. Wilderness North and Art Walk

	Quantity	Unit	Rate	Total	Quantity	Unit	Rate	Total
Escalation								
Escalation to Start Date (July 2023)	*7.50%*		*2,796,940*	*209,771*	*7.50%*		*2,796,940*	*209,771*
Subtotal				***$636,423***				***$636,423***
ESTIMATED CONTRACT AWARD				***$3,006,711***				***$3,006,711***

7. Nutrition Centre and Restaurant

7.1 GREENHOUSE AND PRODUCTION CENTRE

	Quantity	Unit	Rate	Total	Quantity	Unit	Rate	Total
Trade Costs								
Foundations								
Strip footings at exterior, including foundation wall	295	LF	330.27	97,429	90	M	1,082.54	97,429
Strip footings at interior plaza	170	LF	330.27	56,146	52	M	1,079.73	56,146
Column footings at exterior, including piers/pilasters	16	EA	2,178.00	34,848	16	EA	2,178.00	34,848
Column footings at courtyard, including piers	16	EA	2,178.00	34,848	16	EA	2,178.00	34,848
Slab on grade								
Standard slab on grade	3,900	SF	10.10	39,404	362	M2	108.85	39,404
Elevator/Escalator pit	1	EA	13,794.00	13,794	1	EA	13,794.00	13,794
Floor construction								
Steel construction, including metal decking	3,900	SF	45.98	179,322	362	M2	495.36	179,322
Concrete topping to floors	3,900	SF	7.26	28,314	362	M2	78.22	28,314
Miscellaneous								
Fireproofing and fire stopping	3,900	SF	2.78	10,854	362	M2	29.98	10,854
Roof construction								
Steel construction, including metal decking	3,900	SF	45.98	179,322	362	M2	495.36	179,322
Concrete topping to roof	3,900	SF	7.26	28,314	362	M2	78.22	28,314
Miscellaneous								
Fireproofing	3,900	SF	2.78	10,854	362	M2	29.98	10,854
Exterior walls								
Interior backup - metal stud	10,335	SF	26.20	270,741	961	M2	281.73	270,741
Exterior skin - metal	10,335	SF	78.65	812,848	961	M2	845.84	812,848
Miscellaneous								
Rail at roof level	465	LF	623.15	289,765	142	M	2,040.60	289,765
Scaffolding to exterior wall	13,950	SF	4.84	67,518	1,296	M2	52.10	67,518
Windows								
Aluminum curtain wall	6,975	SF	174.24	1,215,324	648	M2	1,875.50	1,215,324
Exterior doors								
Hollow metal doors or wood doors, frame and hardware	4	LVLS	2,904.00	11,616	4	LVLS	2,904.00	11,616
Aluminum doors, double leaf	4	LVLS	4,840.00	19,360	4	LVLS	4,840.00	19,360
Overhead doors	1	EA	7,260.00	7,260	1	EA	7,260.00	7,260
Door operators	1	EA	6,050.00	6,050	1	EA	6,050.00	6,050

7. Nutrition Centre and Restaurant

	Quantity	Unit	Rate	Total	Quantity	Unit	Rate	Total
Roofing								
TPO roof membrane, with green roof	3,900	SF	56.14	218,962	362	M2	604.87	218,962
Partitions								
Partitions, predominantly drywall	8,000	SF GFA	22.45	179,564	743	M2 GFA	241.67	179,564
Interior doors								
Interior metal or wood doors, complete	20	LVLS	2,904.00	58,080	20	LVLS	2,904.00	58,080
Specialties								
Specialties	8,000	SF GFA	3.63	29,040	743	M2 GFA	39.08	29,040
Allowance for miscellaneous metals	8,000	SF GFA	3.75	30,008	743	M2 GFA	40.39	30,008
Miscellaneous sealants throughout building	8,000	SF GFA	0.36	2,904	743	M2 GFA	3.91	2,904
Staircases								
Egress/Internal circulation staircases	4	FLT	27,467.00	109,868	4	FLT	27,467.00	109,868
Stair finishes								
Egress staircases	4	FLT	3,146.00	12,584	4	FLT	3,146.00	12,584
Finishes								
Wall finishes	7,800	SF GFA	2.54	19,820	725	M2 GFA	27.34	19,820
Floor finishes	7,800	SF GFA	1.94	15,101	725	M2 GFA	20.83	15,101
Ceiling finishes	7,800	SF GFA	3.15	24,539	725	M2 GFA	33.85	24,539
Conveying								
Passenger elevators, 3 stop	1	EA	188,760.00	188,760	1	EA	188,760.00	188,760
MEP systems								
Plumbing, complete	7,800	SF GFA	49.85	388,846	725	M2 GFA	536.34	388,846
Hvac, complete	7,800	SF GFA	44.17	344,487	725	M2 GFA	475.15	344,487
Fire protection, complete	7,800	SF GFA	8.71	67,954	725	M2 GFA	93.73	67,954
Electrical, complete	7,800	SF GFA	43.56	339,768	725	M2 GFA	468.65	339,768
Equipment								
Loading dock equipment	1	LS	15,004.00	15,004	1	LS	15,004.00	15,004
Miscellaneous equipment	1	LS	24,926.00	24,926	1	LS	24,926.00	24,926
Fixed furnishings								
Miscellaneous casework	7,800	SF	3.75	29,258	725	M2	40.36	29,258
Entry mat	50	SF	49.62	2,481	5	M2	496.20	2,481
Window treatment	6,975	SF	17.55	122,377	648	M2	188.85	122,377
Site preparation								
Site preparation								
Site set up, clearance	24,752	SF	0.61	14,975	2,300	M2 GFA	6.51	14,975
Pavement demolition	780	SF	1.51	1,180	72	M2 GFA	16.39	1,180

7. Nutrition Centre and Restaurant

	Quantity	Unit	Rate	Total	Quantity	Unit	Rate	Total
Earthwork								
Strip topsoil - store	666	CY	12.46	8,301	506	M3	16.41	8,301
Cut to fill - general grading	917	CY	12.46	11,428	85	M3	134.45	11,428
Fine grading	2,750	SY	1.94	5,324	256	M2	20.80	5,324
Paving								
Concrete sidewalk	3,048	SF	10.89	33,193	283	M2	117.29	33,193
Access roadway	1,564	SF	6.05	9,462	145	M2	65.26	9,462
Site development								
Allow for site walls, furnishings etc.	1	LS	6,232.00	6,232	1	LS	6,232.00	6,232
Landscaping								
Respread existing topsoil	666	CY	12.46	8,301	62	M3	133.89	8,301
Trees	3	EA	3,115.67	9,347	3	EA	3,115.67	9,347
Shrubs and ground cover	16,240	SF	3.75	60,916	1,509	M2	40.37	60,916
Irrigation	16,240	SF	1.88	30,458	1,509	M2	20.18	30,458
Exhibits								
Artificial exhibit construction								
Allowance	1	LS	37,389.00	37,389	1	LS	37,389.00	37,389
Utilities								
Mechanical								
Water	1	LS	25,108.00	25,108	1	LS	25,108.00	25,108
Sanitary	1	LS	43,560.00	43,560	1	LS	43,560.00	43,560
Storm water	1	LS	20,268.00	20,268	1	LS	20,268.00	20,268
Gas	1	LS	14,956.00	14,956	1	LS	14,956.00	14,956
Electrical								
Services	1	LS	37,389.00	37,389	1	LS	37,389.00	37,389
Telecommunication	1	LS	14,956.00	14,956	1	LS	14,956.00	14,956
Site lighting	1	LS	9,075.00	9,075	1	LS	9,075.00	9,075
Subtotal				**$6,040,080**				**$6,040,080**
Markups								
General conditions and project requirements								
General conditions and requirements	9.00%		6,040,080	543,607	9.00%		6,040,080	543,607
Bond and Insurance	2.00%		6,583,687	131,674	2.00%		6,583,687	131,674
Building permit	1.00%		6,715,361	67,154	1.00%		6,715,361	67,154

	Quantity	Unit	Rate	Total	Quantity	Unit	Rate	Total
Overhead and Profit								
Prime contractor's head office overhead and profit (Fee)	4.00%		6,782,515	271,301	4.00%		6,782,515	271,301
Subtotal				**$1,013,736**				**$1,013,736**
Contingencies/Escalation								
Contingencies								
Design contingency	18.00%		7,053,816	1,269,687	18.00%		7,053,816	1,269,687
GMP contingency	0.00%		8,323,503		0.00%		8,323,503	
Escalation								
Escalation to Start Date (July 2023)	7.50%		8,323,503	624,263	7.50%		8,323,503	624,263
Subtotal				**$1,893,950**				**$1,893,950**
ESTIMATED CONTRACT AWARD				**$8,947,766**				**$8,947,766**

7.2 RESTAURANT

Trade Costs								
Foundations								
Strip footings at exterior, including foundation wall	250	LF	330.27	82,568	76	M	1,086.42	82,568
Strip footings at interior plaza	170	LF	330.27	56,146	52	M	1,079.73	56,146
Column footings at exterior, including piers/pilasters	14	EA	2,178.00	30,492	14	EA	2,178.00	30,492
Column footings at interior, including piers	16	EA	2,178.00	34,848	16	EA	2,178.00	34,848
Slab on grade								
Standard slab on grade	3,900	SF	10.10	39,404	362	M2	108.85	39,404
Floor construction								
Steel construction, including metal decking	3,900	SF	45.98	179,322	362	M2	495.36	179,322
Concrete topping to floors	3,900	SF	7.26	28,314	362	M2	78.22	28,314
Miscellaneous								
Fireproofing and fire stopping	3,900	SF	2.78	10,854	362	M2	29.98	10,854

7. Nutrition Centre and Restaurant

	Quantity	Unit	Rate	Total	Quantity	Unit	Rate	Total
Roof construction								
Steel construction, including metal decking	3,900	SF	45.98	179,322	362	M2	495.36	179,322
Concrete topping to roof	3,900	SF	7.26	28,314	362	M2	78.22	28,314
Miscellaneous								
Fireproofing	3,900	SF	2.78	10,854	362	M2	29.98	10,854
Exterior walls								
Interior backup - metal stud	7,020	SF	26.20	183,899	652	M2	282.05	183,899
Exterior skin - metal	7,020	SF	78.65	552,123	652	M2	846.81	552,123
Miscellaneous								
Rail at roof level	465	LF	623.15	289,765	142	M	2,040.60	289,765
Scaffolding to exterior wall	13,320	SF	4.84	64,469	1,238	M2	52.08	64,469
Windows								
Aluminum curtain wall	6,300	SF	174.24	1,097,712	586	M2	1,873.23	1,097,712
Exterior doors								
Hollow metal doors or wood doors, frame and hardware	2	LVLS	2,904.00	5,808	2	LVLS	2,904.00	5,808
Aluminum doors	4	LVLS	4,840.00	19,360	4	LVLS	4,840.00	19,360
Door operators	1	EA	6,050.00	6,050	1	EA	6,050.00	6,050
Roofing								
TPO roof membrane with green roof	3,900	SF	54.45	212,355	362	M2	586.62	212,355
Partitions								
Partitions, predominantly drywall	8,000	SF GFA	27.47	219,736	743	M2 GFA	295.74	219,736
Interior doors								
Interior metal or wood doors, complete	13	LVLS	2,904.00	37,752	13	LVLS	2,904.00	37,752
Specialties								
Specialties	8,000	SF GFA	4.96	39,688	743	M2 GFA	53.42	39,688
Allowance for miscellaneous metals	8,000	SF GFA	2.54	20,328	743	M2 GFA	27.36	20,328
Miscellaneous sealants throughout building	8,000	SF GFA	0.42	3,388	743	M2 GFA	4.56	3,388
Staircases								
Feature staircase	1	FLT	62,315.00	62,315	1	FLT	62,315.00	62,315
Egress/Internal circulation staircases	1	FLT	27,467.00	27,467	1	FLT	27,467.00	27,467
Stair finishes								
Feature staircases	1	FLT	9,075.00	9,075	1	FLT	9,075.00	9,075
Egress staircases	1	FLT	3,146.00	3,146	1	FLT	3,146.00	3,146
Finishes								
Wall finishes	7,800	SF GFA	6.29	49,078	725	M2 GFA	67.69	49,078
Floor finishes, including moisture mitigation	7,800	SF GFA	15.00	117,031	725	M2 GFA	161.42	117,031

7. Nutrition Centre and Restaurant

	Quantity	Unit	Rate	Total	Quantity	Unit	Rate	Total
Ceiling finishes	7,800	SF GFA	9.98	77,864	725	M2 GFA	107.40	77,864
MEP systems								
Plumbing, complete	7,800	SF GFA	37.51	292,578	725	M2 GFA	403.56	292,578
Hvac, complete	7,800	SF GFA	81.07	632,346	725	M2 GFA	872.20	632,346
Fire protection, complete	7,800	SF GFA	7.50	58,516	725	M2 GFA	80.71	58,516
Electrical, complete	7,800	SF GFA	56.14	437,923	725	M2 GFA	604.03	437,923
Equipment								
Food service equipment	1	LS	156,090.00	156,090	1	LS	156,090.00	156,090
Fixed furnishings								
Miscellaneous casework	7,800	SF	1.33	10,382	725	M2	14.32	10,382
Entry mat	50	SF	60.50	3,025	5	M2	605.00	3,025
Demolition								
Interface with existing building	1	LS	25,410.00	25,410	1	LS	25,410.00	25,410
Site preparation								
Site preparation								
Site set up, clearance	5,500	SF	0.54	2,995	511	M2 GFA	5.86	2,995
Earthwork								
Strip topsoil - store	153	CY	12.46	1,907	116	M3	16.44	1,907
Cut to fill - general grading	204	CY	12.46	2,542	19	M3	133.79	2,542
Fine grading	611	SY	1.94	1,183	57	M2	20.75	1,183
Paving								
Paving within enclosed terrace	1,964	SF	56.14	110,267	183	M2	602.55	110,267
Site development								
Allow for site walls, furnishings etc.	1	LS	6,292.00	6,292	1	LS	6,292.00	6,292
Landscaping								
Respread existing topsoil	153	CY	12.46	1,907	14	M3	136.21	1,907
Trees	2	EA	3,146.00	6,292	2	EA	3,146.00	6,292
Shrubs and ground cover	7,464	SF	3.75	27,997	694	M2	40.34	27,997
Irrigation	7,464	SF	1.88	13,998	694	M2	20.17	13,998
Exhibits								
Artificial exhibit construction								
Allowance	1	LS	18,755.00	18,755	1	LS	18,755.00	18,755
Utilities								
Mechanical								
Sanitary	1	LS	24,926.00	24,926	1	LS	24,926.00	24,926
Storm water	1	LS	9,015.00	9,015	1	LS	9,015.00	9,015

	Quantity	Unit	Rate	Total	Quantity	Unit	Rate	Total
Electrical								
Site lighting	1	LS	9,075.00	9,075	1	LS	9,075.00	9,075
Subtotal				**$5,632,268**				**$5,632,268**
Markups								
General conditions and project requirements								
General conditions and requirements	9.00%		5,632,268	506,904	9.00%		5,632,268	506,904
Bond and Insurance	2.00%		6,139,172	122,783	2.00%		6,139,172	122,783
Building permit	1.00%		6,261,955	62,620	1.00%		6,261,955	62,620
Overhead and Profit								
Prime contractor's head office overhead and profit (Fee)	4.00%		6,324,575	252,983	4.00%		6,324,575	252,983
Subtotal				**$945,290**				**$945,290**
Contingencies/Escalation								
Contingencies								
Design contingency	18.00%		6,577,558	1,183,960	18.00%		6,577,558	1,183,960
GMP contingency	0.00%		7,761,518		0.00%		7,761,518	
Escalation								
Escalation to Start Date (July 2023)	7.50%		7,761,518	582,114	7.50%		7,761,518	582,114
Subtotal				**$1,766,074**				**$1,766,074**
ESTIMATED CONTRACT AWARD				**$8,343,632**				**$8,343,632**

7.3 PLAZA

Trade Costs								
Site preparation								
Site preparation								
Site set up, clearance	8,525	SF	0.42	3,611	792	M2 GFA	4.56	3,611
Pavement demolition	8,525	SF	1.51	12,894	792	M2 GFA	16.28	12,894

7. Nutrition Centre and Restaurant

	Quantity	Unit	Rate	Total	Quantity	Unit	Rate	Total
Earthwork								
Strip topsoil - store	1	LS	3,751.00	3,751	1	LS	3,751.00	3,751
Fine grading	947	SY	2.54	2,407	88	M2	27.35	2,407
Paving								
Pavers	8,525	SF	50.82	433,241	792	M2	547.02	433,241
Site development								
Allow for site walls, furnishings etc.	1	LS	18,755.00	18,755	1	LS	18,755.00	18,755
Landscaping								
Respread existing topsoil	1	CY	1,876.00	1,876	1	LS	1,876.00	1,876
Trees	6	EA	3,146.00	18,876	6	EA	3,146.00	18,876
Shrubs and ground cover	1	LS	9,378.00	9,378	1	LS	9,378.00	9,378
Irrigation	1	LS	3,751.00	3,751	1	LS	3,751.00	3,751
Utilities								
Storm drainage	1	LS	18,755.00	18,755	1	LS	15,500.00	18,755
Electrical								
Power and data	1	LS	9,136.00	9,136	1	LS	7,550.00	9,136
Lighting	1	LS	18,755.00	18,755	1	LS	15,500.00	18,755
Subtotal				**$555,186**				**$555,186**
Markups								
General conditions and project requirements								
General conditions and requirements	9.00%		555,186	49,967	9.00%		555,186	49,967
Bond and Insurance	2.00%		605,153	12,103	2.00%		605,153	12,103
Building permit	1.00%		617,256	6,173	1.00%		617,256	6,173
Overhead and Profit								
Prime contractor's head office overhead and profit (Fee)	4.00%		623,429	24,937	4.00%		623,429	24,937
Subtotal				**$93,180**				**$93,180**
Contingencies/Escalation								
Contingencies								
Design contingency	18.00%		648,366	116,706	18.00%		648,366	116,706
GMP contingency	0.00%		765,072		0.00%		765,072	

	Quantity	Unit	Rate	Total	Quantity	Unit	Rate	Total
Escalation								
Escalation to Start Date (July 2023)	7.50%		765,072	57,380	7.50%		765,072	57,380
Subtotal				**$174,086**				**$174,086**
ESTIMATED CONTRACT AWARD				**$822,452**				**$822,452**

7.4 COURTYARDS

Trade Costs								
Paving								
Paving within enclosed terrace	2,430	SF	56.14	136,430	226	M2	603.67	136,430
Site development								
Allowance for specialties in interior terrace	1	LS	18,695.00	18,695	1	LS	18,695.00	18,695
Landscaping								
Respread existing topsoil	45	CY	12.47	561	4	M3	140.25	561
Trees	4	EA	3,115.75	12,463	4	EA	3,115.75	12,463
Shrubs and ground cover	2,430	SF	3.75	9,115	226	M2	40.33	9,115
Irrigation	2,430	SF	1.88	4,558	226	M2	20.17	4,558
Utilities								
Mechanical								
Water	1	LS	6,050.00	6,050	1	LS	6,050.00	6,050
Sanitary	1	LS	8,470.00	8,470	1	LS	8,470.00	8,470
Storm water	1	LS	21,780.00	21,780	1	LS	21,780.00	21,780
Electrical								
Site lighting	1	LS	9,680.00	9,680	1	LS	9,680.00	9,680
Subtotal				**$227,802**				**$227,802**
Markups								
General conditions and project requirements								
General conditions and requirements	9.00%		227,802	20,502	9.00%		227,802	20,502
Bond and Insurance	2.00%		248,304	4,966	2.00%		248,304	4,966
Building permit	1.00%		253,270	2,533	1.00%		253,270	2,533

7. Nutrition Centre and Restaurant

	Quantity	Unit	Rate	Total	Quantity	Unit	Rate	Total
Overhead and Profit								
Prime contractor's head office overhead and profit (Fee)	*4.00%*		*255,803*	*10,232*	*4.00%*		*255,803*	*10,232*
Subtotal				***$38,233***				***$38,233***
Contingencies/Escalation								
Contingencies								
Design contingency	*18.00%*		*266,035*	*47,886*	*18.00%*		*266,035*	*47,886*
GMP contingency	*0.00%*		*313,921*		*0.00%*		*313,921*	
Escalation								
Escalation to Start Date (July 2023)	*7.50%*		*313,921*	*23,544*	*7.50%*		*313,921*	*23,544*
Subtotal				***$71,430***				***$71,430***
ESTIMATED CONTRACT AWARD				***$337,465***				***$337,465***

8.1 AMERICAS PAVILION STRUCTURE

	Quantity	Unit	Rate	Total	Quantity	Unit	Rate	Total
Trade Costs								
Foundations								
Strip footings at exterior, including foundation wa	500	LF	330.27	165,135	152	M	1,086.41	165,135
Strip footings at retaining wall	330	LF	467.36	154,230	101	M	1,527.03	154,230
Strip footings at ramp retaining wall	180	LF	467.36	84,125	55	M	1,529.55	84,125
Column footings at exterior, including piers/pilasters	28	EA	2,178.00	60,984	28	EA	2,178.00	60,984
Column footings at interior, including piers	39	EA	2,057.00	80,223	39	EA	2,057.00	80,223
Slab on grade								
Standard slab on grade	6,617	SF	10.10	66,855	615	M2	108.71	66,855
Retaining wall earthwork								
Earthwork, including removal and backfill	1,980	CY	93.47	185,076	1,514	M3	122.24	185,076
Retaining wall								
Retaining walls, complete	6,600	SF	67.76	447,216	613	M2	729.55	447,216
Retaining walls at ramp	2,160	SF	67.76	146,362	201	M2	728.17	146,362
Roof construction								
Steel construction, including metal decking	60,000	SF	67.76	4,065,600	5,576	M2	729.12	4,065,600
Concrete topping to roof	53,795	SF	7.26	390,552	5,000	M2	78.11	390,552
Miscellaneous								
Fireproofing	60,000	SF	2.78	166,980	5,576	M2	29.95	166,980
Exterior walls								
Interior backup - masonry	3,750	SF	47.43	177,870	349	M2	509.66	177,870
Exterior skin - unknown	3,750	SF	72.60	272,250	349	M2	780.09	272,250
Miscellaneous								
Rail at roof level	830	LF	623.15	517,215	253	M	2,044.33	517,215
Rail at ramp	180	LF	66.55	11,979	55	M	217.80	11,979
Scaffolding to exterior wall	7,500	SF	4.84	36,300	697	M2	52.08	36,300
Windows								
Aluminum curtain wall	3,750	SF	174.24	653,400	349	M2	1,872.21	653,400
Exterior doors								
Aluminum doors, double leaf	6	LVL	4,840.00	29,040	6	LVLS	4,840.00	29,040
Overhead doors	1	EA	8,470.00	8,470	1	EA	8,470.00	8,470
Door operators	2	EA	6,050.00	12,100	2	EA	6,050.00	12,100

8. Americas Pavilion Redevelopment

	Quantity	Unit	Rate	Total	Quantity	Unit	Rate	Total
Roofing								
TPO roof membrane, green roof	30,000	SF	72.60	2,178,000	2,788	M2	781.21	2,178,000
TPO roof membrane with pavers	30,000	SF	66.55	1,996,500	2,788	M2	716.10	1,996,500
Roof openings								
Skylights	8,700	SF	187.55	1,631,685	809	M2	2,016.92	1,631,685
Partitions								
Partitions,, animal barriers, rails, complete	61,000	SF GFA	29.95	1,826,798	5,669	M2	322.24	1,826,798
Interior doors								
Interior doors, shift gates etc.	61,000	SF GFA	14.16	863,577	61,000	LVLS	14.16	863,577
Specialties								
Specialties	61,000	SF GFA	0.97	59,048	5,669	M2 GFA	10.42	59,048
Allowance for miscellaneous metals	61,000	SF GFA	2.54	155,001	5,669	M2 GFA	27.34	155,001
Miscellaneous sealants throughout building	61,000	SF GFA	0.42	25,834	5,669	M2 GFA	4.56	25,834
Finishes								
Wall finishes	61,000	SF GFA	1.88	114,406	5,669	M2 GFA	20.18	114,406
Floor finishes, including moisture mitigation	61,000	SF GFA	3.75	228,811	5,669	M2 GFA	40.36	228,811
Ceiling finishes	61,000	SF GFA	24.93	1,520,486	5,669	M2 GFA	268.21	1,520,486
MEP systems								
Plumbing, complete	61,000	SF GFA	24.93	1,520,486	5,669	M2 GFA	268.21	1,520,486
Hvac, complete	61,000	SF GFA	68.67	4,188,718	5,669	M2 GFA	738.88	4,188,718
Fire protection, complete	61,000	SF GFA	7.50	457,622	5,669	M2 GFA	80.72	457,622
Electrical, complete	61,000	SF GFA	52.64	3,210,735	5,669	M2 GFA	566.37	3,210,735
Equipment								
Animal equipment such as pit scales etc.	1	LS	62,315.00	62,315	1	LS	62,315.00	62,315
Loading dock equipment	1	LS	15,004.00	15,004	1	LS	15,004.00	15,004
Maintenance equipment	1	LS	37,510.00	37,510	1	LS	37,510.00	37,510
Residential appliances	1	LS	3,146.00	3,146	1	LS	3,146.00	3,146
Fixed furnishings								
Miscellaneous casework	61,000	SF	2.54	155,001	5,669	M2	27.34	155,001
Window treatment	3,750	SF	24.81	93,019	349	M2	266.53	93,019
Exhibits								
Rockwork, artificial exhibits, landscaping, life support systems, etc. in habitat areas	6,100	SF	151.25	922,625	567	M2	1,627.20	922,625
Utilities								
Mechanical								
Water	1	LS	18,755.00	18,755	1	LS	18,755.00	18,755
Sanitary	1	LS	37,510.00	37,510	1	LS	37,510.00	37,510

	Quantity	Unit	Rate	Total	Quantity	Unit	Rate	Total
Storm water	1	LS	37,510.00	37,510	1	LS	37,510.00	37,510
Gas	1	LS	9,378.00	9,378	1	LS	9,378.00	9,378
Electrical								
Services	1	LS	37,510.00	37,510	1	LS	37,510.00	37,510
Telecommunication	1	LS	15,004.00	15,004	1	LS	15,004.00	15,004
Site lighting	1	LS	18,755.00	18,755	1	LS	18,755.00	18,755
Subtotal				**$29,172,711**				**$29,172,711**
Markups								
General conditions and project requirements								
General conditions and requirements	9.00%		29,172,711	2,625,544	9.00%		29,172,711	2,625,544
Bond and Insurance	2.00%		31,798,255	635,965	2.00%		31,798,255	635,965
Building permit	1.00%		32,434,220	324,342	1.00%		32,434,220	324,342
Overhead and Profit								
Prime contractor's head office overhead and profit (Fee)	4.00%		32,758,562	1,310,342	4.00%		32,758,562	1,310,342
Subtotal				**$4,896,193**				**$4,896,193**
Contingencies/Escalation								
Contingencies								
Design contingency	18.00%		34,068,904	6,132,403	18.00%		34,068,904	6,132,403
GMP contingency	0.00%		40,201,307		0.00%		40,201,307	
Escalation								
Escalation to Start Date (July 2023)	7.50%		40,201,307	3,015,098	7.50%		40,201,307	3,015,098
Subtotal				**$9,147,501**				**$9,147,501**
ESTIMATED CONTRACT AWARD				**$43,216,405**				**$43,216,405**

8.2 AMERICAS PAVILION SITE

	Quantity	Unit	Rate	Total	Quantity	Unit	Rate	Total
Trade Costs								
Site preparation								
Site preparation								
Site set up, clearance and demolition	21,900	SF	1.33	29,149	2,035	M2 GFA	14.32	29,149
Pavement demolition	9,000	SF	1.51	13,613	836	M2 GFA	16.28	13,613
Existing building demolition	11,386	SF	18.75	213,544	1,058	M2 GFA	201.84	213,544
Earthwork								
Strip topsoil - store	28	CY	12.43	348	21	M3	16.57	348
Cut to fill - general grading including fill under ramps	1,622	CY	12.46	20,215	151	M3	133.87	20,215
Fine grading	168	SY	1.88	315	16	M2	19.69	315
Paving								
Decorative/Themed concrete paving	1,000	SF	14.04	14,036	93	M2	150.92	14,036
Site development								
Amphitheater	2,200	SF	62.32	137,093	204	M2	672.02	137,093
Other site development and features	1	LS	36,300.00	36,300		LS	#DIV/0!	36,300
Landscaping								
Respread existing topsoil	28	CY	12.43	348	3	M3	116.00	348
Trees	10	EA	3,146.00	31,460	10	EA	3,146.00	31,460
Mixed understory	2,500	SF	6.29	15,730	232	M2	67.80	15,730
Irrigation	2,500	SF	1.88	4,689	232	M2	20.21	4,689
Exhibits								
Artificial exhibit construction								
Allowance	1	LS	12,100.00	12,100	1	LS	12,100.00	12,100
Exhibit signage	1	LS	14,520.00	14,520	1	LS	14,520.00	14,520
Utilities								
Electrical								
Lighting	1	LS	14,520.00	14,520	1	LS	12,000.00	14,520
Subtotal				**$557,980**				**$557,980**

	Quantity	Unit	Rate	Total	Quantity	Unit	Rate	Total
Markups								
General conditions and project requirements								
General conditions and requirements	*9.00%*		*557,980*	*50,218*	*9.00%*		*557,980*	*50,218*
Bond and Insurance	*2.00%*		*608,198*	*12,164*	*2.00%*		*608,198*	*12,164*
Building permit	*1.00%*		*620,362*	*6,204*	*1.00%*		*620,362*	*6,204*
Overhead and Profit								
Prime contractor's head office overhead and profit (Fee)	*4.00%*		*626,566*	*25,063*	*4.00%*		*626,566*	*25,063*
Subtotal				***$93,649***				***$93,649***
Contingencies/Escalation								
Contingencies								
Design contingency	*18.00%*		*651,629*	*117,293*	*18.00%*		*651,629*	*117,293*
GMP contingency	*0.00%*		*768,922*		*0.00%*		*768,922*	
Escalation								
Escalation to Start Date (July 2023)	*7.50%*		*768,922*	*57,669*	*7.50%*		*768,922*	*57,669*
Subtotal				***$174,962***				***$174,962***
ESTIMATED CONTRACT AWARD				***$826,591***				***$826,591***

9.1 THE SAFARI MEANDER ANIMAL BRIDGE

	Quantity	Unit	Rate	Total	Quantity	Unit	Rate	Total
Trade Costs								
Animal bridge								
Animal bridge structure and buildings (similar in concept and structure to Atlanta Legacy Makers @ Woodruff Park In Atlanta GA)	8,000	SF	1,514.25	12,114,036	2,439	M	4,966.80	12,114,036
Add for café equipment	1	LS	49,852.00	49,852	1	LS	49,852.00	49,852
Additional retaining walls	1	LS	124,630.00	124,630	1	LS	124,630.00	124,630
Utilities								
Mechanical								
Water	1	LS	24,926.00	24,926	1	LS	24,926.00	24,926
Sanitary	1	LS	81,010.00	81,010	1	LS	81,010.00	81,010
Storm water	1	LS	56,084.00	56,084	1	LS	56,084.00	56,084
Electrical								
Services	1	LS	37,389.00	37,389	1	LS	37,389.00	37,389
Telecommunication	1	LS	14,956.00	14,956	1	LS	14,956.00	14,956
Subtotal				**$12,502,883**				**$12,502,883**
Markups								
General conditions and project requirements								
General conditions and requirements	9.00%		12,502,883	1,125,259	9.00%		12,502,883	1,125,259
Bond and Insurance	2.00%		13,628,142	272,563	2.00%		13,628,142	272,563
Building permit	1.00%		13,900,705	139,007	1.00%		13,900,705	139,007
Overhead and Profit								
Prime contractor's head office overhead and profit (Fee)	4.00%		14,039,712	561,588	4.00%		14,039,712	561,588
Subtotal				**$2,098,417**				**$2,098,417**
Contingencies/Escalation								
Contingencies								
Design contingency	18.00%		14,601,300	2,628,234	18.00%		14,601,300	2,628,234
GMP contingency	0.00%		17,229,534		0.00%		17,229,534	

	Quantity	Unit	Rate	Total	Quantity	Unit	Rate	Total
Escalation								
Escalation to Start Date (July 2023)	7.50%		17,229,534	1,292,215	7.50%		17,229,534	1,292,215
Subtotal				**$3,920,449**				**$3,920,449**
ESTIMATED CONTRACT AWARD				**$18,521,749**				**$18,521,749**

9.2 THE SAFARI MEANDER BUSH CAMP (10#)

Trade Costs								
Foundations								
Wood deck structure	300	SF	36.30	10,890	28	M2	388.93	10,890
Enclosure								
Tent	10	EA	7,986.00	79,860	1	EA	79,860.00	79,860
Specialties								
Specialties	10	LS	937.80	9,378	1	M2 GFA	9,378.00	9,378
MEP systems								
Electrical, complete	10	LS	3,630.00	36,300	1	M2 GFA	36,300.00	36,300
Utilities								
Electrical								
Services and lighting	10	LS	3,146.00	31,460	10	LS	3,146.00	31,460
Site preparation								
Site preparation								
Site set up, clearance and demolition	4,000	SF	2.42	9,680	372	M2 GFA	26.02	9,680
Earthwork								
Strip topsoil - store	111	CY	12.46	1,383	84	M3	16.46	1,383
Fine grading	444	SY	1.93	859	41	M2	20.95	859
Site development								
Animal rail	330	LF	375.10	123,783	101	M	1,225.57	123,783
Landscaping								
Respread existing topsoil	111	CY	12.46	1,383	10	M3	138.30	1,383

	Quantity	Unit	Rate	Total	Quantity	Unit	Rate	Total
Seeding	4,000	SF	0.61	2,420	372	M2	6.51	2,420
Irrigation	4,000	SF	1.88	7,502	372	M2	20.17	7,502
Subtotal				**$314,898**				**$314,898**
Markups								
General conditions and project requirements								
General conditions and requirements	9.00%		314,898	28,341	9.00%		314,898	28,341
Bond and Insurance	2.00%		343,239	6,865	2.00%		343,239	6,865
Building permit	1.00%		350,104	3,501	1.00%		350,104	3,501
Overhead and Profit								
Prime contractor's head office overhead and profit (Fee)	4.00%		353,605	14,144	4.00%		353,605	14,144
Subtotal				**$52,851**				**$52,851**
Contingencies/Escalation								
Contingencies								
Design contingency	18.00%		367,749	66,195	18.00%		367,749	66,195
GMP contingency	0.00%		433,944		0.00%		433,944	
Escalation								
Escalation to Start Date (July 2023)	7.50%		433,944	32,546	7.50%		433,944	32,546
Subtotal				**$98,741**				**$98,741**
ESTIMATED CONTRACT AWARD				**$466,490**				**$466,490**

9.3 THE SAFARI MEANDER SITE

Trade Costs								
Plaza								
Site preparation								
Site preparation								
Site set up, clearance and demolition	30,000	SF	0.91	27,225	2,788	M2	9.77	27,225
Pavement demolition	8,800	SF	1.63	14,375	818	M2	17.57	14,375

	Quantity	Unit	Rate	Total	Quantity	Unit	Rate	Total
Earthwork								
Strip topsoil - store	589	CY	12.46	7,341	448	M3	16.39	7,341
Fine grading	3,333	SY	2.54	8,469	310	M2	27.32	8,469
Paving								
Decorative themed concrete	21,464	SF	16.94	363,600	1,995	M2	182.26	363,600
Site development								
Allowance	1	LS	25,410.00	25,410	1	LS	25,410.00	25,410
Animal barriers	1,200	LF	314.60	377,520	366	M	1,031.48	377,520
Landscaping								
Respread existing topsoil	589	CY	12.46	7,341	55	M3	133.47	7,341
Trees	12	EA	3,146.00	37,752	12	EA	3,146.00	37,752
Mixed understory	1	LS	25,410.00	25,410	1	LS	25,410.00	25,410
Irrigation	8,536	SF	1.63	13,944	793	M2	17.58	13,944
Utilities								
Storm drainage	1	EA	25,410.00	25,410	1	LS	25,410.00	25,410
Site lighting	10	EA	4,719.00	47,190	10	EA	4,719.00	47,190
Exhibit area								
Site preparation								
Cheetah expansion (based on Cheetah exhibit at Nashville Zoo)	49,400	SF	88.33	4,363,502	4,591	M2	950.45	4,363,502
Gorilla expansion (based on primate exhibit at Nashville Zoo)	21,900	SF	43.92	961,914	2,035	M2	472.69	961,914
Minor improvements to hoof areas (assumed 15% cost of new)	215,788	SF	3.93	848,586	20,055	M2	42.31	848,586
Subtotal				**$7,154,989**				**$7,154,989**
Markups								
General conditions and project requirements								
General conditions and requirements	9.00%		7,154,989	643,949	9.00%		7,154,989	643,949
Bond and Insurance	2.00%		7,798,938	155,979	2.00%		7,798,938	155,979
Building permit	1.00%		7,954,917	79,549	1.00%		7,954,917	79,549
Overhead and Profit								
Prime contractor's head office overhead and profit (Fee)	4.00%		8,034,466	321,379	4.00%		8,034,466	321,379
Subtotal				**$1,200,856**				**$1,200,856**

	Quantity	Unit	Rate	Total	Quantity	Unit	Rate	Total
Contingencies/Escalation								
Contingencies								
Design contingency	18.00%		8,355,845	1,504,052	18.00%		8,355,845	1,504,052
GMP contingency	0.00%		9,859,897		0.00%		9,859,897	
Escalation								
Escalation to Start Date (July 2023)	7.50%		9,859,897	739,492	7.50%		9,859,897	739,492
Subtotal				**$2,243,544**				**$2,243,544**
ESTIMATED CONTRACT AWARD				**$10,599,389**				**$10,599,389**

10. Forage Farm, Café and Demonstration Site

10.1 CAFÉ

	Quantity	Unit	Rate	Total	Quantity	Unit	Rate	Total
Trade Costs								
Foundations								
Strip footings at exterior, including foundation wa	180	LF	330.27	59,449	55	M	1,080.89	59,449
Strip footings at retaining wall	211	LF	405.05	85,465	64	M	1,335.39	85,465
Column footings at exterior, including piers/pilasters	14	EA	2,178.00	30,492	14	EA	2,178.00	30,492
Slab on grade								
Standard slab on grade	3,770	SF	10.10	38,091	350	M2	108.83	38,091
Retaining wall earthwork								
Backfill at retaining wall	310	CY	49.61	15,379	237	M3	64.89	15,379
Retaining wall								
Retaining walls, complete	2,805	SF	67.76	190,067	261	M2	728.23	190,067
Roof construction								
Steel construction, including metal decking	3,770	SF	70.18	264,579	350	M2	755.94	264,579
Concrete topping to roof	3,770	SF	7.26	27,370	350	M2	78.20	27,370
Exterior walls								
Interior backup - masonry	1,890	SF	47.43	89,646	176	M2	509.35	89,646
Exterior skin - unknown	1,890	SF	72.60	137,214	176	M2	779.63	137,214
Miscellaneous								
Rail at roof level	180	LF	623.15	112,167	55	M	2,039.40	112,167
Scaffolding to exterior wall	2,700	SF	3.63	9,801	251	M2	39.05	9,801
Windows								
Storefront	810	SF	121.00	98,010	75	M2	1,306.80	98,010
Exterior doors								
Aluminum doors, double leaf	2	LVL	4,840.00	9,680	2	LVLS	4,840.00	9,680
Metal door	1	LVL	2,904.00	2,904	1	LVLS	2,904.00	2,904
Door operators	1	EA	6,050.00	6,050	1	EA	6,050.00	6,050
Roofing								
TPO roof membrane, green roof	3,770	SF	72.60	273,702	350	M2	782.01	273,702
Partitions								
Partitions	600	SF	18.76	11,253	56	M2	200.95	11,253
Interior doors								
Interior doors	3	EA	2,904.00	8,712	3	LVLS	2,904.00	8,712

10. Forage Farm, Café and Demonstration Site

	Quantity	Unit	Rate	Total	Quantity	Unit	Rate	Total
Specialties								
Specialties	3,770	SF GFA	4.84	18,247	350	M2 GFA	52.13	18,247
Allowance for miscellaneous metals	3,770	SF GFA	2.42	9,123	350	M2 GFA	26.07	9,123
Miscellaneous sealants throughout building	3,770	SF GFA	0.42	1,597	350	M2 GFA	4.56	1,597
Finishes								
Wall finishes	5,895	SF	15.00	88,449	548	M2 GFA	161.40	88,449
Floor finishes	3,770	SF GFA	27.47	103,551	350	M2 GFA	295.86	103,551
Ceiling finishes	3,770	SF GFA	18.75	70,706	350	M2 GFA	202.02	70,706
MEP systems								
Plumbing, complete	5	FIX	10,648.00	53,240	5	FIX	10,648.00	53,240
Hvac, complete	3,770	SF GFA	74.42	280,545	350	M2 GFA	801.56	280,545
Fire protection, complete	3,770	SF GFA	7.50	28,283	350	M2 GFA	80.81	28,283
Electrical, complete	3,770	SF GFA	43.56	164,221	350	M2 GFA	469.20	164,221
Equipment								
Café equipment	1	LS	50,215.00	50,215	1	LS	50,215.00	50,215
Fixed furnishings								
Miscellaneous casework	3,770	SF	2.54	9,580	350	M2	27.37	9,580
Utilities								
Mechanical								
Water	1	LS	12,463.00	12,463	1	LS	12,463.00	12,463
Sanitary	1	LS	18,755.00	18,755	1	LS	18,755.00	18,755
Electrical								
Services	1	LS	12,463.00	12,463	1	LS	12,463.00	12,463
Subtotal				**$2,391,469**				**$2,391,469**
Markups								
General conditions and project requirements								
General conditions and requirements	9.00%		2,391,469	215,232	9.00%		2,391,469	215,232
Bond and Insurance	2.00%		2,606,701	52,134	2.00%		2,606,701	52,134
Building permit	1.00%		2,658,835	26,588	1.00%		2,658,835	26,588
Overhead and Profit								
Prime contractor's head office overhead and profit (Fee)	4.00%		2,685,423	107,417	4.00%		2,685,423	107,417
Subtotal				**$401,371**				**$401,371**

	Quantity	Unit	Rate	Total	Quantity	Unit	Rate	Total
Contingencies/Escalation								
Contingencies								
Design contingency	18.00%		2,792,840	502,711	18.00%		2,792,840	502,711
GMP contingency	0.00%		3,295,551		0.00%		3,295,551	
Escalation								
Escalation to Start Date (July 2023)	7.50%		3,295,551	247,166	7.50%		3,295,551	247,166
Subtotal				**$749,877**				**$749,877**
ESTIMATED CONTRACT AWARD				**$3,542,717**				**$3,542,717**

10.2 STORAGE SHED

Trade Costs								
Foundations								
Strip footings at exterior, including foundation wa	90	LF	330.28	29,725	27	M	1,100.93	29,725
Strip footings at retaining wall	101	LF	405.05	40,910	31	M	1,319.68	40,910
Column footings at exterior, including piers/pilasters	9	EA	2,178.00	19,602	9	EA	2,178.00	19,602
Column footings at interior, including piers	3	EA	2,057.00	6,171	3	EA	2,057.00	6,171
Slab on grade								
Standard slab on grade	2,100	SF	10.10	21,217	195	M2	108.81	21,217
Retaining wall earthwork								
Backfill at retaining wall	290	CY	49.61	14,387	222	M3	64.81	14,387
Retaining wall								
Retaining walls, complete	505	SF	67.76	34,219	47	M2	728.06	34,219
Roof construction								
Steel construction, including metal decking	2,100	SF	70.18	147,378	195	M2	755.78	147,378
Concrete topping to roof	2,100	SF	7.26	15,246	195	M2	78.18	15,246
Exterior walls								
Interior backup - masonry	1,350	SF	47.43	64,033	125	M2	512.26	64,033
Exterior skin - unknown	1,350	SF	72.60	98,010	125	M2	784.08	98,010
Miscellaneous								
Rail at roof level	90	LF	623.16	56,084	27	M	2,077.19	56,084
Scaffolding to exterior wall	1,350	SF	3.63	4,901	125	M2	39.21	4,901

10. Forage Farm, Café and Demonstration Site

	Quantity	Unit	Rate	Total	Quantity	Unit	Rate	Total
Exterior doors								
Hollow metal doors	4	LVL	2,904.00	11,616	4	LVLS	2,904.00	11,616
Overhead doors	1	EA	8,470.00	8,470	1	EA	8,470.00	8,470
Roofing								
TPO roof membrane, green roof	2,100	SF	72.60	152,460	195	M2	781.85	152,460
Specialties								
Specialties	2,100	SF GFA	1.88	3,939	195	M2 GFA	20.20	3,939
Finishes								
Floor finishes, sealer	2,100	SF GFA	3.75	7,877	195	M2 GFA	40.39	7,877
MEP systems								
Plumbing, complete	2,100	SF GFA	6.23	13,086	195	M2 GFA	67.11	13,086
Hvac, heat and ventilation	2,100	SF GFA	9.98	20,963	195	M2 GFA	107.50	20,963
Electrical, complete	2,100	SF GFA	11.50	24,140	195	M2 GFA	123.79	24,140
Utilities								
Mechanical								
Water	1	LS	18,755.00	18,755	1	LS	18,755.00	18,755
Electrical								
Services	1	LS	12,463.00	12,463	1	LS	12,463.00	12,463
Subtotal				**$825,652**				**$825,652**
Markups								
General conditions and project requirements								
General conditions and requirements	9.00%		825,652	74,309	9.00%		825,652	74,309
Bond and Insurance	2.00%		899,961	17,999	2.00%		899,961	17,999
Building permit	1.00%		917,960	9,180	1.00%		917,960	9,180
Overhead and Profit								
Prime contractor's head office overhead and profit (Fee)	4.00%		927,140	37,086	4.00%		927,140	37,086
Subtotal				**$138,574**				**$138,574**
Contingencies/Escalation								
Contingencies								
Design contingency	18.00%		964,226	173,561	18.00%		964,226	173,561
GMP contingency	0.00%		1,137,787		0.00%		1,137,787	

	Quantity	Unit	Rate	Total	Quantity	Unit	Rate	Total
Escalation								
Escalation to Start Date (July 2023)	7.50%		1,137,787	85,334	7.50%		1,137,787	85,334
Subtotal				**$258,895**				**$258,895**
ESTIMATED CONTRACT AWARD				**$1,223,121**				**$1,223,121**

10.3 FORAGE FARM AND PLAZA

Trade Costs								
Site preparation								
Site preparation								
Site set up, clearance	114,000	SF	0.36	41,382	10,595	M2 GFA	3.91	41,382
Remove existing paving	9,200	SF	1.63	15,028	855	M2 GFA	17.58	15,028
Existing building demolition	1,603	SF	12.71	20,367	149	M2 GFA	136.69	20,367
Earthwork								
Strip topsoil - store	1,911	CY	12.46	23,816	1,452	M3	16.40	23,816
Fine grading	12,667	SY	1.88	23,757	1,177	M2	20.18	23,757
Paving								
Decorative/Themed concrete paving	12,500	SF	14.10	176,206	1,162	M2	151.64	176,206
Site development								
Allow for site walls, furnishings etc.	1	LS	18,755.00	18,755	1	LS	18,755.00	18,755
Landscaping								
Respread existing topsoil	1,911	CY	12.46	23,816	178	M3	133.80	23,816
New planting medium	2,296	CY	99.22	227,809	213	M3	1,069.53	227,809
Trees	6	EA	3,146.00	18,876	6	EA	3,146.00	18,876
Shrubs and ground cover	1	LS	9,680.00	9,680	1	LS	9,680.00	9,680
Irrigation	114,000	SF	1.88	213,807	10,595	M2	20.18	213,807
Exhibits								
Allowance	1	LS	62,315.00	62,315	1	LS	62,315.00	62,315
Utilities								
Mechanical								
Water	1	LS	12,463.00	12,463	1	LS	12,463.00	12,463
Sanitary - connect to existing	1	LS	18,755.00	18,755	1	LS	18,755.00	18,755

10. Forage Farm, Café and Demonstration Site

	Quantity	Unit	Rate	Total	Quantity	Unit	Rate	Total
Electrical								
Site lighting	1	LS	18,755.00	18,755	1	LS	18,755.00	18,755
Subtotal				**$925,587**				**$925,587**
Markups								
General conditions and project requirements								
General conditions and requirements	9.00%		925,587	83,303	9.00%		925,587	83,303
Bond and Insurance	2.00%		1,008,890	20,178	2.00%		1,008,890	20,178
Building permit	1.00%		1,029,068	10,291	1.00%		1,029,068	10,291
Overhead and Profit								
Prime contractor's head office overhead and profit (Fee)	4.00%		1,039,359	41,574	4.00%		1,039,359	41,574
Subtotal				**$155,346**				**$155,346**
Contingencies/Escalation								
Contingencies								
Design contingency	18.00%		1,080,933	194,568	18.00%		1,080,933	194,568
GMP contingency	0.00%		1,275,501		0.00%		1,275,501	
Escalation								
Escalation to Start Date (July 2023)	7.50%		1,275,501	95,663	7.50%		1,275,501	95,663
Subtotal				**$290,231**				**$290,231**
ESTIMATED CONTRACT AWARD				**$1,371,164**				**$1,371,164**

11.1 THE DAYCARE BUILDING

	Quantity	Unit	Rate	Total	Quantity	Unit	Rate	Total
Trade Costs								
Foundations								
Strip footings at exterior, including foundation wa	548	LF	330.27	180,988	167	M	1,083.76	180,988
Column footings at exterior, including piers/pilast	23	EA	2,420.00	55,660	23	EA	2,420.00	55,660
Slab on grade								
Standard slab on grade	5,260	SF	10.10	53,144	489	M2	108.68	53,144
Roof construction								
Steel construction, including metal decking	6,312	SF	45.98	290,226	587	M2	494.42	290,226
Miscellaneous								
Fireproofing	5,260	SF	2.78	14,639	489	M2	29.94	14,639
Exterior walls								
Interior backup - metal stud	4,603	SF	26.20	120,583	428	M2	281.74	120,583
Exterior skin - corrugated metal	4,603	SF	43.56	200,507	428	M2	468.47	200,507
Miscellaneous								
Scaffolding to exterior wall	78,912	SF	4.84	381,934	7,334	M2	52.08	381,934
Windows								
Aluminum windows and glazing	1,973	SF	112.53	222,022	183	M2	1,213.23	222,022
Exterior doors								
Aluminum doors	6	LVLS	4,840.00	29,040	6	LVLS	4,840.00	29,040
Door operators	1	EA	6,050.00	6,050	1	EA	6,050.00	6,050
Roofing								
Metal roofing	6,312	SF	48.40	305,501	587	M2	520.44	305,501
Partitions								
Partitions	6,312	SF GFA	27.53	173,754	587	M2	296.00	173,754
Interior doors								
Interior metal or wood doors, complete	6,312	SF GFA	17.12	108,071	587	M2	184.11	108,071
Specialties								
Specialties	6,312	SF GFA	3.63	22,913	587	M2 GFA	39.03	22,913
Allowance for miscellaneous metals	6,312	SF GFA	2.54	16,039	587	M2 GFA	27.32	16,039
Miscellaneous sealants throughout building	6,312	SF GFA	0.42	2,673	587	M2 GFA	4.55	2,673
Finishes								
Wall finishes	6,312	SF GFA	10.89	68,738	587	M2 GFA	117.10	68,738
Floor finishes	6,312	SF GFA	13.31	84,013	587	M2 GFA	143.12	84,013
Ceiling finishes	6,312	SF GFA	24.68	155,806	587	M2 GFA	265.43	155,806

	Quantity	Unit	Rate	Total	Quantity	Unit	Rate	Total
MEP systems								
Plumbing, complete	6,312	SF GFA	24.20	152,750	587	M2 GFA	260.22	152,750
Hvac, complete	6,312	SF GFA	39.63	250,129	587	M2 GFA	426.11	250,129
Fire protection, complete	6,312	SF GFA	7.50	47,352	587	M2 GFA	80.67	47,352
Electrical, complete	6,312	SF GFA	54.15	341,779	587	M2 GFA	582.25	341,779
Equipment								
Laundry equipment	4	EA	3,146.00	12,584	4	LS	3,146.00	12,584
Food service equipment	1	LS	21,538.00	21,538	1	LS	21,538.00	21,538
Residential appliances	1	LS	2,420.00	2,420	1	LS	2,420.00	2,420
Fixed furnishings								
Miscellaneous casework	6,312	SF	32.67	206,213	587	M2	351.30	206,213
Entry mat	50	SF	48.40	2,420	5	M2	484.00	2,420
Window treatment	1,973	SF	18.76	37,004	183	M2	202.21	37,004
Site preparation								
Site preparation								
Site set up, clearance and demolition	8,260	SF	2.54	20,989	768	M2 GFA	27.33	20,989
Earthwork								
Strip topsoil - store	229	CY	12.46	2,854	174	M3	16.40	2,854
Fine grading	918	SY	1.88	1,722	85	M2	20.26	1,722
Paving								
Play surfacing within courtyard	3,000	SF	36.30	108,900	279	M2	390.32	108,900
Site development								
Play structures in courtyard	1	LS	124,630.00	124,630	1	LS	124,630.00	124,630
Landscaping								
Trees and landscaping in courtyard	1	LS	15,004.00	15,004	1	LS	15,004.00	15,004
Exhibits								
Exhibits and animals within courtyard	1	LS	18,755.00	18,755	1	LS	18,755.00	18,755
Utilities								
Mechanical								
Water	1	LS	31,158.00	31,158	1	LS	31,158.00	31,158
Sanitary	1	LS	43,560.00	43,560	1	LS	43,560.00	43,560
Storm water	1	LS	62,315.00	62,315	1	LS	62,315.00	62,315
Gas	1	LS	15,004.00	15,004	1	LS	15,004.00	15,004
Electrical								
Services	1	LS	37,510.00	37,510	1	LS	37,510.00	37,510

	Quantity	Unit	Rate	Total	Quantity	Unit	Rate	Total
Telecommunication	1	LS	18,755.00	18,755	1	LS	18,755.00	18,755
Courtyard lighting	1	LS	12,463.00	12,463	1	LS	12,463.00	12,463
Subtotal				**$4,080,109**				**$4,080,109**
Markups								
General conditions and project requirements								
General conditions and requirements	9.00%		4,080,109	367,210	9.00%		4,080,109	367,210
Bond and Insurance	2.00%		4,447,319	88,946	2.00%		4,447,319	88,946
Building permit	1.00%		4,536,265	45,363	1.00%		4,536,265	45,363
Overhead and Profit								
Prime contractor's head office overhead and profit (Fee)	4.00%		4,581,628	183,265	4.00%		4,581,628	183,265
Subtotal				**$684,784**				**$684,784**
Contingencies/Escalation								
Contingencies								
Design contingency	18.00%		4,764,893	857,681	18.00%		4,764,893	857,681
GMP contingency	0.00%		5,622,574		0.00%		5,622,574	
Escalation								
Escalation to Start Date (July 2023)	7.50%		5,622,574	421,693	7.50%		5,622,574	421,693
Subtotal				**$1,279,374**				**$1,279,374**
ESTIMATED CONTRACT AWARD				**$6,044,267**				**$6,044,267**

11.2 THE DAYCARE SITE (PLAZA, DOCK & YARD)

Trade Costs								
Site preparation								
Site preparation								
Site set up, clearance and demolition	18,700	SF	1.88	35,072	1,738	M2	20.18	35,072
Water cut off at docks	1	LS	12,100.00	12,100	1	LS	12,100.00	12,100

	Quantity	Unit	Rate	Total	Quantity	Unit	Rate	Total
Earthwork								
Strip topsoil - store	519	CY	12.46	6,469	394	M3	16.42	6,469
Fine grading	2,078	SY	2.54	5,280	193	M2	27.36	5,280
Paving								
Roadway at drop off circle	3,300	SF	7.26	23,958	307	M2	78.04	23,958
Pavers at entry	582	SF	33.88	19,718	54	M2	365.15	19,718
Themed concrete paving at plaza	2,400	SF	14.04	33,686	223	M2	151.06	33,686
Deck								
Foundations	2,800	SF	30.25	84,700	260	M2	325.77	84,700
Structure	2,800	SF	25.41	71,148	260	M2	273.65	71,148
Decking	2,800	SF	22.39	62,678	260	M2	241.07	62,678
Rail	148	LF	254.10	37,607	45	M	835.71	37,607
Site development								
Other site elements - Allowance	1	LS	25,410.00	25,410	1	LS	25,410.00	25,410
Landscaping								
Respread existing topsoil	519	CY	12.46	6,469	48	M3	134.77	6,469
Trees	20	EA	3,146.00	62,920	20	EA	3,146.00	62,920
Mixed understory	6,418	SF	24.80	159,198	596	M2	267.11	159,198
Lawn areas	3,200	SF	3.15	10,067	297	M2	33.90	10,067
Irrigation	9,618	SF	1.88	18,039	894	M2	20.18	18,039
Utilities								
Storm drainage	1	EA	25,410.00	25,410	1	LS	25,410.00	25,410
Site lighting	10	EA	4,719.00	47,190	10	EA	4,719.00	47,190
Subtotal				**$747,119**				**$747,119**
Markups								
General conditions and project requirements								
General conditions and requirements	9.00%		747,119	67,241	9.00%		747,119	67,241
Bond and Insurance	2.00%		814,360	16,287	2.00%		814,360	16,287
Building permit	1.00%		830,647	8,306	1.00%		830,647	8,306
Overhead and Profit								
Prime contractor's head office overhead and profit (Fee)	4.00%		838,953	33,558	4.00%		838,953	33,558
Subtotal				**$125,392**				**$125,392**

	Quantity	Unit	Rate	Total	Quantity	Unit	Rate	Total
Contingencies/Escalation								
Contingencies								
Design contingency	18.00%		872,511	157,052	18.00%		872,511	157,052
GMP contingency	0.00%		1,029,563		0.00%		1,029,563	
Escalation								
Escalation to Start Date (July 2023)	7.50%		1,029,563	77,217	7.50%		1,029,563	77,217
Subtotal				**$234,269**				**$234,269**
ESTIMATED CONTRACT AWARD				**$1,106,780**				**$1,106,780**

12. Tigerline, Sumatran Tiger Habitat + Holding

	Quantity	Unit	Rate	Total	Quantity	Unit	Rate	Total
12.1 TIGERLINE & HABITAT EXPANSION PHASE 1								
Trade Costs								
Site preparation								
Site preparation								
Site set up, clearance including demolition of existing habitat	29,431	SF	1.88	55,198	2,735	M2 GFA	20.18	55,198
Remove existing paving	3,409	SF	1.63	5,568	317	M2 GFA	17.56	5,568
Earthwork								
Strip topsoil - store	308	CY	12.46	3,838	234	M3	16.40	3,838
Cut to fill - general grading	1,611	CY	12.46	20,078	150	M3	133.85	20,078
Fine grading	1,611	SY	1.88	3,021	150	M2	20.14	3,021
Paving								
Decorative/Themed concrete paving	5,026	SF	14.04	70,545	467	M2	151.06	70,545
Site development								
Allow for site walls, furnishings etc.	14,497	SF	1.33	19,296	1,347	M2	14.33	19,296
Landscaping								
Respread existing topsoil	308	CY	12.46	3,838	29	M3	132.34	3,838
Trees	25	EA	3,146.00	78,650	25	EA	3,146.00	78,650
Shrubs and ground cover	4,784	SF	12.71	60,781	445	M2	136.59	60,781
Animal grazing	13,015	SF	0.97	12,599	1,210	M2	10.41	12,599
Irrigation	14,497	SF	1.88	27,189	1,347	M2	20.18	27,189
Other enhancements in Himalayan Tahr habitat	4,928	SF	12.10	59,629	458	M2	130.19	59,629
Exhibits (within and around building)								
Other rockwork (not on roof)	1	LS	124,630.00	124,630	1	LS	124,630.00	124,630
Natural exhibit construction								
Natural boulders	10	EA	847.00	8,470	10	EA	847.00	8,470
Natural deadfall	1	LS	25,410.00	25,410	1	LS	25,410.00	25,410
Artificial exhibit construction								
Artificial deadfall	1	LS	62,315.00	62,315	1	LS	62,315.00	62,315
Exhibit signage	1	LS	25,410.00	25,410	1	LS	25,410.00	25,410
Animal tubes								
Based on similar at Philadelphia Zoo	394	LF	2,662.00	1,048,828	120	M	8,740.23	1,048,828
Utilities								
Mechanical								
Water	1	LS	15,004.00	15,004	1	LS	15,004.00	15,004

	Quantity	Unit	Rate	Total	Quantity	Unit	Rate	Total
Electrical								
Site lighting	1	LS	31,158.00	31,158	1	LS	31,158.00	31,158
Subtotal				**$1,761,455**				**$1,761,455**
Markups								
General conditions and project requirements								
General conditions and requirements	9.00%		1,761,455	158,531	9.00%		1,761,455	158,531
Bond and Insurance	2.00%		1,919,986	38,400	2.00%		1,919,986	38,400
Building permit	1.00%		1,958,386	19,584	1.00%		1,958,386	19,584
Overhead and Profit								
Prime contractor's head office overhead and profit (Fee)	4.00%		1,977,970	79,119	4.00%		1,977,970	79,119
Subtotal				**$295,634**				**$295,634**
Contingencies/Escalation								
Contingencies								
Design contingency	18.00%		2,057,089	370,276	18.00%		2,057,089	370,276
GMP contingency	0.00%		2,427,365		0.00%		2,427,365	
Escalation								
Escalation to Start Date (July 2023)	7.50%		2,427,365	182,052	7.50%		2,427,365	182,052
Subtotal				**$552,328**				**$552,328**
ESTIMATED CONTRACT AWARD				**$2,609,417**				**$2,609,417**

12.2 TIGERLINE & HABITAT EXPANSION PHASE 2

Trade Costs								
Site preparation								
Site preparation								
Site set up, clearance including demolition of existing habitat	27,310	SF	1.88	51,221	2,538	M2 GFA	20.18	51,221
Earthwork								
Strip topsoil - store	759	CY	12.46	9,460	577	M3	16.40	9,460

12. Tigerline, Sumatran Tiger Habitat + Holding

	Quantity	Unit	Rate	Total	Quantity	Unit	Rate	Total
Cut to fill - general grading	3,034	CY	12.46	37,813	282	M3	134.09	37,813
Fine grading	3,034	SY	1.88	5,691	282	M2	20.18	5,691
Paving								
Allowance	2,400	SF	66.55	159,720	223	M2	716.23	159,720
Site development								
Allow for site walls, furnishings etc.	27,310	SF	1.21	33,045	2,538	M2	13.02	33,045
Animal barriers								
Mesh wall	863	LF	471.90	407,250	263	M	1,548.48	407,250
Landscaping								
Respread existing topsoil	759	CY	12.46	9,460	71	M3	133.24	9,460
Trees	13	EA	3,146.00	40,898	13	EA	3,146.00	40,898
Shrubs and ground cover	9,012	SF	12.70	114,497	838	M2	136.63	114,497
Animal grazing	13,015	SF	0.97	12,599	1,210	M2	10.41	12,599
Irrigation	27,310	SF	1.88	51,221	2,538	M2	20.18	51,221
Animal tubes								
Based on similar at Philadelphia Zoo	361	LF	2,662.00	960,982	110	M	8,736.20	960,982
Exhibits (within and around building)								
Artificial rockwork/mud work								
Waterway construction, including rockwork/mud work	3,000	SF	101.64	304,920	279	M2	1,092.90	304,920
Life support systems	70,000	GAL	11.25	787,710	70,000	LITER	11.25	787,710
Other rockwork (not on roof)	1	LS	62,315.00	62,315	1	LS	62,315.00	62,315
Natural exhibit construction								
Natural boulders	10	EA	847.00	8,470	10	EA	847.00	8,470
Natural deadfall	1	LS	25,410.00	25,410	1	LS	25,410.00	25,410
Artificial exhibit construction								
Artificial deadfall	1	LS	50,094.00	50,094	1	LS	50,094.00	50,094
Exhibit signage	1	LS	18,755.00	18,755	1	LS	18,755.00	18,755
Utilities								
Mechanical								
Water	1	LS	15,004.00	15,004	1	LS	15,004.00	15,004
Electrical								
Site lighting	1	LS	31,158.00	31,158	1	LS	31,158.00	31,158
Subtotal				**$3,197,693**				**$3,197,693**

	Quantity	Unit	Rate	Total	Quantity	Unit	Rate	Total
Markups								
General conditions and project requirements								
General conditions and requirements	9.00%		3,197,693	287,792	9.00%		3,197,693	287,792
Bond and Insurance	2.00%		3,485,485	69,710	2.00%		3,485,485	69,710
Building permit	1.00%		3,555,195	35,552	1.00%		3,555,195	35,552
Overhead and Profit								
Prime contractor's head office overhead and profit (Fee)	4.00%		3,590,747	143,630	4.00%		3,590,747	143,630
Subtotal				**$536,684**				**$536,684**
Contingencies/Escalation								
Contingencies								
Design contingency	18.00%		3,734,377	672,188	18.00%		3,734,377	672,188
GMP contingency	0.00%		4,406,565		0.00%		4,406,565	
Escalation								
Escalation to Start Date (July 2023)	7.50%		4,406,565	330,492	7.50%		4,406,565	330,492
Subtotal				**$1,002,680**				**$1,002,680**
ESTIMATED CONTRACT AWARD				**$4,737,057**				**$4,737,057**
12.3 HABITAT EXPANSION & STRUCTURE PHASE								
Trade Costs								
Foundations								
Strip footings at exterior, including foundation wa	310	LF	330.27	102,384	95	M	1,077.73	102,384
Column footings at exterior, including piers/pilast	16	EA	2,178.00	34,848	16	EA	2,178.00	34,848
Column footings at bridge, including piers/pilaste	6	EA	2,178.00	13,068	6	EA	2,178.00	13,068
Column footings at interior, including piers	3	EA	2,057.00	6,171	3	EA	2,057.00	6,171
Slab on grade								
Standard slab on grade	5,600	SF	10.10	56,580	520	M2	108.81	56,580
Elevator pit	1	EA	15,004.00	15,004	1	EA	15,004.00	15,004
Water pools, complete	1	EA	25,410.00	25,410	1	EA	25,410.00	25,410

12. Tigerline, Sumatran Tiger Habitat + Holding

	Quantity	Unit	Rate	Total	Quantity	Unit	Rate	Total
Floor								
Steel construction, including topping and metal decking	2,000	SF	67.76	135,520	186	M2	728.60	135,520
Steel trusses, at bridge	63	TN	7,865.00	495,495	63	TN	7,865.00	495,495
Steel construction, at bridge including topping and metal decking	3,150	SF	60.50	190,575	293	M2	650.43	190,575
Roof construction								
Steel construction, including metal decking	6,160	SF	96.80	596,288	572	M2	1,042.46	596,288
Concrete topping to roof	5,600	SF	7.26	40,656	520	M2	78.18	40,656
Steel construction, including metal decking at bri	3,150	SF	48.40	152,460	293	M2	520.34	152,460
Concrete topping to roof	3,150	SF	7.26	22,869	293	M2	78.05	22,869
Miscellaneous								
Fireproofing	3,150	SF	2.66	8,385	293	M2	28.62	8,385
Exterior walls								
Interior backup - masonry at holding	1,815	SF	47.43	86,089	169	M2	509.40	86,089
Exterior skin at animal holding	1,815	SF	66.55	120,788	169	M2	714.72	120,788
Interior backup - metal stud - at bridge	1,210	SF	36.30	43,923	112	M2	392.17	43,923
Exterior skin abridge	1,210	SF	72.60	87,846	112	M2	784.34	87,846
Miscellaneous								
Bridge soffit	3,150	SF	66.55	209,633	293	M2	715.47	209,633
Scaffolding to exterior wall	15,500	SF	3.63	56,265	1,441	M2	39.05	56,265
Windows								
Curtainwall	13,685	SF	174.24	2,384,474	1,272	M2	1,874.59	2,384,474
Curtainwall at bridge	373	SF	174.24	64,992	35	M2	1,856.91	64,992
Exterior doors								
Metal doors and animal/shift doors	1	LS	15,004.00	15,004	1	LS	15,004.00	15,004
Entry doors	4	PR	11,495.00	45,980	4	PR	11,495.00	45,980
Roofing								
Membrane roofing	8,750	SF	37.51	328,213	813	M2	403.71	328,213
Partitions								
Partitions,, animal barriers, rails, complete	2,000	SF GFA	29.95	59,895	186	M2 GFA	322.02	59,895
Interior glass partition at interior viewing	1,120	SF	112.53	126,034	104	M2	1,211.87	126,034
Interior doors								
Interior doors, shift gates etc.	2,000	SF GFA	14.22	28,435	186	M2 GFA	152.88	28,435
Specialties								
Specialties	2,000	SF GFA	9.68	19,360	186	M2 GFA	104.09	19,360
Allowance for miscellaneous metals	7,900	SF GFA	2.42	19,118	734	M2 GFA	26.05	19,118

12. Tigerline, Sumatran Tiger Habitat + Holding

	Quantity	Unit	Rate	Total	Quantity	Unit	Rate	Total
Miscellaneous sealants throughout building	7,900	SF GFA	0.24	1,912	734	M2 GFA	2.60	1,912
Staircases								
Egress/Internal circulation staircases	2	FLT	37,510.00	75,020	2	FLT	37,510.00	75,020
Finishes								
Wall finishes	2,000	SF GFA	3.75	7,502	186	M2 GFA	40.33	7,502
Floor finishes	2,000	SF GFA	2.54	5,082	186	M2 GFA	27.32	5,082
Conveying								
Elevator, 2 stops	1	EA	169,400.00	169,400	1	ea	169,400.00	169,400
MEP systems								
Plumbing, animal water, floor drains and food prep sink	2,000	SF GFA	15.00	30,008	186	M2 GFA	161.33	30,008
Hvac	7,900	SF GFA	68.37	540,084	734	M2 GFA	735.81	540,084
Fire protection, complete	7,900	SF GFA	7.50	59,266	734	M2 GFA	80.74	59,266
Electrical, complete	7,900	SF GFA	31.16	246,144	734	M2 GFA	335.35	246,144
Equipment								
Residential appliances	1	LS	4,356.00	4,356	1	LS	4,356.00	4,356
Fixed furnishings								
Miscellaneous casework	1	LS	3,146.00	3,146	1	LS	3,146.00	3,146
Window treatment	13,685	SF	24.93	341,112	1,272	M2	268.17	341,112
Exhibits								
Complete	7,900	SF	187.55	1,481,645	734	M2 GFA	2,018.59	1,481,645
Site preparation								
Site preparation								
Site set up, clearance including demolition of existing habitat and paving	11,300	SF	3.03	34,183	1,050	M2 GFA	32.56	34,183
Building demolition	6,500	SF	12.71	82,583	604	M2 GFA	136.73	82,583
Earthwork								
Allowance	1	LS	18,634.00	18,634	1	LS	18,634.00	18,634
Site development								
Allow for site walls, furnishings etc.	1	LS	31,158.00	31,158	1	LS	31,158.00	31,158
Landscaping								
Allowance	1	LS	25,410.00	25,410	1	LS	25,410.00	25,410
Mechanical								
Water	1	LS	25,410.00	25,410	1	LS	25,410.00	25,410
Sanitary	1	LS	43,560.00	43,560	1	LS	43,560.00	43,560
Storm water	1	LS	93,473.00	93,473	1	LS	93,473.00	93,473

12. Tigerline, Sumatran Tiger Habitat + Holding

	Quantity	Unit	Rate	Total	Quantity	Unit	Rate	Total
Electrical								
Services and lighting	1	LS	75,020.00	75,020	1	LS	75,020.00	75,020
Subtotal				**$8,985,870**				**$8,985,870**
Markups								
General conditions and project requirements								
General conditions and requirements	9.00%		8,985,870	808,728	9.00%		8,985,870	808,728
Bond and Insurance	2.00%		9,794,598	195,892	2.00%		9,794,598	195,892
Building permit	1.00%		9,990,490	99,905	1.00%		9,990,490	99,905
Overhead and Profit								
Prime contractor's head office overhead and profit (Fee)	4.00%		10,090,395	403,616	4.00%		10,090,395	403,616
Subtotal				**$1,508,141**				**$1,508,141**
Contingencies/Escalation								
Contingencies								
Design contingency	18.00%		10,494,011	1,888,922	18.00%		10,494,011	1,888,922
GMP contingency	0.00%		12,382,933		0.00%		12,382,933	
Escalation								
Escalation to Start Date (July 2023)	7.50%		12,382,933	928,720	7.50%		12,382,933	928,720
Subtotal				**$2,817,642**				**$2,817,642**
ESTIMATED CONTRACT AWARD				**$13,311,653**				**$13,311,653**

13.1 MALAYAN WOODS PAVILION RENOVATION

	Quantity	Unit	Rate	Total	Quantity	Unit	Rate	Total
Trade Costs								
Slab on grade								
Patch existing after demolition	5,300	SF	0.63	3,335	493	M2	6.76	3,335
Roof construction								
Infill, create new penetrations	6,360	SF	1.88	11,928	591	M2	20.18	11,928
Exterior walls								
Interior backup - new air/thermal barrier to interior face of existing	3,315	SF	21.19	70,236	308	M2	228.04	70,236
Refinish/repair	3,315	SF	12.46	41,315	308	M2	134.14	41,315
Windows								
Aluminum windows	1,785	SF	112.17	200,219	166	M2	1,206.14	200,219
Exterior doors								
Hollow metal doors or wood doors, frame and hardware	2	LVLS	2,866.50	5,733	2	LVLS	2,866.50	5,733
Aluminum doors	4	LVLS	4,736.00	18,944	4	LVLS	4,736.00	18,944
Overhead doors	1	EA	7,229.00	7,229	1	EA	7,229.00	7,229
Door operators	2	EA	5,608.50	11,217	2	EA	5,608.50	11,217
Roofing								
Metal roofing	6,360	SF	31.16	198,162	591	M2	335.30	198,162
Partitions								
Partitions, predominantly drywall	5,300	SF GFA	25.00	132,493	493	M2 GFA	268.75	132,493
Interior doors								
Interior metal or wood doors, complete	5,300	SF GFA	8.02	42,518	5,300	M2 GFA	8.02	42,518
Specialties								
Specialties	5,300	SF GFA	3.74	19,816	493	M2 GFA	40.19	19,816
Allowance for miscellaneous metals	5,300	SF GFA	1.25	6,605	493	M2 GFA	13.40	6,605
Miscellaneous sealants throughout building	5,300	SF GFA	0.38	1,988	493	M2 GFA	4.03	1,988
Finishes								
Wall finishes	5,300	SF GFA	4.99	26,422	493	M2 GFA	53.59	26,422
Floor finishes	5,300	SF GFA	5.61	29,756	493	M2 GFA	60.36	29,756
Ceiling finishes	5,300	SF GFA	9.97	52,843	493	M2 GFA	107.19	52,843
MEP systems								
Plumbing, complete	5,300	SF GFA	7.02	37,195	493	M2 GFA	75.45	37,195
Hvac, complete	5,300	SF GFA	67.30	356,691	493	M2 GFA	723.51	356,691
Fire protection, complete	5,300	SF GFA	6.86	36,362	493	M2 GFA	73.76	36,362
Electrical, complete	5,300	SF GFA	48.61	257,610	493	M2 GFA	522.54	257,610

	Quantity	Unit	Rate	Total	Quantity	Unit	Rate	Total
Equipment								
Residential appliances								
Complete	1	LS	6,232.00	6,232	1	LS	6,232.00	6,232
Fixed furnishings								
Miscellaneous casework	5,300	SF GFA	4.99	26,422	493	M2 GFA	53.59	26,422
Entry mat	50	SF	49.86	2,493	5	M2	498.60	2,493
Subtotal				**$1,603,764**				**$1,603,764**
Markups								
General conditions and project requirements								
General conditions and requirements	9.00%		1,603,764	144,339	9.00%		1,603,764	144,339
Bond and Insurance	2.00%		1,748,103	34,962	2.00%		1,748,103	34,962
Building permit	1.00%		1,783,065	17,831	1.00%		1,783,065	17,831
Overhead and Profit								
Prime contractor's head office overhead and profit (Fee)	4.00%		1,800,896	72,036	4.00%		1,800,896	72,036
Subtotal				**$269,168**				**$269,168**
Contingencies/Escalation								
Contingencies								
Design contingency	18.00%		1,872,932	337,128	18.00%		1,872,932	337,128
GMP contingency	0.00%		2,210,060		0.00%		2,210,060	
Escalation								
Escalation to Start Date (July 2023)	8.40%		2,210,060	185,645	8.40%		2,210,060	185,645
Subtotal				**$522,773**				**$522,773**
ESTIMATED CONTRACT AWARD				**$2,395,705**				**$2,395,705**

13.2 BREWERY BUILDING

	Quantity	Unit	Rate	Total	Quantity	Unit	Rate	Total
Trade Costs								
Foundations								
Strip footings at exterior, including foundation wall	250	LF	330.27	82,568	76	M	1,086.42	82,568
Strip footings at interior retaining walls	120	LF	118.58	14,230	37	M	384.59	14,230
Column footings at exterior, including piers/pilasters	10	EA	2,178.00	21,780	10	EA	2,178.00	21,780
Column footings at interior, including piers	4	EA	2,057.00	8,228	4	EA	2,057.00	8,228
Slab on grade								
Standard slab on grade	4,030	SF	10.10	40,718	375	M2	108.58	40,718
Elevator pit	1	EA	15,004.00	15,004	1	EA	14,600.00	15,004
Roof construction								
Steel construction, including metal decking	4,433	SF	96.80	429,114	412	M2	1,041.54	429,114
Concrete topping to roof	4,030	SF	7.26	29,258	375	M2	78.02	29,258
Miscellaneous								
Fireproofing	4,030	SF	2.78	11,215	375	M2	29.91	11,215
Exterior walls								
Interior backup - masonry at holding	3,788	SF	47.43	179,673	352	M2	510.43	179,673
Exterior skin	3,788	SF	72.60	275,009	352	M2	781.28	275,009
Miscellaneous								
Scaffolding to exterior wall	6,451	SF	3.63	23,417	600	M2	39.03	23,417
Windows								
Curtainwall	2,663	SF	174.24	464,001	247	M2	1,878.55	464,001
Exterior doors								
Metal doors and animal/shift doors	2	EA	3,146.00	6,292	2	EA	3,146.00	6,292
Entry doors	4	PR	10,890.00	43,560	4	PR	10,890.00	43,560
Roofing								
Membrane roofing	4,433	SF	37.51	166,282	412	M2	403.60	166,282
Partitions								
Partitions, complete	4,030	SF GFA	22.39	90,212	375	M2 GFA	240.57	90,212
Interior doors								
Interior doors,	4,030	SF GFA	11.25	45,350	375	M2 GFA	120.93	45,350

13. Zoo Brewery and Malayan Woods Renewal

	Quantity	Unit	Rate	Total	Quantity	Unit	Rate	Total
Specialties								
Specialties	4,030	SF GFA	4.84	19,505	375	M2 GFA	52.01	19,505
Allowance for miscellaneous metals	4,030	SF GFA	3.03	12,191	375	M2 GFA	32.51	12,191
Miscellaneous sealants throughout building	4,030	SF GFA	0.42	1,707	375	M2 GFA	4.55	1,707
Staircases								
Egress/Internal circulation staircases	4	FLT	32,367.50	129,470	4	FLT	32,367.50	129,470
Finishes								
Wall finishes	4,030	SF GFA	5.08	20,480	375	M2 GFA	54.61	20,480
Floor finishes	4,030	SF GFA	12.70	51,201	375	M2 GFA	136.54	51,201
Ceiling finishes	4,030	SF GFA	12.70	51,201	375	M2 GFA	136.54	51,201
Conveying								
Elevator, 3 stops	1	EA	205,700.00	205,700	1	ea	205,700.00	205,700
MEP systems								
Plumbing	4,030	SF GFA	12.70	51,201	375	M2 GFA	136.54	51,201
Hvac	4,030	SF GFA	68.97	277,949	375	M2 GFA	741.20	277,949
Fire protection, complete	4,030	SF GFA	7.50	30,233	375	M2 GFA	80.62	30,233
Electrical, complete	4,030	SF GFA	37.51	151,165	375	M2 GFA	403.11	151,165
Equipment								
Brewery equipment	1	LS	124,630.00	124,630	1	LS	124,630.00	124,630
Fixed furnishings								
Miscellaneous casework	1	LS	6,232.00	6,232	1	LS	6,232.00	6,232
Window treatment	2,663	SF	22.39	59,612	247	M2	241.34	59,612
Site preparation								
Site preparation								
Site set up, clearance including demolition of existing habitat and paving	3,500	SF	3.03	10,588	325	M2 GFA	32.58	10,588
Earthwork								
Allowance	1	LS	12,100.00	12,100	1	LS	12,100.00	12,100
Utilities								
Mechanical								
Water	1	LS	18,755.00	18,755	1	LS	18,755.00	18,755
Sanitary	1	LS	31,158.00	31,158	1	LS	31,158.00	31,158
Storm water	1	LS	24,200.00	24,200	1	LS	24,200.00	24,200
Electrical								
Services and lighting	1	LS	42,350.00	42,350	1	LS	42,350.00	42,350
Subtotal				**$3,277,539**				**$3,277,539**

	Quantity	Unit	Rate	Total	Quantity	Unit	Rate	Total
Markups								
General conditions and project requirements								
General conditions and requirements	9.00%		3,277,539	294,979	9.00%		3,277,539	294,979
Bond and Insurance	2.00%		3,572,518	71,450	2.00%		3,572,518	71,450
Building permit	1.00%		3,643,968	36,440	1.00%		3,643,968	36,440
Overhead and Profit								
Prime contractor's head office overhead and profit (Fee)	4.00%		3,680,408	147,216	4.00%		3,680,408	147,216
Subtotal				**$550,085**				**$550,085**
Contingencies/Escalation								
Contingencies								
Design contingency	18.00%		3,827,624	688,972	18.00%		3,827,624	688,972
GMP contingency	0.00%		4,516,596		0.00%		4,516,596	
Escalation								
Escalation to Start Date (July 2023)	8.40%		4,516,596	379,394	8.40%		4,516,596	379,394
Subtotal				**$1,068,366**				**$1,068,366**
ESTIMATED CONTRACT AWARD				**$4,895,990**				**$4,895,990**
13.3 BREWERY PLAZA								
Trade Costs								
Site preparation								
Site preparation								
Site set up, clearance including demolition of existing habitat and paving	3,500	SF	3.03	10,588	325	M2 GFA	32.58	10,588
Earthwork								
Allowance	1	LS	12,100.00	12,100	1	LS	12,100.00	12,100
Pedestrian paving and hardscape								
Plaza	3,500	SF	62.32	218,103	3,500	LS	62.32	218,103

	Quantity	Unit	Rate	Total	Quantity	Unit	Rate	Total
Site development								
Allow for site walls, furnishings etc.	1	LS	18,150.00	18,150	1	LS	18,150.00	18,150
Landscaping								
Allowance	1	LS	24,200.00	24,200	1	LS	24,200.00	24,200
Utilities								
Mechanical								
Storm water	1	LS	18,150.00	18,150	1	LS	18,150.00	18,150
Electrical								
Services and lighting	1	LS	18,150.00	18,150	1	LS	18,150.00	18,150
Subtotal				**$319,441**				**$319,441**
Markups								
General conditions and project requirements								
General conditions and requirements	9.00%		319,441	28,750	9.00%		319,441	28,750
Bond and Insurance	2.00%		348,191	6,964	2.00%		348,191	6,964
Building permit	1.00%		355,155	3,552	1.00%		355,155	3,552
Overhead and Profit								
Prime contractor's head office overhead and profit (Fee)	4.00%		358,707	14,348	4.00%		358,707	14,348
Subtotal				**$53,614**				**$53,614**
Contingencies/Escalation								
Contingencies								
Design contingency	18.00%		373,055	67,150	18.00%		373,055	67,150
GMP contingency	0.00%		440,205		0.00%		440,205	
Escalation								
Escalation to Start Date (July 2023)	8.40%		440,205	36,977	8.40%		440,205	36,977
Subtotal				**$104,127**				**$104,127**
ESTIMATED CONTRACT AWARD				**$477,182**				**$477,182**

	Quantity	Unit	Rate	Total	Quantity	Unit	Rate	Total
14.1 WINTER ZOO MOBILE STRUCTURES (ASSUMED 12#)								
Trade Costs								
Mobile structures								
Complete (12 structures assumed, each 250 sf)	12	EA	78,650.00	943,800	12	EA	78,650.00	943,800
Subtotal				**$943,800**				**$943,800**
Markups								
General conditions and project requirements								
No markups required as mobile units manufactured off site by others								
Overhead and Profit								
No contractor profit as Zoo would contract directly with manufacturer								
Subtotal				**$0**				**$0**
Contingencies/Escalation								
Contingencies								
Design contingency	18.00%		943,800	169,884	18.00%		943,800	169,884
GMP contingency	0.00%		1,113,684		0.00%		1,113,684	
Escalation								
Escalation to Start Date (July 2023)	7.50%		1,113,684	83,526	7.50%		1,113,684	83,526
Subtotal				**$253,410**				**$253,410**
ESTIMATED CONTRACT AWARD				**$1,197,210**				**$1,197,210**

14.2 WINTER ZOO SITE

	Quantity	Unit	Rate	Total	Quantity	Unit	Rate	Total
Trade Costs								
Site preparation								
Paving								
Decorative/Themed concrete paving, including preparation and making good adjacent landscaping	28,800	SF	26.62	766,656	2,677	M2	286.39	766,656
Utilities								
Electrical								
Lighting	1	LS	290,400.00	290,400	1	LS	290,400.00	290,400
Subtotal				**$1,057,056**				**$1,057,056**
Markups								
General conditions and project requirements								
General conditions and requirements	9.00%		1,057,056	95,135	9.00%		1,057,056	95,135
Bond and Insurance	2.00%		1,152,191	23,044	2.00%		1,152,191	23,044
Building permit	1.00%		1,175,235	11,752	1.00%		1,175,235	11,752
Overhead and Profit								
Prime contractor's head office overhead and profit (Fee)	4.00%		1,186,987	47,479	4.00%		1,186,987	47,479
Subtotal				**$177,410**				**$177,410**
Contingencies/Escalation								
Contingencies								
Design contingency	18.00%		1,234,466	222,204	18.00%		1,234,466	222,204
GMP contingency	0.00%		1,456,670		0.00%		1,456,670	
Escalation								
Escalation to Start Date (July 2023)	7.50%		1,456,670	109,250	7.50%		1,456,670	109,250
Subtotal				**$331,454**				**$331,454**
ESTIMATED CONTRACT AWARD				**$1,565,920**				**$1,565,920**

15. Core Woods Picnic Area

15.1 PICNIC AREA ACCESS

	Quantity	Unit	Rate	Total	Quantity	Unit	Rate	Total
Trade Costs								
Site preparation								
Site preparation								
Site set up, clearance including demolition of existing habitat	38,500	SF	1.88	72,207	3,578	M2 GFA	20.18	72,207
Remove existing paving	11,051	SF	0.61	6,686	1,027	M2 GFA	6.51	6,686
Earthwork								
Strip topsoil - store	508	CY	12.46	6,331	386	M3	16.40	6,331
Fine grading	4,278	SY	2.54	10,871	398	M2	27.31	10,871
Paving								
Stone dust paving	12,156	SF	4.54	55,158	1,130	M2	48.81	55,158
Site development								
Signage and wood curbs at parking areas	20	LOC	937.75	18,755	20	LOC	937.75	18,755
Landscaping								
Respread existing topsoil	508	CY	12.46	6,331	47	M3	134.70	6,331
Seeding	6,586	SF	0.97	6,375	612	M2	10.42	6,375
Subtotal				**$182,714**				**$182,714**
Markups								
General conditions and project requirements								
General conditions and requirements	9.00%		182,714	16,444	9.00%		182,714	16,444
Bond and Insurance	2.00%		199,158	3,983	2.00%		199,158	3,983
Building permit	1.00%		203,141	2,031	1.00%		203,141	2,031
Overhead and Profit								
Prime contractor's head office overhead and profit (Fee)	4.00%		205,172	8,207	4.00%		205,172	8,207
Subtotal				**$30,665**				**$30,665**

	Quantity	Unit	Rate	Total	Quantity	Unit	Rate	Total
Contingencies/Escalation								
Contingencies								
Design contingency	*18.00%*		*213,379*	*38,408*	*18.00%*		*213,379*	*38,408*
GMP contingency	*0.00%*		*251,787*		*0.00%*		*251,787*	
Escalation								
Escalation to Start Date (July 2023)	*7.50%*		*251,787*	*18,884*	*7.50%*		*251,787*	*18,884*
Subtotal				***$57,292***				***$57,292***
ESTIMATED CONTRACT AWARD				***$270,671***				***$270,671***

17. Red Panda Climate - Controlled Viewing Bldg.

	Quantity	Unit	Rate	Total	Quantity	Unit	Rate	Total
17.1 RED PANDA VIEWING BUILDING								
Trade Costs								
Foundations								
Strip footings at exterior, including foundation wall	60	LF	330.27	19,816	18	M	1,100.89	19,816
Slab on grade								
Standard slab on grade	225	SF	10.11	2,274	21	M2	108.29	2,274
Roof construction								
Wood structure and decking	248	SF	36.30	9,002	23	M2	391.39	9,002
Exterior walls								
Interior backup - masonry	540	SF	47.43	25,613	50	M2	512.26	25,613
Exterior skin	540	SF	72.60	39,204	50	M2	784.08	39,204
Miscellaneous								
Scaffolding to exterior wall	900	SF	3.63	3,267	84	M2	38.89	3,267
Windows								
Aluminum	360	SF	96.80	34,848	33	M2	1,056.00	34,848
Exterior doors								
Entry doors	2	LVL	4,840.00	9,680	2	PR	4,840.00	9,680
Roofing								
Metal	248	SF	54.45	13,504	23	M2	587.13	13,504
Specialties								
Specialties	225	SF GFA	2.42	545	21	M2 GFA	25.95	545
Finishes								
Wall finishes	225	SF GFA	4.84	1,089	21	M2 GFA	51.86	1,089
Floor finishes	225	SF GFA	2.42	545	21	M2 GFA	25.95	545
Ceiling finishes	225	SF GFA	1.82	409	21	M2 GFA	19.48	409
MEP systems								
Hvac	1	LS	3,388.00	3,388	1	LS	3,388.00	3,388
Electrical, complete	1	SF GFA	1,452.00	1,452	1	LS	1,452.00	1,452
Site preparation								
Site preparation								
Site set up, clearance including demolition of existing habitat and paving	1	LS	1,815.00	1,815	1	LS	1,815.00	1,815

17. Red Panda Climate - Controlled Viewing Bldg.

	Quantity	Unit	Rate	Total	Quantity	Unit	Rate	Total
Site development and paving								
Complete, including landscaping	1	LS	3,025.00	3,025	1	LS	3,025.00	3,025
Utilities								
Electrical								
Services and lighting	1	LS	4,235.00	4,235	1	LS	4,235.00	4,235
Subtotal				**$173,711**				**$173,711**
Markups								
General conditions and project requirements								
General conditions and requirements	9.00%		173,711	15,634	9.00%		173,711	15,634
Bond and Insurance	2.00%		189,345	3,787	2.00%		189,345	3,787
Building permit	1.00%		193,132	1,931	1.00%		193,132	1,931
Overhead and Profit								
Prime contractor's head office overhead and profit (Fee)	4.00%		195,063	7,803	4.00%		195,063	7,803
Subtotal				**$29,155**				**$29,155**
Contingencies/Escalation								
Contingencies								
Design contingency	18.00%		202,866	36,516	18.00%		202,866	36,516
GMP contingency	0.00%		239,382		0.00%		239,382	
Escalation								
Escalation to Start Date (July 2023)	8.40%		239,382	20,108	8.40%		239,382	20,108
Subtotal				**$56,624**				**$56,624**
ESTIMATED CONTRACT AWARD				**$259,490**				**$259,490**

toronto ZOO

MASTER PLAN

APPENDIX 5. TECHNOLOGY MASTER PLAN

JUNE, 2021

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Executive Summary

1 Findings

- The current IT organization at Our Toronto Zoo has been significantly underfunded over the past decades, resulting in a significant business risk if key systems are not replaced (ERP, admission systems, procurement, etc.)
- WSP interviewed 38 stakeholders across key departments and mapped 16 processes split between guest-facing and operations. Stakeholders form Our Toronto Zoo assessed the current IT organization to be between a cost optimizer and a service provider (providing regular service but underfunded), the general direction was to become a Strategic Enabler (Use IT/Technology to gain sustainable advantage)
- Benchmarking against other leading Zoos placed Our Toronto Zoo below the median spend per employee and IT employees / total staff

2 Roadmap

- A review of leading practices in the Zoos & Aquariums industry identified 4 core themes that are currently driving transformation in the industry: digital guest experience, connected animal care, conservation centre of excellence, and resilient organization
- Combining the gaps identified by the Zoo stakeholders and the best practices yielded 88 projects with a ranging degree of importance to undertake over the next 10 years. These projects were consolidated under 8 building blocks and a prioritization analysis was conducted based on several risk and value criteria

3 Recommendations

- **5-Year Roadmap:** The immediate recommendation is to firstly fix the basics (the network being a critical enabler), followed by building flexible platforms (with a high priority on ERP), building the ability to execute (increasing IT team to exceed industry average), enhance revenue (through new sources), deploy animal care & conservation (leveraging automated systems), deploy data to intelligence (build a reporting environment), engage guests in the park & communities (zoo app experience), and ensure next gen security (automated locks, video surveillance)
- **The 10 year plan:** Focusing on predictive care, machine learning, animal tracking in the wild, guest feeding animals digitally, showcasing digital reproduction lab expertise, expanding zoo at home, last mile accessibility, conservation digital exhibit, VR for camp programs, preventing poaching in the wild

4 Next Steps

- Our Toronto Zoo needs to execute on this roadmap by managing an efficient project management office
- Critical steps will be to: unlock budget, select the preferred technology, build RFPs, and manage projects

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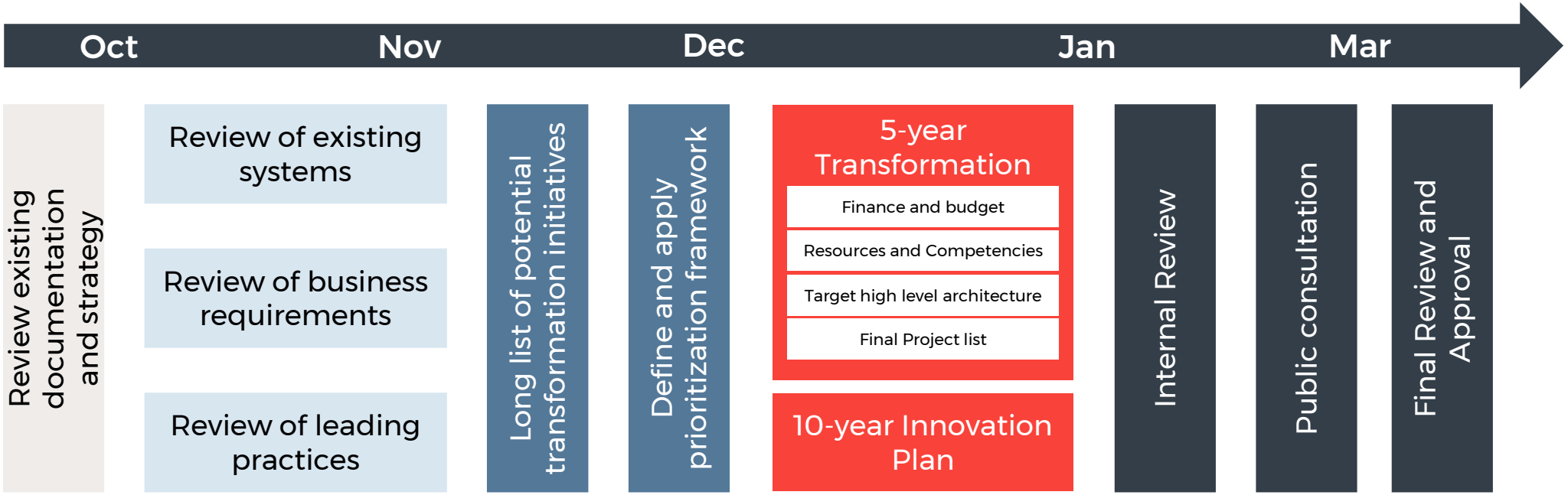
Baseline IT strategy framework

The diagram below illustrates the framework used to develop Our Toronto Zoo's IT Strategy, which is designed to ensure alignment with business strategies.



Toronto Zoo Processes

Interviews demonstrated trust on current direction, yet with significant IT challenges ahead. Identified processes were broken down into: Guest-facing, Operational, and Back Office

Type	*Process Summary*					
Guest Facing	**Manage Animal Wellness**	**Manage Conservation Programs**	**Market Products and Services**	**Sell Products and Services**	**Design and Manage Guest Experience**	**Create and Deploy Conservation Giving Opportunities**
	Vet. services	Reproduction	Digital Marketing	Entrance / Signage	Exhibits / Rides	Philanthropic Impact
	Keepers	Endocrinology	Loyalty	Experiences	Zones and pavilions	Reward System
	Nutrition	Education	Partnerships	Food	Community Events	Tap to Donate
	Welfare Science	Species Recovery	Guest Analytics	Merchandises	Digital	
	Behavioural Husbandry		Marketing Means	Online Platforms	Outside the Zoo	
			Campaign Awareness		Drive Through	
Operations	**Manage Safety & Security**	**Manage Facilities and Equipment**	**Manage Procurement and Inventory**	**Manage Programs**	**Manage Stakeholders**	
	Site access	Parking	Procurement	Program initiation	Governments	
	Dangerous animals	Buildings	Inventory	Manage scope	Interests groups	
	H&S	Equipment	Resell	(...)	Partnerships	
	Surveillance	Habitats	Tendering Process		Donors	
		Roads and Paths			Animals	
	Plan & Manage The Business	**Manage HR**	**Manage IT**	**Manage Finance and risks**	**Manage Support Services**	
	Goal Alignment	Attract and hire	Provide technology	Manage risk & funds	Provide timely support	
	Making the hidden zoo go extinct	Payroll, retention	Optimize back office	Optimize costs	Consultant engagement	
	Leverage guest data	Employee experience	Support guest experience	Accounting	Project management	

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Current Situation

★ Critical business processes

Summary of guest-facing processes

Interviews demonstrated trust on current direction, yet with significant IT challenges ahead. Identified processes were broken down into: Guest-facing, Operational, and Back Office.

Manage Animal Wellness ★	Manage Conservation Programs	Market Products and Services	Sell Products and Services	Design and Manage Guest Experience ★	Create and Deploy Conservation Giving Opportunities
Business Requirements					
▪ Keep animals in good physical and mental health ▪ Prepare high quality food for animals and determine the right diets for 300+ species ▪ Source the right amount of food, at the right time, and at the right quantity ▪ Robotic feeding systems ▪ Cage keys system ▪ Show the hidden Zoo ▪ Monitor animals 24/7 ▪ Habitat improvements ▪ Enrichment technologies	▪ Educate guests about conservation ▪ Reproduction research, develop tools and techniques ▪ Collect data on animals ▪ Participate in animal reproduction by insemination ▪ Implement welfare research programs ▪ Support transdisciplinary research programs with external partners	▪ Get as many people on site as possible pre-COVID, capacity limited during pandemic ▪ Create engagement on social media to grow popularity and online purchasing ▪ Get guests to spend as much as possible on site	▪ Generate revenue from ticket sales ▪ Sell online to respect COIVD public health guidelines ▪ Sell food and beverages on site, as well as additional merchandise ▪ Additional revenue generation	▪ Create an unforgettable experience ▪ Attract a large number of guests ▪ Maintain satisfaction within the Zoo ▪ Ability to purchase tickets	▪ Create engaging signage and displays that stress the importance of conservation philanthropy to wildlife preservation, and specific campaigns underway ▪ Create opportunities for donation "rewards" through augmented reality and other experiences (e.g. Coins for Conservation upgrade) ▪ Provide tap to donate and other digital opportunities to make a donation on-site, on the spot
IT Assessment					
▪ No centralized system for animal data across all disciplines ▪ No animal monitoring system ▪ Paper-based forms for observations ▪ No current effective nutrition communication system for Zoo staff	▪ Currently unable to track animals within the Zoo with IoT or cameras ▪ No common platform regrouping genetic material with welfare information for all Zoo species ▪ Online education limited outside of Canada	▪ Web store hard to access ▪ CRM installed but it is not effective ▪ No mass email software available ▪ No tracking from intent to buy to purchase to re-targeting ▪ No customer insights ▪ Limited digital capabilities ▪ No segmentation	▪ Parking and rides sales are not integrated ▪ Cross sale and upsell strategies not clear ▪ Ticket sale & entrance slow due to outdated software ▪ No gift card ▪ Compass systems not easily connected ▪ Smart pricing not possible with current infrastructure	▪ No wi-fi for guests, no LTE coverage in buildings ▪ Maps are located around the Zoo, there is no app ▪ Not a lot of PoC ▪ Digital and physical experiences not integrated ▪ Exhibits/Interpretive Stations do not use technology to engage with guests ▪ Limited public outreach outside of the Zoo	▪ No digital activation/ donation options currently on site ▪ Current traditional signage is static and can become outdated/irrelevant

Source: Toronto Zoo Staff Interviews, see appendix for detail

Summary of operational processes

Interviews demonstrated trust on current direction, yet with significant IT challenges ahead. Identified processes were broken down into: Guest-facing, Operational, and Back Office.

Current Situation

★ Critical business processes

Manage Safety & Security ★	Manage Facilities and Equipment	Manage Procurement and Inventory	Manage Programs	Manage Stakeholders
Business Requirements				
▪ Maintain the safety of Staff, Volunteers, Contractors, Guests and animals at the Zoo ▪ Digitize Heath & Safety measures that reduce risk and ensure a safe environment ▪ Collect and analyze, Safety & Security data to mitigate risk ▪ Early detection system = Rapid response	▪ Maximize capacity and people flow ▪ Allow easy access to the Zoo ▪ Increase building sustainability ▪ Reduce building energy and water consumption ▪ Allow easier access to the Zoo via transit	▪ Allow staff to quickly source materials needed to do their job duties ▪ Ensure that processes are quick ▪ Allow to quickly source professional services ▪ Manage the Zoo Interests acknowledging the City's own interests	▪ Manage program timelines and budgets ▪ Plan for short, medium, and long term ▪ Contract-out major programs to mitigate risk	▪ Maintain relationship with the City of Toronto to get funding ▪ Maintain relationship with TTC ▪ Partnerships with universities for research staff ▪ Grow education programs within the Zoo ▪ Track and steward donors (individuals, companies, foundations)
IT Assessment				
▪ Lack of integration with other systems maintained by other Branch's (HR, Workplace) ▪ Electronic guard patrol required ▪ Increase in community activity requires increase in perimeter security ▪ No current technology to confirm animal location ▪ Current work order system has no way to follow up on process	▪ Equipment assignation and keys fully manual ▪ No smart buildings ▪ Some buildings do not have LTE coverage ▪ Most of the Zoo does not have wi-fi coverage ▪ Server rooms filled with dust, and water damage ▪ There are power cuts every other week, IT infrastructure running on generators	▪ Work order system being implemented but siloed – not connected with other potential events managers ▪ Nutrition and procurement have a separate order system, with no plans to connect ▪ Signatures are not electronic, printing is required	▪ Priorities are shifting, delaying programs (ex: wi-fi) ▪ Limited laptops for Zoo staff ▪ Limited mobile devices ▪ No program or project management software suite available to Zoo staff ▪ Online presence is limited for guest-facing programs	▪ Current platforms, security and infra does not allow easy third party experimentation ▪ No mass email platform ▪ No animal directory ▪ No strategy for partnerships ▪ Current CRM is cumbersome and not easy to train; need to integrate with Zoo but have system with donor tracking/outreach functionality

Source: Toronto Zoo Staff Interviews, see appendix for detail

Summary of operational processes

Interviews demonstrated trust on current direction, yet with significant IT challenges ahead. Identified processes were broken down into: Guest-facing, Operational, and Back Office.

Current Situation

★ Critical business processes

Plan & Manage The Business ★	Manage HR	Manage IT ★	Manage Finance and risks	Manage Support Services
Business Requirements				
▪ Goal Alignment and Master Planning ▪ Create WOW for guests ▪ Get people to think differently about tech. ▪ Making the "hidden Zoo" go extinct ▪ Leverage guest data from all of their interactions with the Zoo ▪ Price accordingly, make quick, data-driven decisions ▪ Communicate effectively to staff and stakeholders	▪ Attract and hire the right people ▪ Retain people ▪ Payroll ▪ Engage employees and build a strong culture ▪ Learning and Development ▪ Work Arrangement ▪ Employee/volunteer engagement ▪ Employee communication ▪ Union	▪ Have a stable network ▪ Provide a strong technology experience to guests ▪ Optimize back office ▪ Division user support ▪ System Support & Infrastructure Design ▪ Researching Technology & Innovation ▪ Software & Hardware Maintenance & Recommendations ▪ Online Platform Support ▪ Data Management	▪ Manage funds ▪ Minimize risk within the Zoo ▪ Optimize costs around the Zoo ▪ Fund the Zoo's strategic ambitions ▪ Accounting ▪ Business analytics ▪ Policies for compliance ▪ Insurance management ▪ Risk management ▪ Revenue management ▪ Cost management	▪ Minimize cost while ensuring best service ▪ Provide timely support during and outside of business hours ▪ Consultant engagement ▪ Project management ▪ Independent advice
IT Assessment				
▪ Lack of guest metrics, all the analysis is done on excel with very limited databases ▪ Data accessibility is difficult, hence process times are long ▪ Outdated systems do not provide business insights, integration between each software is poor ▪ Unknown segments to target	▪ Paper-based onboarding process in the process of being replaced by Workforce Now, future process will be automated ▪ Training coordinated by an external vendor ▪ No employee database providing requisitions and turnover	▪ IT department too small ▪ No IT architecture maps ▪ City network preventing staff from serving guests due to low speeds and platform restrictions ▪ IT lacks budget for upgrades needed for network and others ▪ Skills gap, need flexibility in order to grow efficient IT operations	▪ Current ERP is out of date with threat of data loss ▪ In-depth financial analysis not possible due to lack of data collection ▪ No dashboards providing reporting	▪ No dedicated IT resource for 24/7 support ▪ IT equipment for support staff is outdated, difficulties for remote access ▪ No central e-signatures across the Zoo departments, making processes slow

Source: Toronto Zoo Staff Interviews, see appendix for detail

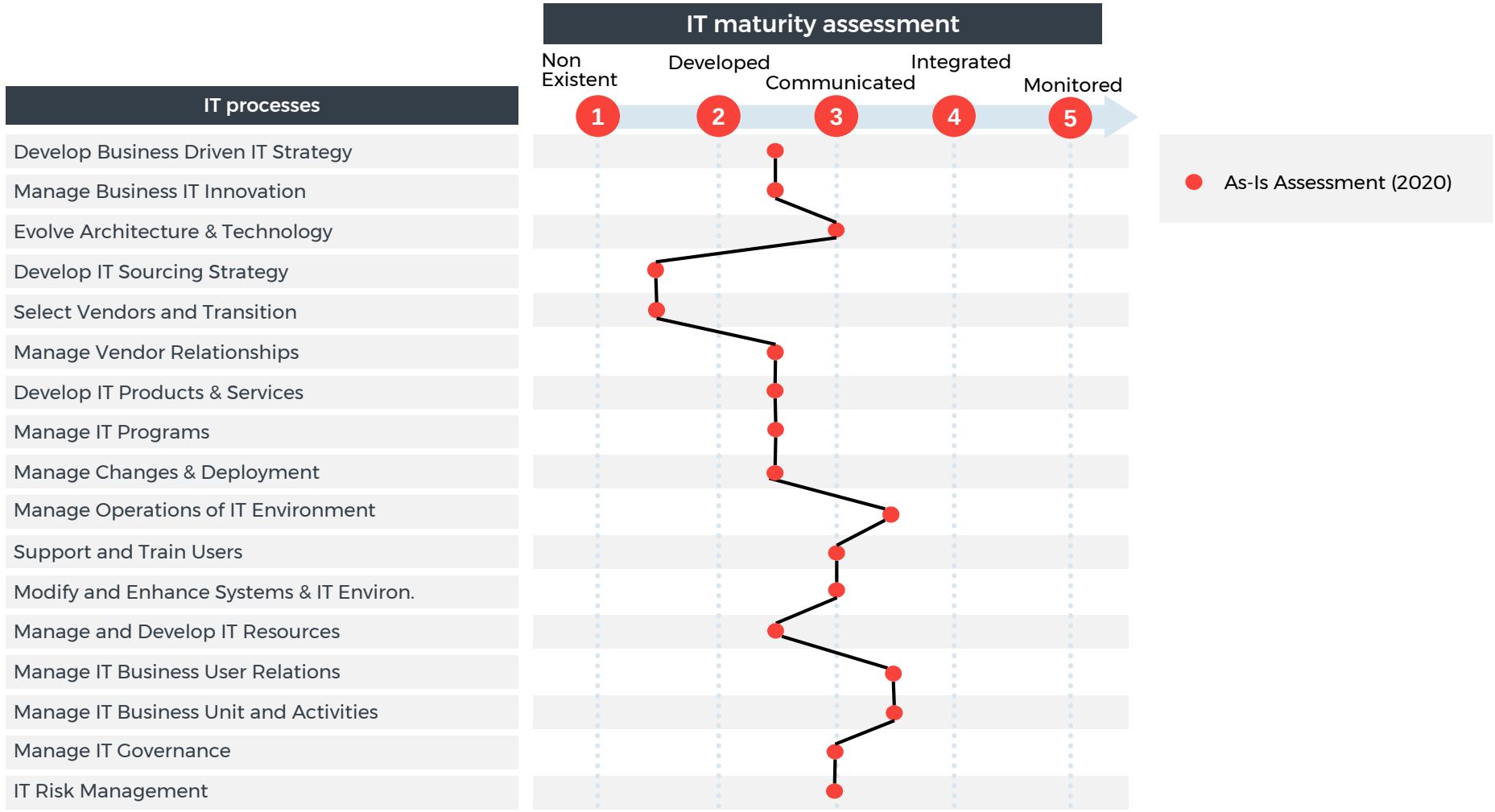
Current Situation

Role of IT within our Toronto Zoo

Business executives were hopeful and positive about the recent changes that they have seen within Toronto Zoo IT. They still feel, however, that IT currently functions as a cost center with limited focus on achieving our mission and supporting business objectives

IT Organization Capabilities – As-is

The maturity level of the IT organization is relatively low. Of particular importance is the lack of IT Resources, systems environment, strategy, and architecture.



* Refer to the Appendix for the IT Maturity Assessment score definitions.

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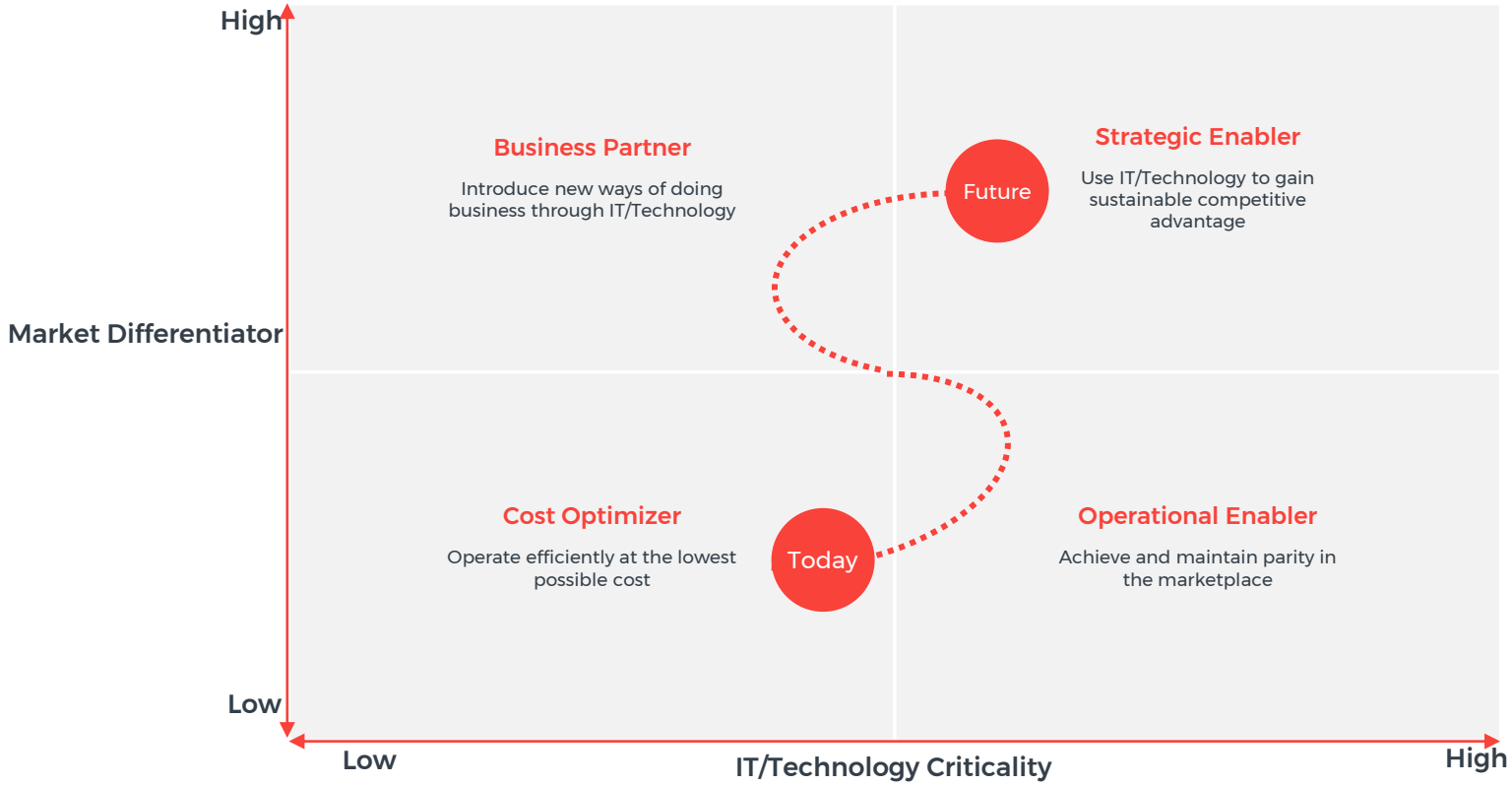
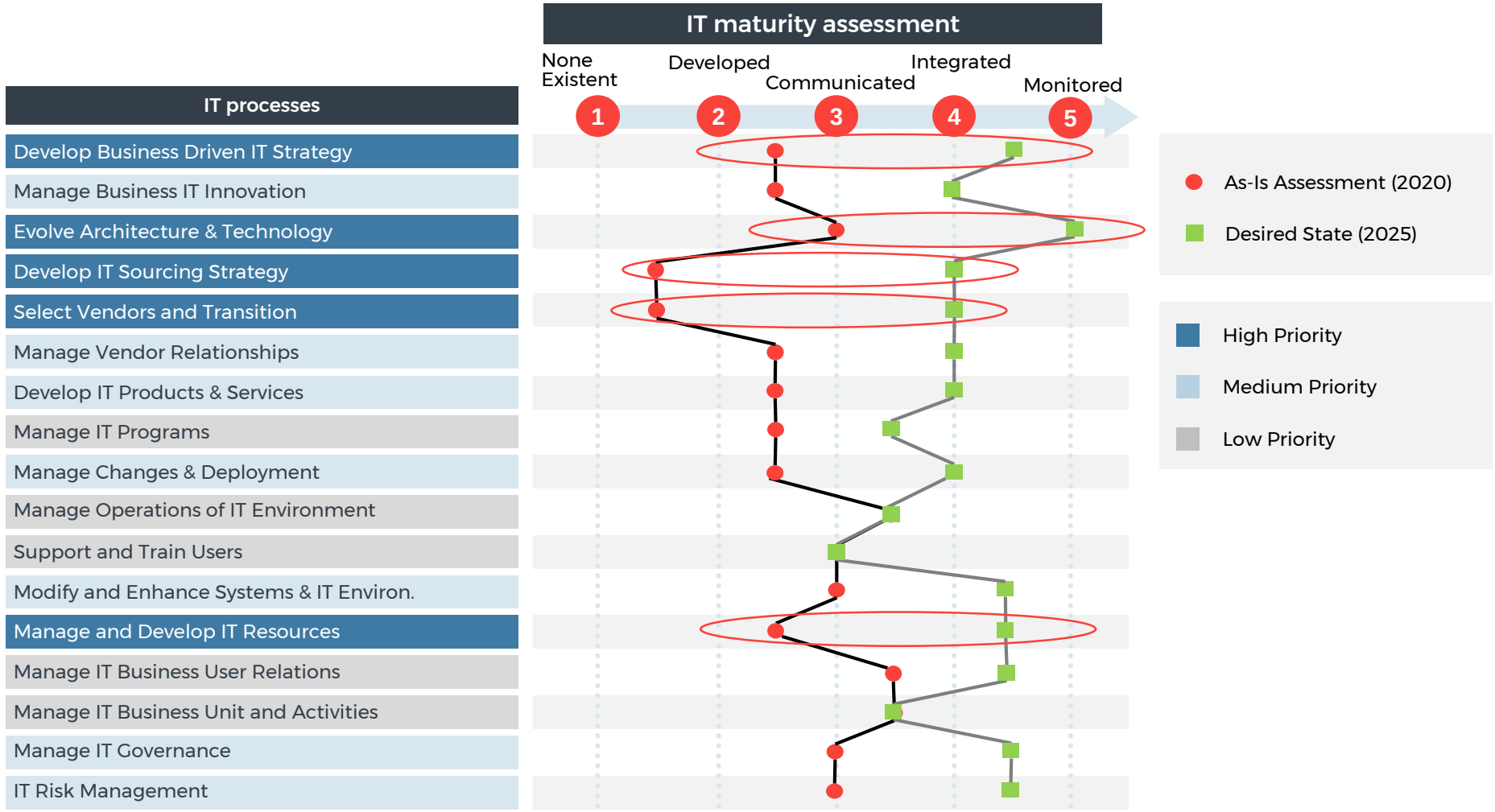
Role of IT within our Toronto Zoo

Both IT leaders and key business executives agree on the need for IT to evolve into more of a strategic partner with the business. The traditional path to strategic partner follows an s-shaped curve via the role of service provider.



IT Organization Capabilities – "As-is" vs "To be"

The maturity level of the IT organization is relatively low. Of particular importance is the lack of IT Resources, systems environment, strategy, and architecture.

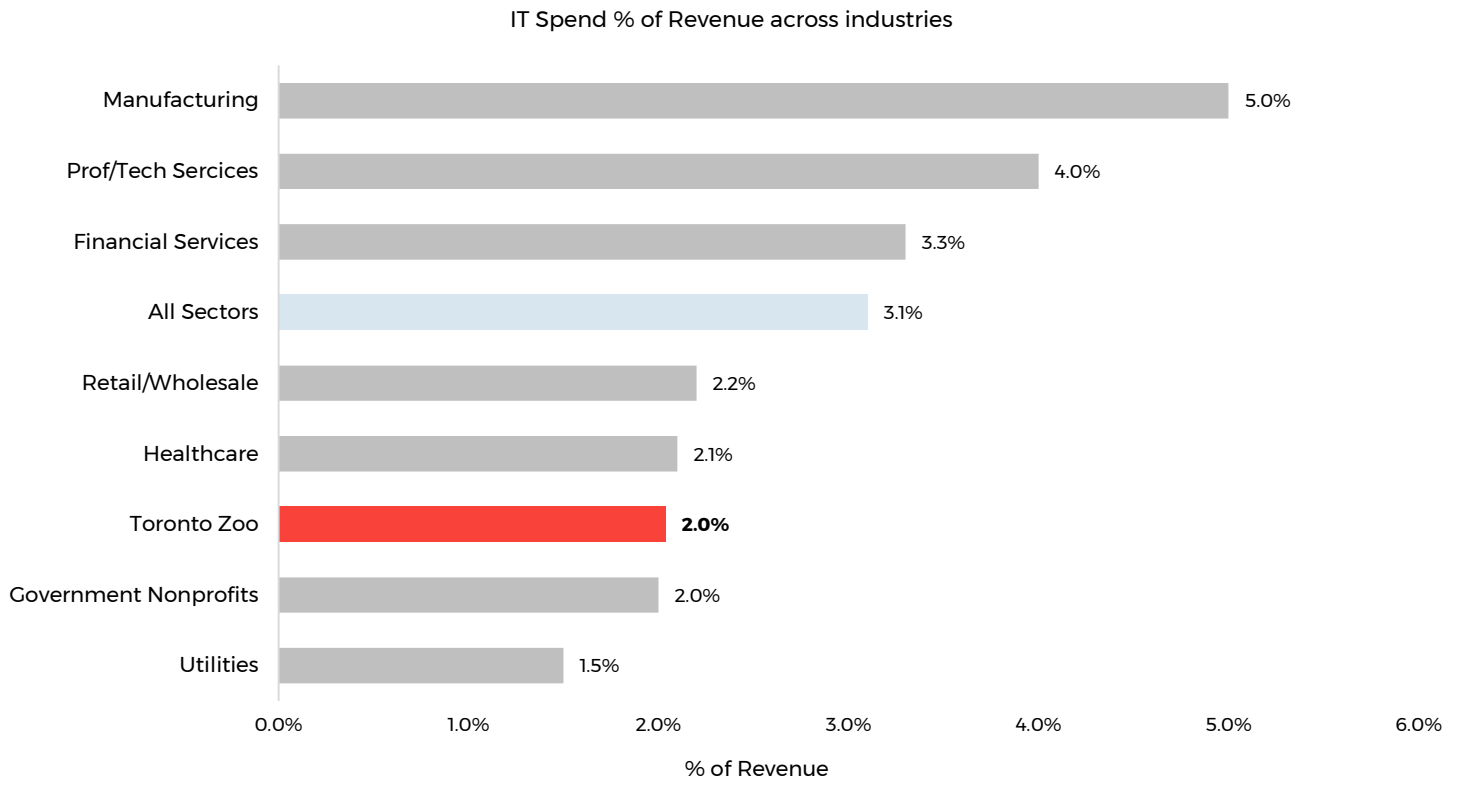


* Refer to the Appendix for the IT Maturity Assessment score definitions.

How is IT spend flaring across industries?

IT spend widely varies, but is growing across all industries

An IT spend of $1.1M. In 2021 would place the Toronto Zoo on the lower-end of the spend spectrum



Source: Computer Economics 2019

Leading Practices Summary

4 key technology trends are emerging in the Zoo and Theme Park industry

Core themes	Technology Themes	Enablers			
1 Digital Guest Experience	Adopt wearables and leverage smartphones	Smart wristbands	Smartphone app	Microtransactions	Systems integration
	Bring data to the core of guest experience	Wifi tracking	Data warehousing	Machine Learning	Social listening and analytics
	Create Personalized Experiences	24/7 virtual assistant	User profiling	Dynamic Pricing	Wearables
	Develop Hyper Immersive Experiences	Augmented reality in exhibits	4D Theatre	Exhibit interaction through smartphone	Storytelling through lights and sounds
	Expand Beyond Local	Animal Livestream	Online education	Memory Makers	User account
2 Connected Animal Care	24/7 Monitoring	Computer vision to identify path and behaviour	Sensors to know animal patterns	Mobile-based control	Precise geolocation
	Connected Health	On the spot diagnosis	Minimally invasive surgery	Wearable devices	3D Printing
	Automated Nutrition	Just in time food supply chain	Automated feeding	Food level sensing	Drone Feeding
	Smart safety	Smart locks	Learning from video to identify abnormal behaviour	Sensors to detect mood swings, heart rate, and location	Heat cameras

Source: WSP Analysis

Leading Practices Summary (cont'd)

4 key technology trends are emerging in the Zoo and Theme Park industry

Core themes	Technology Themes	Enablers			
3 Conservation Centre of Excellence	Conservation without borders	Website engagement	Exclusive event livestreams	Virtual Reality safari	Research partnerships
	Wildlife tracking	GPS	Story-building	Camera Traps	Bioacoustic monitoring devices
	Advanced Analytics	Open source data	Big data correlation	Deep learning for image analysis	Drone-based remote sensing
	Education platforms	Online Courses on Zoo website	Worldwide reach	Use of MOC platforms	University partnerships
4 A Resilient Organization	Centralized data systems	Social listening and analytics	Data visualizations for guests & staff	Mobile devices for event staff	Non-siloed systems
	Digital Revenue Stream	Digital Advertising	Guest data monetization	Online Event Booking	Wifi add, price tiering
	Smart, Sustainable Infrastructure	Self-reliance	Location-aware hardware	Visible tech infrastructure	Preventive maintenance
	Easing accessibility	Mobile purchases	Rideshare apps	Systems integrated with public transit	Digital wayfinding
	Commercial partnerships	Hackathons	Brand partners for IT equipment	Competitive bidding for coverage	Back-office at the forefront

Source: WSP Analysis

Technology Strategic Directions

The IT Strategic Directions are based on the business strategies & requirements, the desired role of IT, and the resulting high priority IT processes. The following statements are designed to effectively communicate the focus for IT over the next five years:

1. Make the hidden Zoo go Extinct
2. Create WOW
3. Become an innovation zone
4. Embed sustainable principles in technology

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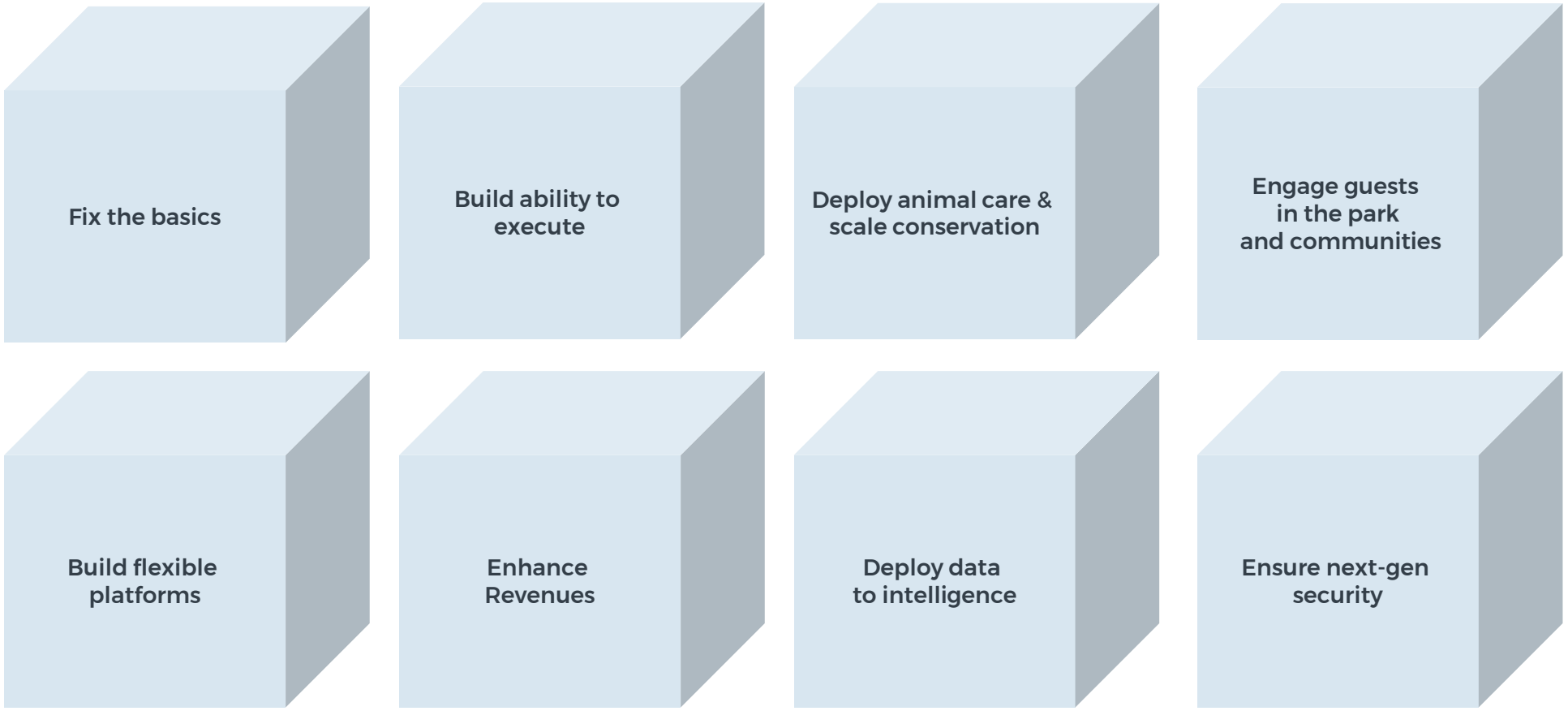
We have identified 8 building blocks for the Zoo's IT strategy

A building block* regroups a list of critical projects to be tacked by the team, 88 projects have been identified



*Note: Excludes continuous projects

Building Blocks: Fix the Basics

To close the gaps between the current and desired states, the team identified required IT initiatives. These initiatives have been grouped into like categories called building blocks.

#	Projects	Type	Value	Risk
1	Implement Wifi site wide / Install Bell Network / Investigate 5G Network /	Growth	High	High
2	Provide wireless devices and laptops to staff	Growth	Medium	Low
3	VoIP telephone system	Growth	Medium	Medium
4	Improve electrical network to avoid power cuts, and support equipment (UPS)	Maintenance	Medium	Medium
5	Implement cloud services for inhouse servers	Growth	High	Medium
6	Identify and integrate Hidden IT (Safety, finance, others)	Productivity	Medium	Medium
7	Implement guest distress system / zoo-wide alarm	Productivity	Medium	Medium
8	Develop CyberSecurity Platforms	Maintenance	Medium	High
9	Plan a holistic software ecosystem & architecture	Growth	Medium	Medium
10	Build a data warehouse (Azure, AWS, Oracle...)	Growth	Medium	Medium

Building Blocks: Build ability to execute

To close the gaps between the current and desired states, the team identified required IT initiatives. These initiatives have been grouped into like categories called building blocks.

#	Projects	Type	Value	Risk
1	Manage Technology Partnerships / Become an innovation zone	Innovation	High	High
2	Grow the IT team with qualified staff 8 (3 applications, 2 infra, 2 service desk, 1 ar)	Growth	Medium	Medium
3	Improve Project management (less complications)	Productivity	Medium	Low
4	Build Technology Reputation / IT marketing plan	Growth	Low	Medium
5	Finalize governance of funds and planning of recurring costs	Maintenance	Low	Low
6	Implement Zoo-wide e-signature software	Productivity	Low	Low

Building Blocks: Build flexible platforms

To close the gaps between the current and desired states, the team identified required IT initiatives. These initiatives have been grouped into like categories called building blocks.

#	Projects	Type	Value	Risk
1	Implement Dynamics ERP	Growth	High	Medium
2	Update and centralise work order system across all departments (harmonize infra + nutrition)	Productivity	High	Medium
3	Launch Electronic Mail Management	Productivity	Low	Medium
4	Implement improved CRM	Growth	Medium	Medium
5	Implement ADP Workforce Now	Productivity	Low	Low
6	Replace ADMITS	Growth	High	Medium
7	Digitalize Employee Onboarding	Productivity	Low	Low
8	Build a quick turnaround digital hiring process	Growth	Low	Low
9	Develop Employee Training	Growth	High	Medium
10	Implement Centralized Inventory Management System	Productivity	Medium	Medium
11	Automate processes through (Service Now)	Productivity	Low	Medium
12	Implement Supplier Relationship System	Productivity	Medium	Medium

Building Blocks: Deploy animal care

To close the gaps between the current and desired states, the team identified required IT initiatives. These initiatives have been grouped into like categories called building blocks.

#	Projects	Type	Value	Risk
1	Scale worldwide conservation: Animal tracking	Innovation	Medium	Medium
2	Scale worldwide conservation: Poaching tracking	Innovation	Medium	Medium
3	Implement animal cameras and sensors (heat, location)	Maintenance	High	Low
4	Automate diet planning	Productivity	Medium	Medium
5	Implement automated animal meal production system	Productivity	High	Medium
6	Implement automated feeding system (distribution)	Productivity	Medium	Medium
7	Predictive care based on history and sensors	Innovation	Medium	Medium
8	Centralized Animal Database in warehouse (reproduction, welfare, nutrition…)	Productivity	High	Medium
9	Digitize nutrition information to Zoo staff & guests	Productivity	Low	Medium

Building Blocks: Deploy data to intelligence

To close the gaps between the current and desired states, the team identified required IT initiatives. These initiatives have been grouped into like categories called building blocks.

#	Projects	Type	Value	Risk
1	Build a reporting dashboard ecosystem on PowerBI or Tableau	Productivity	Medium	Medium
2	Automate reporting for CCAC, OMAFRA, AZA, CAZA	Productivity	Medium	Medium
3	Implement sensors for building health monitoring & consumption	Productivity	High	Medium
4	Track key nutrition metrics	Productivity	Low	Low
5	Partner with tech company to implement digial infrastructure	Innovation	High	Medium
6	Digitalize paper records across the organization	Productivity	Low	Low
7	Measure and automate sustainability reporting	Productivity	Low	Medium
8	Digitize building & infrastructure drawings	Productivity	Medium	Medium
9	Develop a digital twin of the zoo	Productivity	High	Medium
10	Install tracking system on zoo vehicles	Maintenance	Low	Low
11	Install moisture sensors for garden beds/greenhouse	Maintenance	Low	Low
12	Implement Smart Washroom Facilities	Innovation	Medium	Low

Building Blocks: Engage guests and enable communication

To close the gaps between the current and desired states, the team identified required IT initiatives. These initiatives have been grouped into like categories called building blocks.

#	Projects	Type	Value	Risk
1	Develop segment and personal customer journeys	Growth	Medium	Low
2	Installation of guest tracking system i.e. heat maps, cameras, sensors	Innovation	Medium	Medium
3	Implement smart signage across the zoo / interactive maps	Productivity	Medium	Low
4	Display management tool	Productivity	Low	Low
5	Implement AV equipment for boardrooms and event spaces	Productivity	High	Low
6	Improve Last mile to get to the zoo	Innovation	Very High	High
7	Source and implement IT Equipment for Orangutan Exhibit	Growth	Medium	Medium
8	Source and implement IT Equipment for Canadian Pavilion	Growth	Medium	Medium
9	Source and implement IT Equipment for Welcome Area	Growth	Medium	Medium
10	Install automated gates for guests	Growth	Medium	Medium
11	Implement new kiosks and ticketless system	Growth	Medium	Medium
12	Upgrade audio equipment around the zoo	Maintenance	Medium	Low
13	Build Zoo App V2: Interactive Map	Growth	Low	Medium
14	Build Zoo App V2: In-App purchases / donations	Growth	Low	Medium
15	Build Zoo App V2: Animal Directory + Donation	Growth	Low	Medium
16	Build Zoo App V2: Audio Guide	Growth	Low	Medium
17	Build Zoo App V2: Augmented Reality	Growth	Low	Medium
18	Build Zoo App V2: Digital tickets & Membership	Growth	Low	Medium
19	Build Zoo App V2: Conservation	Growth	Low	Medium
20	Build Zoo App Education V2	Growth	Low	Medium
21	Implement VR experience for camp programs	Innovation	Low	Low
22	Implement children tracking for camp programs	Innovation	Low	Low
23	Tap to donate implementation (Conservancy)	Growth	Medium	Low

Building Blocks: Enhance revenues

To close the gaps between the current and desired states, the team identified required IT initiatives. These initiatives have been grouped into like categories called building blocks.

#	Projects	Type	Value	Risk
1	Develop dynamic pricing, VIP programs	Growth	Low	Medium
2	Improve presentation of Zoo to partners with technology	Growth	Medium	Medium
3	Rebuild retail and conservancy "store"	Growth	Medium	Medium
4	Launch Virtual products	Growth	Low	Medium
5	Compass food APP food delivery inside the zoo	Innovation	Low	Medium
6	Implement Virtual queueing	Growth	Low	Medium
7	Implement Mobile/Online payment for parking (Precise Park)	Growth	Low	Medium

Building Blocks: Ensure next-gen security

To close the gaps between the current and desired states, the team identified required IT initiatives. These initiatives have been grouped into like categories called building blocks.

#	Projects	Type	Value	Risk
1	Implement smart locks for enclosures	Maintenance	Medium	Medium
2	Implement smart gates for vehicles	Maintenance	Medium	Medium
3	Scale Machine Learning to identify threatening guest and animal behaviour	Innovation	Medium	Medium

Building Blocks: Extend guest and community reach

To close the gaps between the current and desired states, the team identified required IT initiatives. These initiatives have been grouped into like categories called building blocks.

#	Projects	Type	Value	Risk
1	Expand the zoo experience at home	Innovation	Medium	Medium
2	Expand online education presence	Growth	Low	Low
3	Allow guests to feed animals digitally (sync with nutrition system)	Innovation	Medium	Medium
4	Integrating on site donations options with the network; Explore data collection opportunities	Growth	Medium	Low
5	Develop conservation digital exhibit	Innovation	Medium	Low
6	Digitalize reproduction lab expertise and achievements (Hidden Zoo)	Innovation	Low	Low

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Prioritization Model

The building blocks are prioritized using a model that evaluates both risk and value criteria.
Risk and value criteria have been customized to the Toronto Zoo environment.

Toronto Zoo Value & Risk Criteria

Value Criteria

- Impacts the priority value drivers
- Value at Risk
- Compliance with Regulatory Requirements
- Business criticality of process impacted
- Foundational Element
- Financial Benefits Created

Risk Criteria

- Project owner identified
- Stakeholders alignment and support
- Project and/or Technology novelty
- Project size, duration & complexity
- Financial resources
- Dependencies and interrelationships
- Skilled human resources availability
- Degree of change

Investment Type

Innovation
Explore new technologies that present opportunities to adopt new Business models.

Growth
Transform core infrastructure to support desired business model

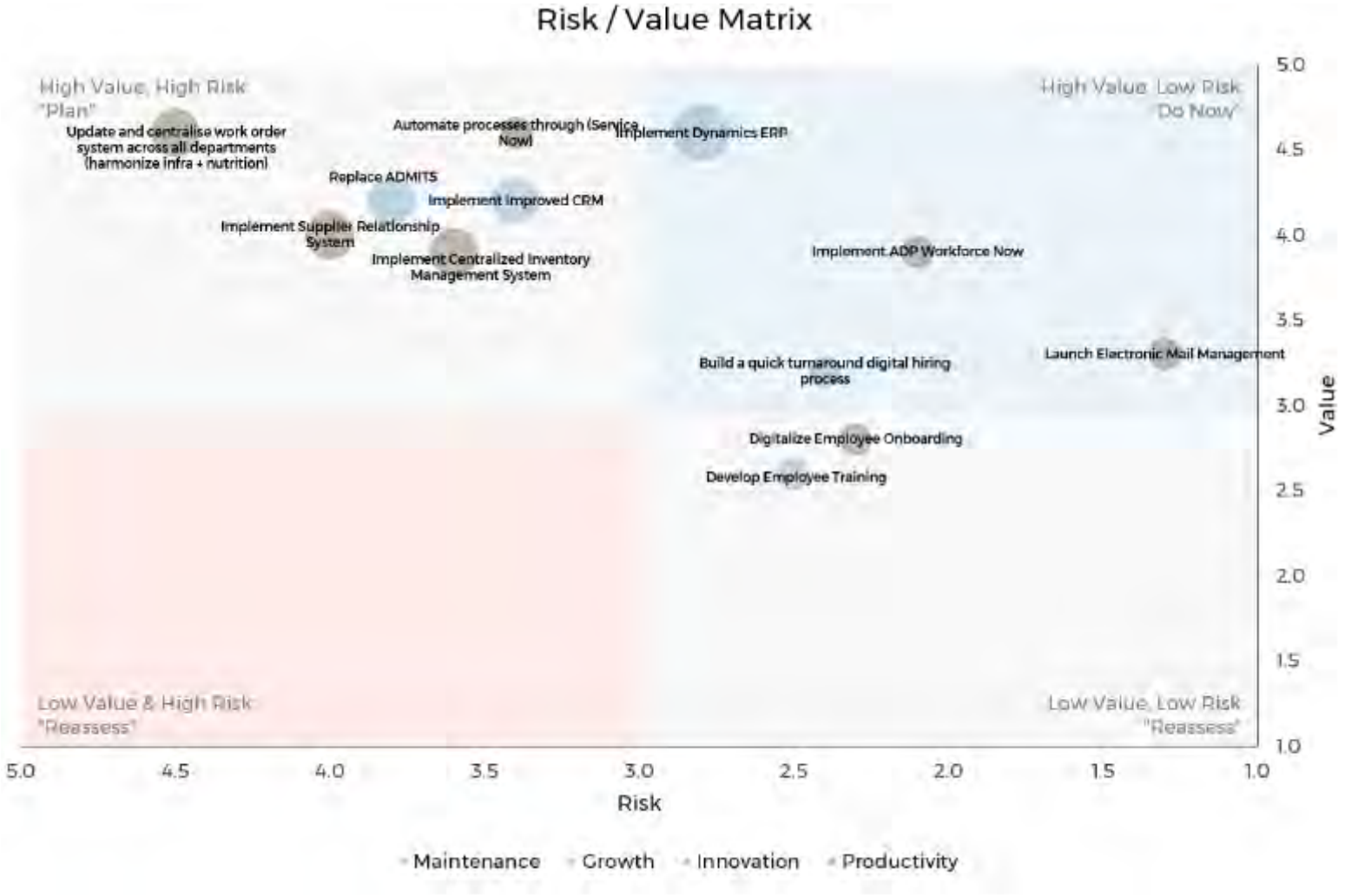
Productivity
Facilitate operational performance improvement of existing processes using IT

Maintenance
Maintain functionality of infrastructure, reduce cost and raise quality and efficiency of IT services

Considering Toronto Zoo's current situation, the first and second years focus will be on Growth and Productivity, and eventually maintenance and innovation.

Prioritization of projects

The building blocks with the highest ratio of value to risk (priority one) are scheduled first within the roadmap, followed by those designated priority two. Priority three building blocks will be scheduled later in the plan, but should be reassessed over time, as their priority may shift.



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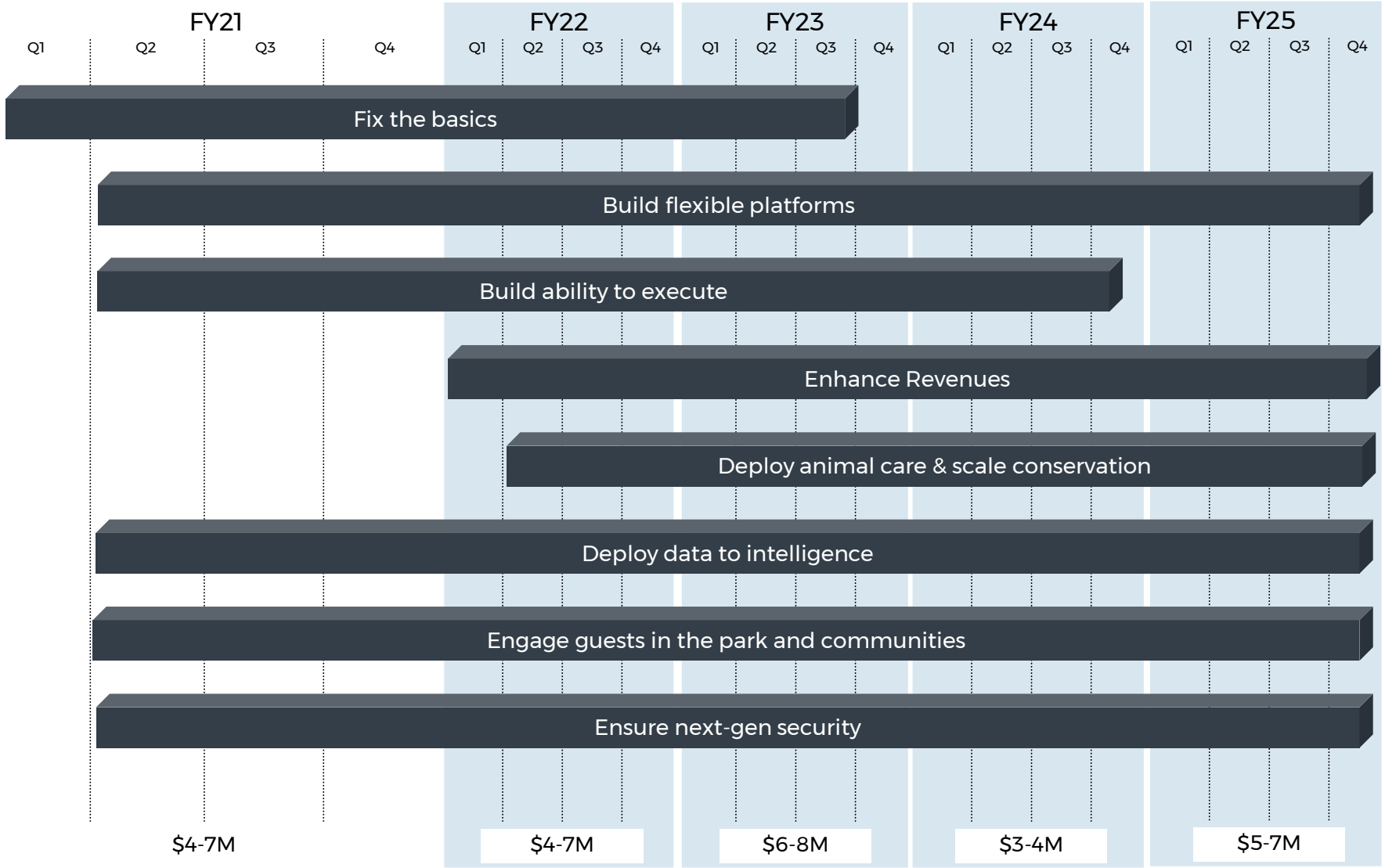
5-Year Technology Roadmap

Interviews uncovered a large number of IT requirements. While immediate execution of all building blocks might be desired, choices may be made on the prioritization. The following roadmap has distributed the blocks over five years given the zoo's capacity to execute.



Notes:

Timelines and costs are targets that will be continuously revised by Our Toronto Zoo's team

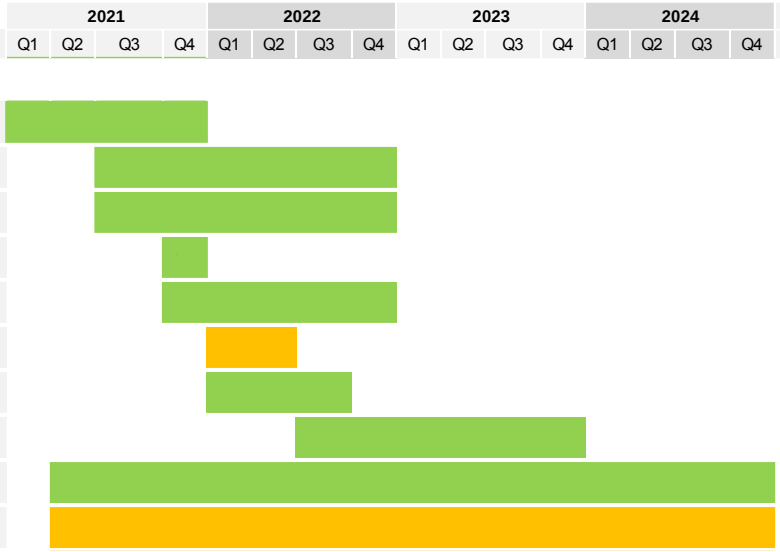
Roadmap

- Finance & Tech.
- Facilities & Infra.
- Human Resources
- Guest Experience
- Wildlife & Science
- Conservation

Fix the Basics

Interviews uncovered a large number of IT requirements. While immediate execution of all building blocks might be desired, choices may be made on the prioritization. The following roadmap has distributed the blocks over five years given the zoo's capacity to execute.

Project	Month	Year	Month	Year	Min	Max	Building Block
Implement Wifi site wide / Install Bell Network / Investigate 5G Network /	1	2021	10	2021	$ 1,900	$ 1,900	Fix the basics
Implement cloud services for inhouse servers	5	2021	10	2022	$ -	$ 100	Fix the basics
Develop CyberSecurity Platforms	7	2021	12	2022	$ 250	$ 500	Fix the basics
VoIP telephone system	9	2021	12	2021	$ -	$ 100	Fix the basics
Identify and integrate Hidden IT (Safety, finance, others)	10	2021	10	2022	$ 100	$ 500	Fix the basics
Implement guest distress system / zoo-wide alarm	11	2021	4	2022	$ -	$ 100	Fix the basics
Plan a holistic software ecosystem & architecture	12	2021	7	2022	$ 100	$ 500	Fix the basics
Build a data warehouse (Azure, AWS, Oracle...)	5	2022	12	2023	$ 100	$ 500	Fix the basics
Provide wireless devices and laptops to staff	2	2021	12	2024	$ 250	$ 300	Asset Management
Improve electrical network to avoid power cuts, and support equipment (UPS)	3	2021	12	2024	$ 100	$ 500	Asset Management



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Build Ability to Execute

Interviews uncovered a large number of IT requirements. While immediate execution of all building blocks might be desired, choices may be made on the prioritization. The following roadmap has distributed the blocks over five years given the zoo's capacity to execute.

Roadmap

- Finance & Tech.
- Facilities & Infra.
- Human Resources
- Guest Experience
- Wildlife & Science
- Conservation

Project	Month	Year	Month	Year	Min	Max	Building Block
Manage Technology Partnerships / Become an innovation zone	3	2021	3	2022	$ -	$ 100	Build ability to execute
Grow the IT team with qualified staff 8 (3 applactions, 2 infra, 2 service desk 1 ar)	6	2021	12	2023	$ 500	$ 800	Build ability to execute
Finalize governance of funds and planning of recurring costs	6	2021	9	2021	$ 1	$ 1	Build ability to execute
Implement Zoo-wide e-signature software	11	2021	12	2021	$ 10	$ 20	Build ability to execute
Build Technology Reputation / IT marketing plan	8	2022	8	2023	$ -	$ 100	Build ability to execute
Improve Project management (less complications)	8	2022	8	2023	$ 100	$ 500	Build ability to execute

Notes:

Timelines and costs are targets that will be continuously revised by Our Toronto Zoo's team

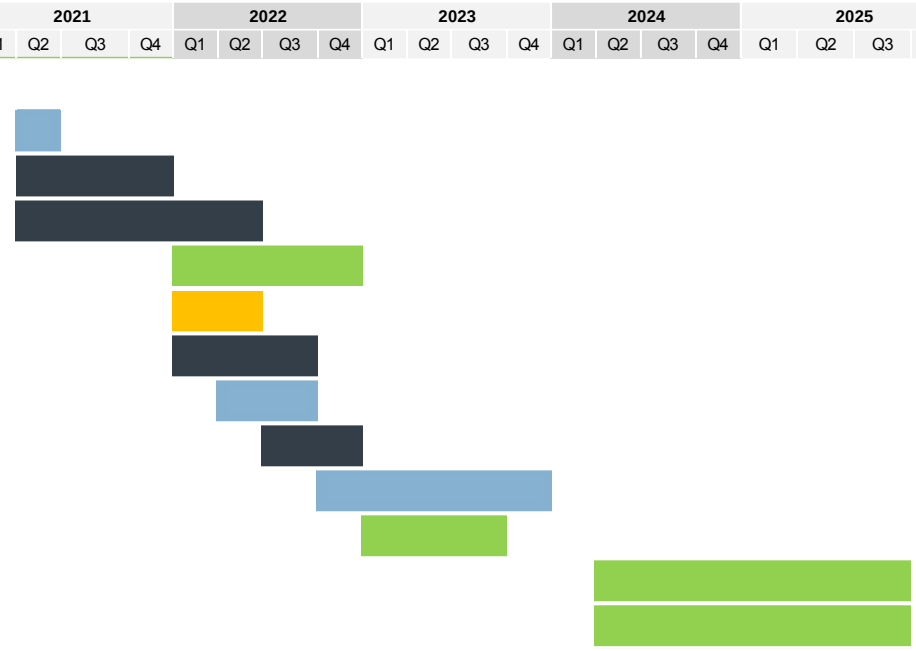
Build Flexible Platforms

Interviews uncovered a large number of IT requirements. While immediate execution of all building blocks might be desired, choices may be made on the prioritization. The following roadmap has distributed the blocks over five years given the zoo's capacity to execute.

Roadmap

- Finance & Tech.
- Facilities & Infra.
- Human Resources
- Guest Experience
- Wildlife & Science
- Conservation

Project	Month	Year	Month	Year	Min	Max	Building Block
Launch Electronic Mail Management	3	2021	4	2021	$ 14	$ 20	Build flexible platforms
Implement ADP Workforce Now	4	2021	12	2021	$ 100	$ 150	Build flexible platforms
Build a quick turnaround digital hiring process	4	2021	4	2022	$ -	$ 100	Build flexible platforms
Implement Dynamics ERP	11	2021	12	2022	$ 500	$ 2,000	Build flexible platforms
Update and centralise work order system across all departments (harmonize infra +	12	2021	6	2022	$ 100	$ 500	Build flexible platforms
Develop Employee Training	1	2022	8	2022	$ -	$ 100	Build flexible platforms
Replace ADMITS	2	2022	8	2022	$ 100	$ 500	Build flexible platforms
Digitalize Employee Onboarding	7	2022	12	2022	$ -	$ 100	Build flexible platforms
Implement improved CRM	9	2022	12	2023	$ 100	$ 500	Build flexible platforms
Implement Centralized Inventory Management System	12	2022	9	2023	$ 100	$ 500	Build flexible platforms
Implement Supplier Relationship System	3	2024	9	2025	$ 100	$ 500	Build flexible platforms
Automate processes through (Service Now)	4	2024	8	2025	$ -	$ 100	Build flexible platforms



Notes:

Timelines and costs are targets that will be continuously revised by Our Toronto Zoo's team

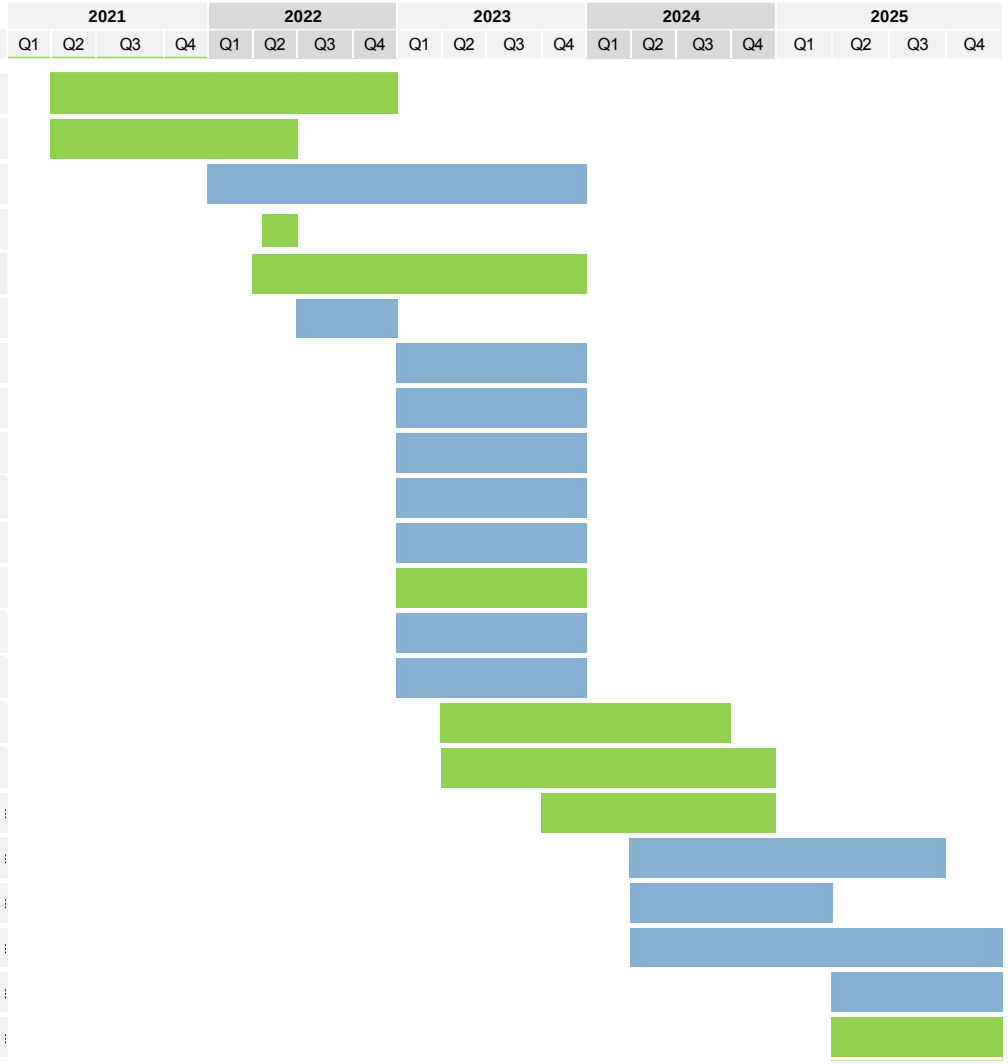
Engage Guests in the Park & Communities

Interviews uncovered a large number of IT requirements. While immediate execution of all building blocks might be desired, choices may be made on the prioritization. The following roadmap has distributed the blocks over five years given the zoo's capacity to execute.

Roadmap

- Finance & Tech.
- Facilities & Infra.
- Human Resources
- Guest Experience
- Wildlife & Science
- Conservation

Project	Month	Year	Month	Year	Min	Max	Building Block
Implement AV equipment for boardrooms and event spaces	3	2021	12	2022	$ 500	$ 2,000	Engage guests in the park and communities
Source and implement IT Equipment for Orangutan Exhibit	4	2021	4	2022	$ 100	$ 500	Engage guests in the park and communities
Develop segment and personal customer journeys	1	2022	12	2023	$ 100	$ 500	Engage guests in the park and communities
Display management tool	2	2022	3	2022	$ -	$ 100	Engage guests in the park and communities
Upgrade audio equipment around the zoo	4	2022	12	2023	$ 100	$ 500	Engage guests in the park and communities
Build Zoo App V2: Interactive Map	5	2022	11	2022	$ -	$ 100	Engage guests in the park and communities
Build Zoo App V2: Animal Directory + Donation	11	2022	11	2023	$ -	$ 100	Engage guests in the park and communities
Build Zoo App V2: Audio Guide	11	2022	11	2023	$ -	$ 100	Engage guests in the park and communities
Build Zoo App V2: Augmented Reality	11	2022	11	2023	$ -	$ 100	Engage guests in the park and communities
Build Zoo App V2: Digital tickets & Membership	11	2022	11	2023	$ -	$ 100	Engage guests in the park and communities
Build Zoo App V2: Conservation	11	2022	11	2023	$ -	$ 100	Engage guests in the park and communities
Installation of guest tracking system i.e. heat maps, cameras, sensors	12	2022	12	2023	$ 100	$ 500	Engage guests in the park and communities
Implement new kiosks and ticketless system	1	2023	12	2023	$ 100	$ 500	Engage guests in the park and communities
Install automated gates for guests	1	2023	12	2023	$ 100	$ 500	Engage guests in the park and communities
Implement smart signage across the zoo / interactive maps	3	2023	8	2024	$ 100	$ 500	Engage guests in the park and communities
Source and implement IT Equipment for Canadian Pavilion	4	2023	12	2024	$ 100	$ 500	Engage guests in the park and communities
Source and implement IT Equipment for Welcome Area	10	2023	12	2024	$ 100	$ 500	Engage guests in the park and communities
Build Zoo App V2: In-App purchases / donations	3	2024	8	2025	$ -	$ 100	Engage guests in the park and communities
Build Zoo App Education V2	3	2024	3	2025	$ -	$ 100	Engage guests in the park and communities
Implement children tracking for camp programs	3	2024	12	2026	$ -	$ 100	Engage guests in the park and communities
Improve Last mile to get to the zoo	3	2025	12	2030	$15,000	$ 15,000	Engage guests in the park and communities
Implement VR experience for camp programs	3	2025	12	2028	$ 100	$ 500	Engage guests in the park and communities



Notes:

Timelines and costs are targets that will be continuously revised by Our Toronto Zoo's team

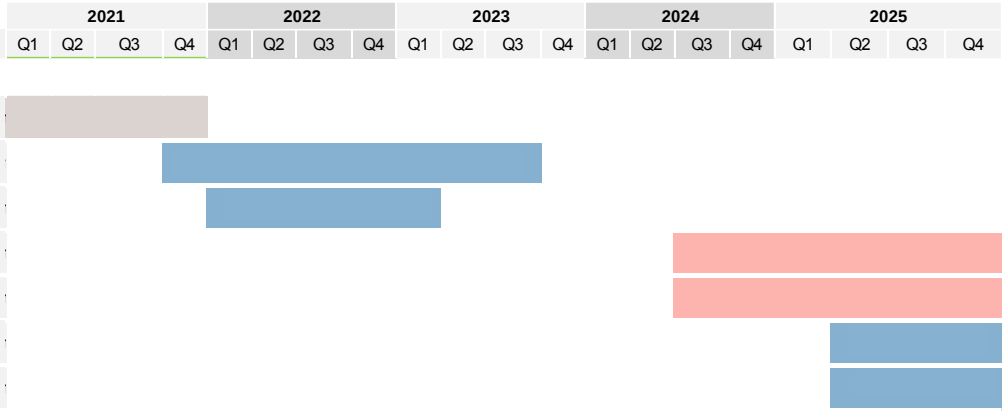
Engage Guests in the Park & Communities (cont'd)

Interviews uncovered a large number of IT requirements. While immediate execution of all building blocks might be desired, choices may be made on the prioritization. The following roadmap has distributed the blocks over five years given the zoo's capacity to execute.

Roadmap

- Finance & Tech.
- Facilities & Infra.
- Human Resources
- Guest Experience
- Wildlife & Science
- Conservation

Project	Month	Year	Month	Year	Min	Max	Building Block
Tap to donate implementation (Conservancy)	1	2021	12	2021	$ -	$ 100	Engage guests in the park and communities
Expand online education presence	9	2021	9	2023	$ -	$ 100	Engage guests in the park and communities
Integrating on site donations options with the network; Explore data collection opportunities	1	2022	1	2023	$ -	$ 100	Engage guests in the park and communities
Allow guests to feed animals digitally (sync with nutrition system)	6	2024	12	2025	$ 100	$ 500	Engage guests in the park and communities
Digitalize reproduction lab expertise and achievements (Hidden Zoo)	7	2024	7	2026	$ -	$ 100	Engage guests in the park and communities
Expand the zoo experience at home	3	2025	3	2027	$ 100	$ 500	Engage guests in the park and communities
Develop conservation digital exhibit	3	2025	3	2027	$ 500	$ 2,000	Engage guests in the park and communities



Notes:

Timelines and costs are targets that will be continuously revised by Our Toronto Zoo's team

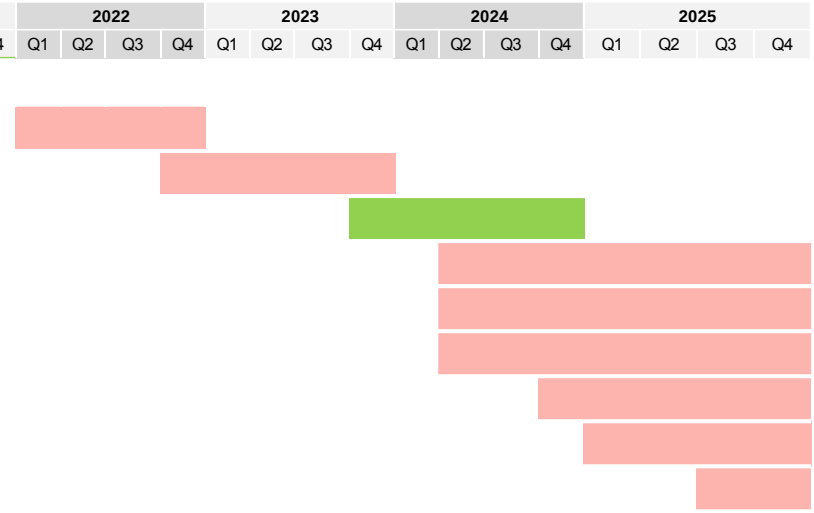
Deploy Animal Care

Interviews uncovered a large number of IT requirements. While immediate execution of all building blocks might be desired, choices may be made on the prioritization. The following roadmap has distributed the blocks over five years given the zoo's capacity to execute.

Roadmap

- Finance & Tech.
- Facilities & Infra.
- Human Resources
- Guest Experience
- Wildlife & Science
- Conservation

Project	Month	Year	Month	Year	Min	Max	Building Block
Implement automated feeding system (distribution)	11	2021	11	2022	$ 100	$ 500	Deploy animal care
Implement animal cameras and sensors (heat, location)	10	2022	10	2023	$ 500	$ 2,000	Deploy animal care
Centralized Animal Database in warehouse (reproduction, welfare, nutrition…)	8	2023	12	2024	$ 100	$ 500	Deploy animal care
Predictive care based on history and sensors	3	2024	12	2026	$ 100	$ 500	Deploy animal care
Scale worldwide conservation: Animal tracking	3	2024	3	2027	$ 100	$ 500	Deploy animal care
Automate diet planning	3	2024	12	2025	$ -	$ 100	Deploy animal care
Digitize nutrition information to Zoo staff & guests	8	2024	12	2025	$ -	$ 100	Deploy animal care
Implement automated animal meal production system	11	2024	11	2025	$ 500	$ 2,000	Deploy animal care
Scale worldwide conservation: Poaching tracking	7	2025	4	2030	$ 100	$ 500	Deploy animal care



Notes:

Timelines and costs are targets that will be continuously revised by Our Toronto Zoo's team

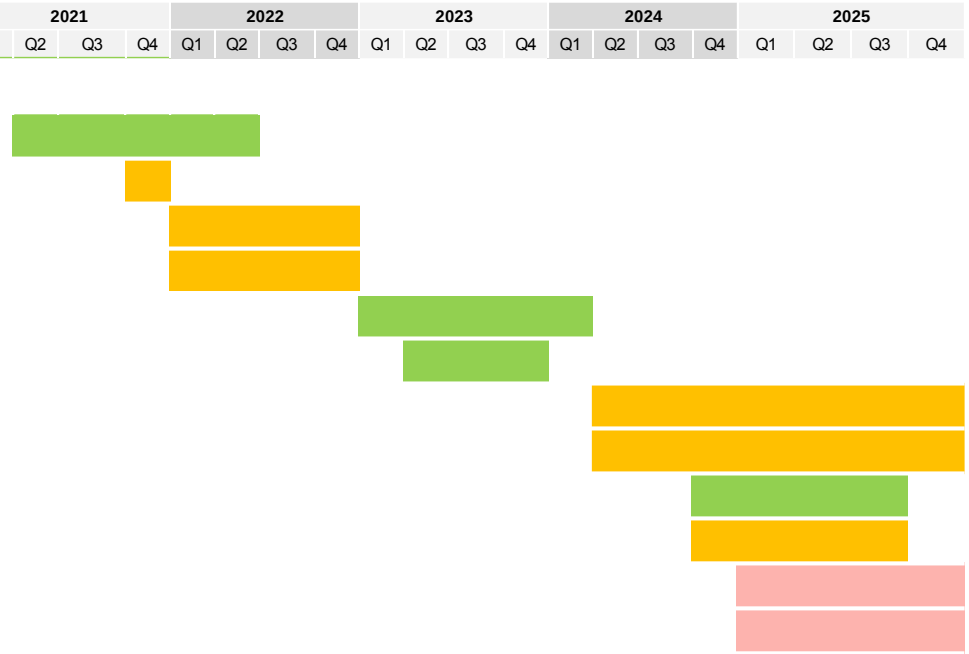
Deploy Data to Intelligence

Interviews uncovered a large number of IT requirements. While immediate execution of all building blocks might be desired, choices may be made on the prioritization. The following roadmap has distributed the blocks over five years given the zoo's capacity to execute.

Roadmap

- Finance & Tech.
- Facilities & Infra.
- Human Resources
- Guest Experience
- Wildlife & Science
- Conservation

Project	Month	Year	Month	Year	Min	Max	Building Block
Digitalize paper records across the organization	4	2021	4	2022	$ -	$ 100	Deploy Data to Intelligence
Implement Smart Washroom Facilities	8	2021	12	2021	$ 500	$ 2,000	Deploy Data to Intelligence
Digitize building & infrastructure drawings	11	2021	11	2022	$ 100	$ 500	Deploy Data to Intelligence
Implement sensors for building health monitoring & consumption	1	2022	12	2022	$ 100	$ 500	Deploy Data to Intelligence
Partner with tech company to implement digial infrastructure	1	2023	1	2024	$ 2,000	$ 2,000	Deploy Data to Intelligence
Build a reporting dashboard ecosystem on PowerBI or Tableau	4	2023	12	2023	$ 100	$ 500	Deploy Data to Intelligence
Install tracking system on zoo vehicles	3	2024	12	2025	$ -	$ 100	Deploy Data to Intelligence
Install moisture sensors for garden beds/greenhouse	3	2024	12	2025	$ -	$ 100	Deploy Data to Intelligence
Track key nutrition metrics	8	2024	8	2025	$ -	$ 100	Deploy Data to Intelligence
Develop a digital twin of the zoo	8	2024	8	2025	$ 500	$ 2,000	Deploy Data to Intelligence
Automate reporting for CCAC, OMAFRA, AZA, CAZA	11	2024	11	2025	$ -	$ 100	Deploy Data to Intelligence
Measure and automate sustainability reporting	11	2024	11	2025	$ -	$ 100	Deploy Data to Intelligence



Notes:

Timelines and costs are targets that will be continuously revised by Our Toronto Zoo's team

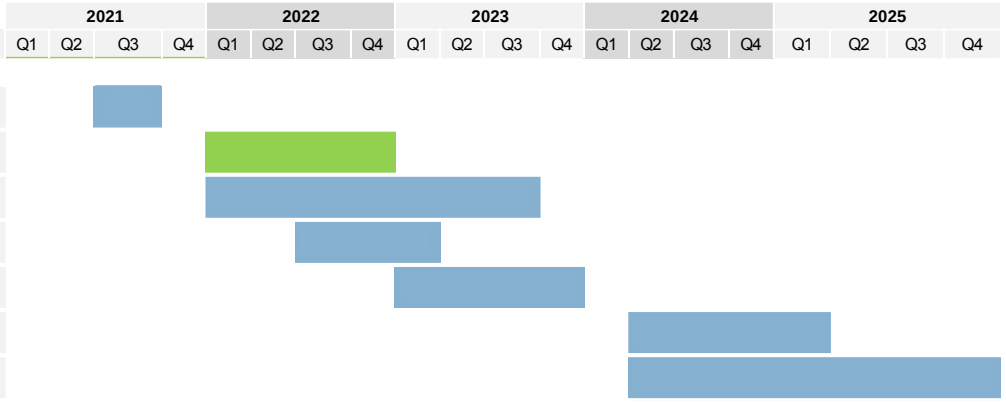
Enhance Revenues

Interviews uncovered a large number of IT requirements. While immediate execution of all building blocks might be desired, choices may be made on the prioritization. The following roadmap has distributed the blocks over five years given the zoo's capacity to execute.

Roadmap

- Finance & Tech.
- Facilities & Infra.
- Human Resources
- Guest Experience
- Wildlife & Science
- Conservation

Project	Month	Year	Month	Year	Min	Max	Building Block
Compass food APP food delivery inside the zoo	5	2021	7	2021	$ 20	$ 50	Enhance revenues
Improve presentation of Zoo to partners with technology	1	2022	12	2022	$ 100	$ 500	Enhance revenues
Implement Mobile/Online payment for parking (Precise Park)	1	2022	8	2023	$ -	$ 100	Enhance revenues
Develop dynamic pricing, VIP programs	6	2022	3	2023	$ -	$ 100	Enhance revenues
Launch Virtual products	1	2023	12	2023	$ -	$ 100	Enhance revenues
Rebuild retail and conservancy "store"	3	2024	3	2025	$ 100	$ 500	Enhance revenues
Implement Virtual queueing	3	2024	12	2025	$ -	$ 100	Enhance revenues



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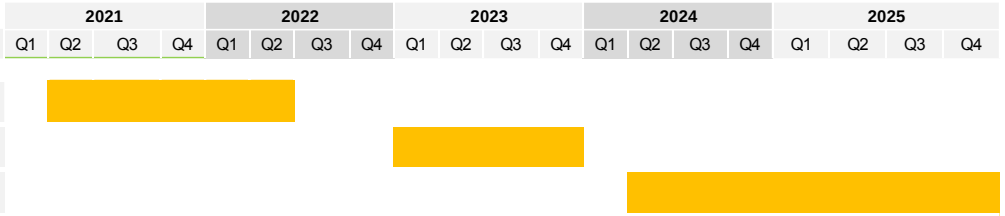
Ensure Next Gen Security

Interviews uncovered a large number of IT requirements. While immediate execution of all building blocks might be desired, choices may be made on the prioritization. The following roadmap has distributed the blocks over five years given the zoo's capacity to execute.

Roadmap

- Finance & Tech.
- Facilities & Infra.
- Human Resources
- Guest Experience
- Wildlife & Science
- Conservation

Project	Month	Year	Month	Year	Min	Max	Building Block
Implement smart locks for enclosures	4	2021	4	2022	$ 100	$ 500	Ensure next-gen security
Implement smart gates for vehicles	1	2023	12	2023	$ 100	$ 500	Ensure next-gen security
Scale Machine Learning to identify threatening guest and animal behaviour	3	2024	12	2025	$ 100	$ 500	Ensure next-gen security



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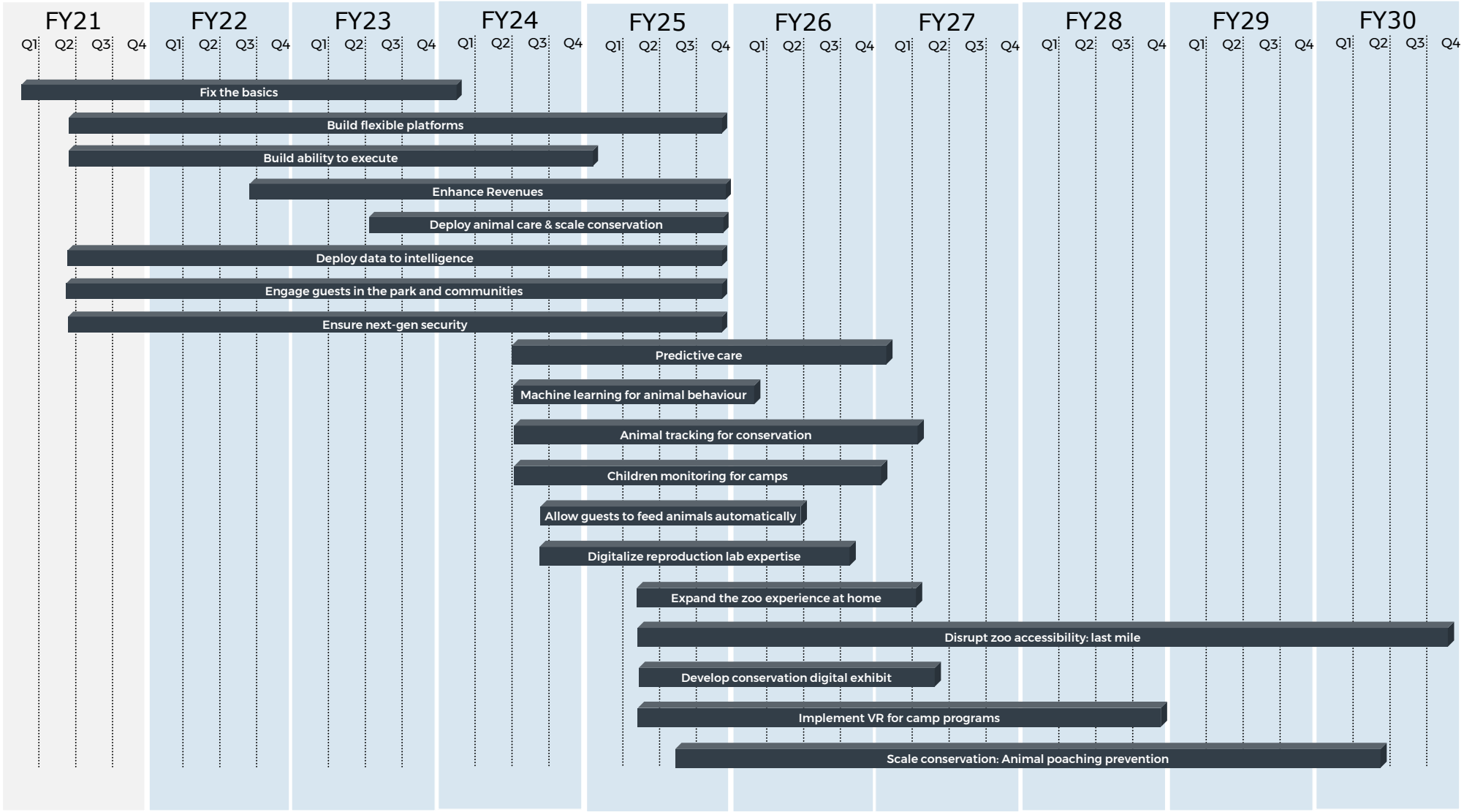
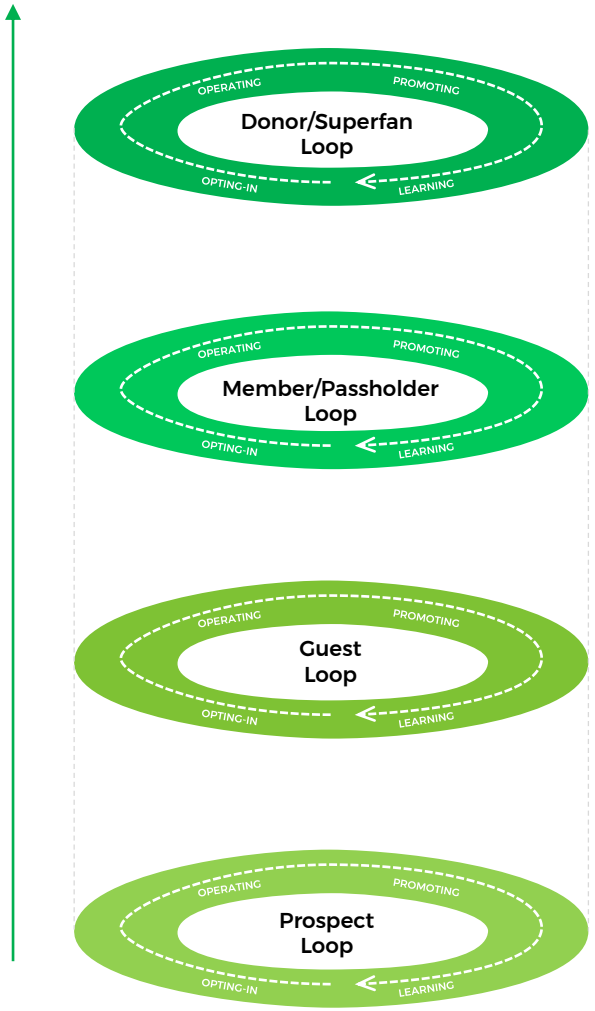
10-Year Innovation Plan

While the first 3 years will be prioritized to fix the basics, innovation projects will be prioritized after 2025 to ensure that the zoo delivers on its strategic ambitions



Integration of technology in the “Loop” model

Loop Model



Enabling Technologies

LEARNING	OPTING-IN	OPERATING	PROMOTING
▪ Donation outreach to member (email, calls)	▪ Online donation ▪ On-site donation through waypoints	▪ Exclusive events for donors ▪ Digital donor leaderboard ▪ Conservation support	▪ Social media experience sharing
▪ Fast membership registration	▪ Digital wallet and membership	▪ Special tips for members ▪ Discounts ▪ Food suggestion	▪ Partner events ▪ Donation suggestions ▪ Special perks
▪ Newsletter follow-up ▪ Social media ads	▪ Guest recognition ▪ Dynamic pricing ▪ Download Zoo app	▪ Activity suggestion ▪ Mobile purchasing for food, etc.	▪ Suggestions for memberships ▪ Special discounts for members
▪ Online reviews ▪ Social Media engagement	▪ Online ticketing ▪ Calendar reminders	▪ Mobile ticket ▪ Interactive digital exhibits	▪ Online feedback form ▪ Rating on platforms ▪ Sharing pictures ▪ Newsletter

How will building blocks focus on conservation?

Building Blocks	*Conservation initiatives*
Fix the basics	▪ A new network will open up the ability to develop and scale systems promoting conservation education and fundraising
Build flexible platforms	▪ Better platforms will open the path for clear data collection and curation, enhancing conservation efforts
Build ability to execute	▪ A stronger IT organization will bring continuous improvement to the zoo and facilitate the scaleup of education programs, and transactions
Enhance Revenues	▪ New tap to donate options, as well as digital gifts will enable greater conservation funding for the zoo
Deploy animal care & scale conservation	▪ Better animal data will allow to advance the research on specific species ▪ Animal tracking and poaching prevention will increase livelihood of animals
Deploy data to intelligence	▪ Showcasing animal data to the public and better understanding trends will accelerate response rate
Engage guests in the park and communities	▪ Guests will learn about conservation through the new app experience, digital conservation exhibits and online tools
Ensure next-gen security	▪ Enhanced safety systems will safeguard animals within the zoo

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Appendix

Overview of data reviewed

We reviewed the key Zoo documents listed by the Toronto Zoo

Data Reviewed	
Capital works plan	1990 Capital Master plan
Conservation and wildlife plan	2016 Master Plan
Financial statements	2019 Environmental Initiatives Report
Network maps	2019 On Site Guest Survey
MOUs	Tripartite Agreement
Organizational Chart	Education Programs Report 2018
G5 Brand and Visitor Research	Historical Board Report
G5 Brand Study	School and Public Education Programs
Market Analysis	Site Plan
IT 2020 project plan	Strategic Plan 2020
IT Annual Costs	Volunteer Service Report

Appendix

Overview of interviews conducted

We interviewed 38 stakeholders from the Zoo across key departments

Pair	Name	Committee	Department	Sub Category	Function	Interview Date	Status
1	Andrew Lentini	Steering	Wildlife and Science		Senior Director	2020-11-04	Completed
2	Andrea Drost	Expert	Wildlife and Science	Wildlife Care	Manager	2020-11-13	Completed
2	Eric Cole	Expert	Wildlife and Science	Wildlife Care & Welfare	Director	2020-11-13	Completed
2	Hollie Ross	Expert	Wildlife and Science	Behavioural Husbandtry	Supervisor	2020-11-13	Completed
3	Gabriela Mastromonaco	Expert	Wildlife and Science	Reproductive Sciences	Manager	2020-11-09	Completed
3	Maria Franke	Expert	Wildlife and Science	Welfare Science	Manager	2020-11-09	Completed
3	Kevin Kerr	Expert	Wildlife and Science	Species Recovery and Program Assessment	Manager	2020-11-09	Completed
4	Jaap Wensvoort	Expert	Wildlife and Science	Nutrition	Manager	2020-11-20	Completed
4	Sarra Gourlie	Expert	Wildlife and Science	Nutrition	Supervisor, Nutrition	2020-11-20	Completed
4	Siga Lapinskas	Expert	Wildlife and Science	Nutrition	Resident	2020-11-20	Completed
5	Leona Mitchell	Steering	Facilities & Infrastructure		Director	2020-11-02	Completed
6	Kyla Greenham	Expert	Facilities & Infrastructure	Conservation Programs & Environment	Manager	2020-11-09	Completed
7	Dolf DeJong	Steering	General Management		Chief Executive Officer	2020-11-04	Completed
8	Jennifer Tracey	Steering	General Management		Senior Director	2020-11-04	Completed
9	Adam Huston	Expert	Strategic Communications & Guest Experience	Guest Experience	Director	2020-11-12	Completed
9	Erika Lewis	Expert	Strategic Communications & Guest Experience	Guest Experience	Manager, Retail & Membership	2020-11-12	Completed
9	Andrea Guindon	Expert	Strategic Communications & Guest Experience	Guest Experience	Manager, Guest Relations	2020-11-12	Completed
10	Alia Lee	Steering	Finance & Technology	Finance & Technology	Director, Finance & Technology	2020-11-05	Completed
11	Michael Squires	Expert	Finance & Technology	Technology	Manager, Technology	2020-11-19	Completed
12	Valerie Peticca	Expert	Human Resources	Human Resources	Director, HR	2020-11-13	Completed
12	Shawna Findlay-Thompson	Expert	Human Resources	Human Resources	Manager, HR	2020-11-13	Completed
12	Sam Nash	Expert	Human Resources	Human Resources	HR, Generalist	2020-11-13	Completed
13	Katie Gray	Expert	Strategic Communications & Guest Experience	Strategic Communications	Manager	2020-11-12	Completed
13	Amanda Chambers	Expert	Strategic Communications & Guest Experience	Strategic Communications	Supervisor	2020-11-12	Completed
13	Olivia Weaver	Expert	Strategic Communications – Marketing & Social Media	Strategic Communications	Associate	2020-11-12	Completed
14	Steve Jones	Expert	Strategic Communications & Guest Experience	Learning & Engagement	Supervisor	2020-11-12	Completed
14	Shawn Blackburn	Expert	Strategic Communications & Guest Experience	Learning & Engagement	Coordinator	2020-11-12	Completed
15	Nicole Herbert	Expert	Strategic Communications & Guest Experience	Guest Experience	Supervisor, Retail & Membership	2020-11-09	Completed
15	Teresa Joblin	Expert	Strategic Communications & Guest Experience	Guest Experience	Clerk, Membership	2020-11-09	Completed
16	Graham Birtles	Expert	Safety and Security	Safety and Security	Supervisor, Safety & Security	2020-11-13	Completed
16	Joanne Eaton	Expert	Safety and Security	Safety and Security	Manager, Safety & Security	2020-11-13	Completed
17	Debbie James	Expert	Executive Administration	General Management	Executive Assistant	2020-11-04	Completed
17	Brian Oliveira	Expert	Wildlife and Science	Wildlife Care	Supervisor	2020-11-04	Completed
17	Andrew Hiltz	Expert	Strategic Communications & Guest Experience	Guest Experience	Supervisor, Guest Relations	2020-11-04	Completed
18	Taryne Haight	Expert	Finance & Technology	Finance	Manager	2020-11-13	Completed
18	Shaneela Jivraj	Expert	Finance & Technology	Finance - Accounting	Supervisor	2020-11-13	Completed
18	Peter Vasilopolous	Expert	Finance & Technology	Purchasing & Supply	Supervisor	2020-11-13	Completed

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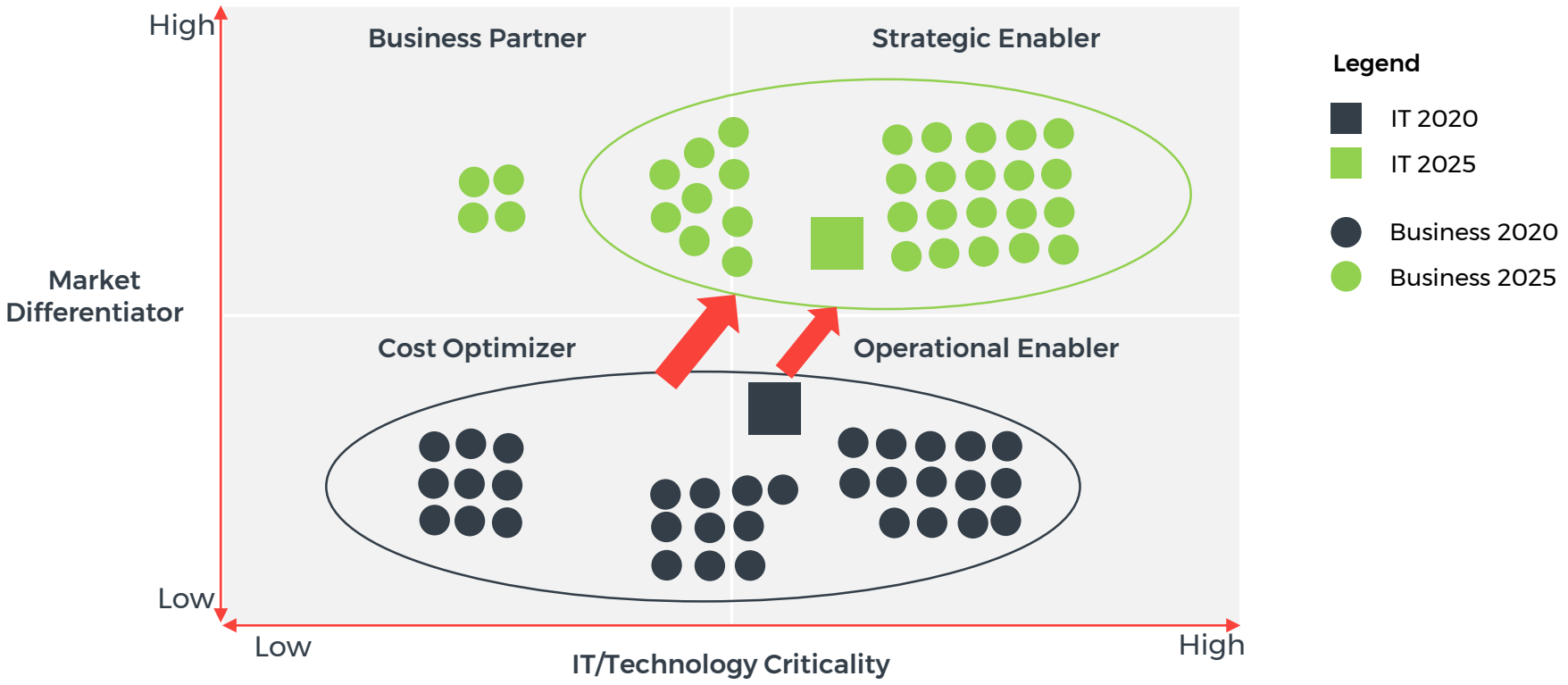
Appendix

Role of IT at the Toronto Zoo

WSP Interviewed 38 Business and IT leaders from the Toronto Zoo to learn bore about IT's perceived current role, and the desired future role in 5 years.

IT Assessment Matrix



There is strong need for IT to create and demonstrate value and evolve from cost center to a business strategic partner.

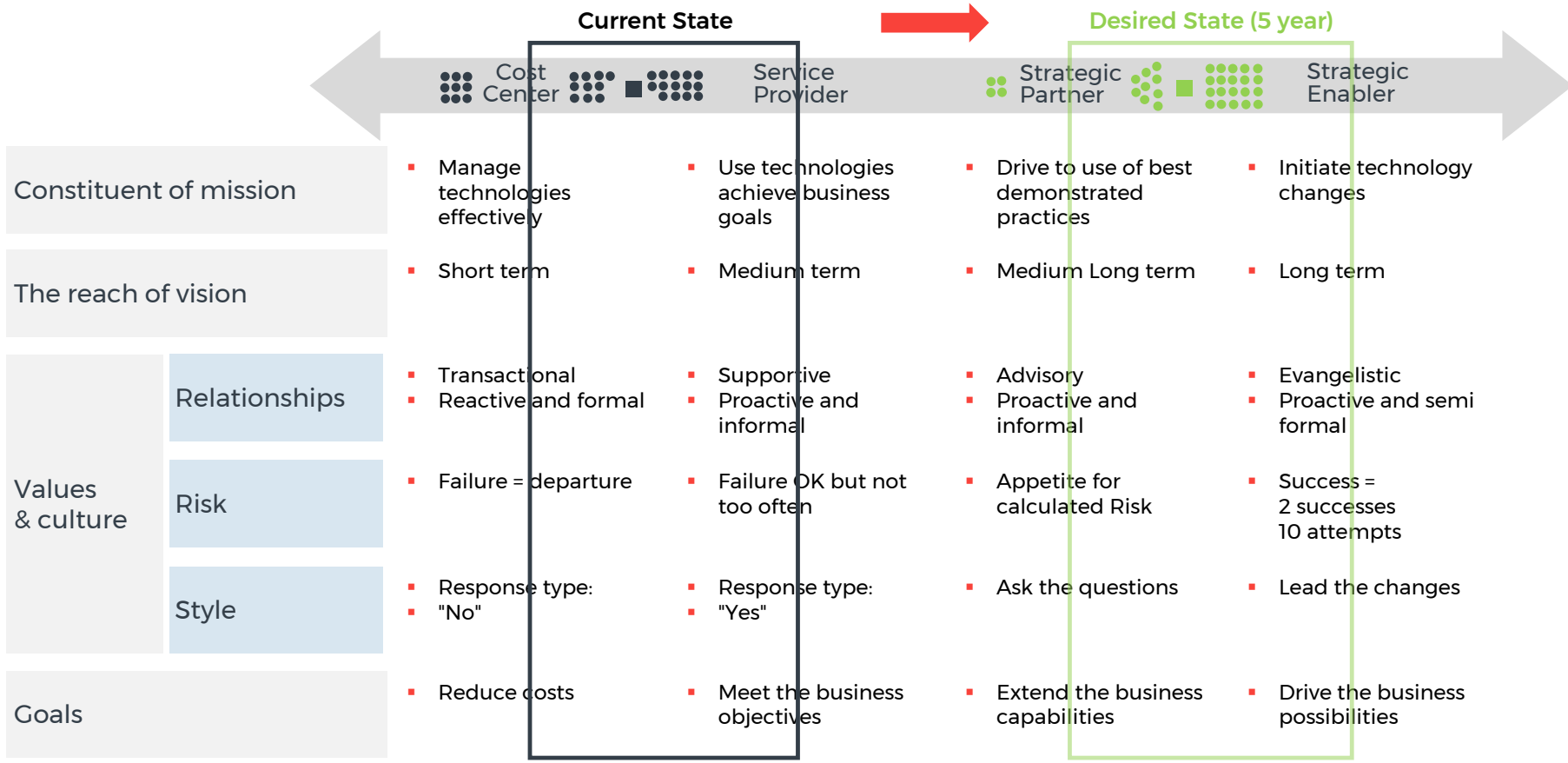
Source: Toronto Zoo Staff Interviews

Appendix

IT Role Progression

WSP Interviewed 38 Business and IT leaders from the Toronto Zoo to learn bore about IT's perceived current role, and the desired future role in 5 years.

IT Role Progression Timeline



There is strong need for IT to create and demonstrate value and evolve from cost center to a strategic partner.

Source: Toronto Zoo Staff Interviews

Appendix

IT Maturity Assessment Score definitions

Key definitions

Score	Description	Definition
1	**None Existent**	Non-Existent / Management processes are not applied at all.
2	**Developed**	Initial processes are developed but disorganized (Ad Hoc).
3	**Communicated**	Repeatable processes follow a regular pattern, are documented & communicated.
4	**Integrated**	Managed processes are integrated.
5	**Monitored**	Optimized / Best practices are monitored.

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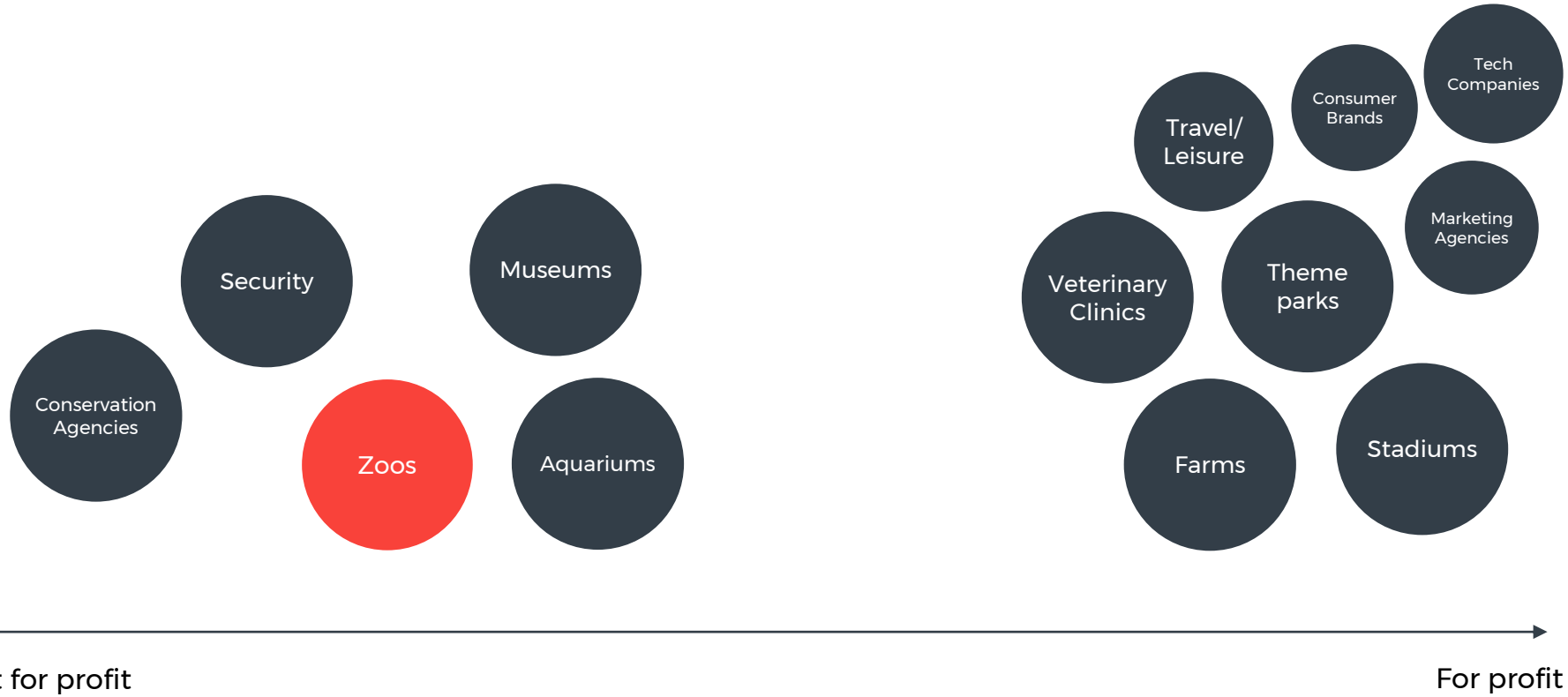
What other industries are relevant to Zoos?

We have looked at 12 additional industries to extract best practices



Focus: Guest Experience

While Zoos are starting to embark on these trends, theme parks have a much higher level of maturity.

Leading Practices

1 Digital Guest Experience

	Adopt wearables and leverage smartphones	Bring data to the core of guest experience	Create Personalized Experiences	Develop Hyper Immersive Experiences	Expand Beyond Local
San Diego Zoo	▪ Application including zoo map, animal story and description, point of sales, walking paths	▪ Free wifi provides guest data	▪ 24/7 virtual chat ▪ Education content for different types of customers: kids platform, learning platform	▪ 4D Theatre playing animal movies	▪ Live animal streams on their website ▪ Global conservation program and team ▪ "Tech to Reconnect" events with worldwide speakers
Ocean Park Hong Kong	▪ Application including Interactive park map, attractions, scheduler, virtual tour guide Booking restaurants ahead of time	▪ Get user profile through wifi network ▪ Live information on guest location around the park, purchases, retention	▪ "Fast track" VIP program ▪ VIP Premium tour ▪ Virtual guided tour for guests	▪ 360 degree interactive projection ▪ Use of VR on rides to tell a story about conservation in the Amazon	▪ E-learning programme available for guests ▪ Digital aquarium services for events outside of the park
Walt Disney World	▪ Application including Real time wait times, park hours, showtimes, purchase tickets, buy merchandise, browse restaurant menu, share pictures and videos, hotel reservations, individual account	▪ Machine Learning is used to predict when and where a visiting family will sit for their dinner reservation. ▪ Prompt kitchen staff to get a head start on pre-ordered meals ▪ Dynamic pricing models	▪ Personalized MagicBands using RF technology allow guests to interact with Touch Points to plan their visit, reserve access, bypass lineups.	▪ Guests use their mobile devices or wristband to interact with attractions ▪ Use of augmented reality for night shows ▪ Local food discovery ▪ Create alternate realities	▪ Guests are engaged before their visit through the app and website ▪ Memory Maker allows to create unique pictures and footages of guests' experience

Source: San Diego Zoo Website (2020); Ocean Park Hong Kong Site (2020); Walt Disney World Website (2020); South China Morning Post, Ocean Park raises its game and stays relevant by embracing technology (2019); San Diego Zoo, Tech to Reconnect (2019); Interna Insights, How Behavioral Analytics Changed Disney World Forever, Harvard Business Review, Mickey Mouse in the 21st Century: How machine learning is making Disney World the happiest, and most efficient, place on Earth (2018)

Example of guest experience best practices

The rapid adoption of technology within museums has transformed the industry.

Leading Practices

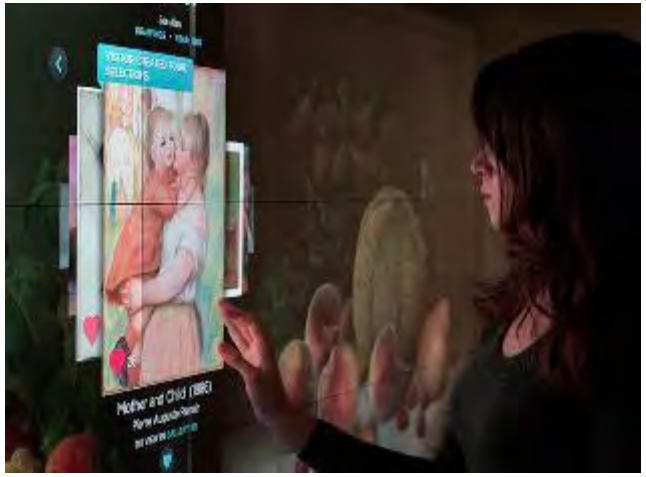
1 Digital Guest Experience

Example

Case Studies

Story of the Forest - National Museum of Singapore

- From the same people behind Future World, this art installation brings to life sixty-nine works from the William Farquhar Collection of National History Drawings within the museum's Glass Rotunda.
- Roving animals, digital flora and seasonal weather in an expansive forest created by Japanese digital art collective teamLab, which seamlessly unfolds into a virtual and visual landscape, immersing visitors in the story of Singapore's journey from its colonial past to its present-day modernity.
- Guests can interact with the exhibit with their cellphone



Studio Play – A Space that Offers an Introduction to the Museum's Collection

- The Cleveland museum of art revamped a room in its museum to have people interact with the key pieces of its collection, giving guests a preview of what they can expect
- The Collection Wall is a way to democratise the collection. It has you looking at objects in ways that you would maybe never notice in the gallery.
- The new themes include symbols, composition, gesture and emotion, and purpose, with games designed specifically to look closer at an artwork within each theme

Source: National Museum of Singapore Website (2020), Cleveland Museum of Art website (2020)

Example of guest experience best practices

What are the best purchasing experiences?

Leading Practices

1 Digital Guest Experience

Example

Case Studies

Zhengzhou Zoo: Perfecting seamless entry

- Ticket machines are available to all customers to purchase tickets and passes
- Smart gates are setup allowing guests to scan QR codes to enter the zoo, pay, or use their tickets.
- The mobile app has a built-in tour guide feature, allowing guests to get a complete overview of the different animals and their stories

Disney World: Leveraging RFID for a seamless experience

- You don't have to be a guest on the property to enjoy the convenience of using MagicBands. Guests staying at Disney World Resorts will get their MagicBands in the mail before their departure date, and the bands will already be linked to their My Disney Experience accounts.
- As each guest swipes their band at a ride, vital intel is being shipped real-time to the operations team. This allows decisions to be made about adding staff or incentivizing guests to head to another ride or attraction to minimize wait times.
- Disney applied for a patent for a system that would allow them to recognize guests at a number of locations via their shoes through sensors and camera-toting robots. The goal would be to potentially offer customized guest experiences at those points.

Source: Zhengzhou Zoo; Meadin, 盘点全国5个智慧景区 互联网+旅游新模式或成2019年新风口; Walt Disney World; Forbes (2017), Disney Uses Big Data, IoT And Machine Learning To Boost Customer Experience;

Focus: Connected Animal Care

Connected animal care is becoming increasingly important in the farming industry, veterinary clinics, and some zoos are leading the pack regarding security.

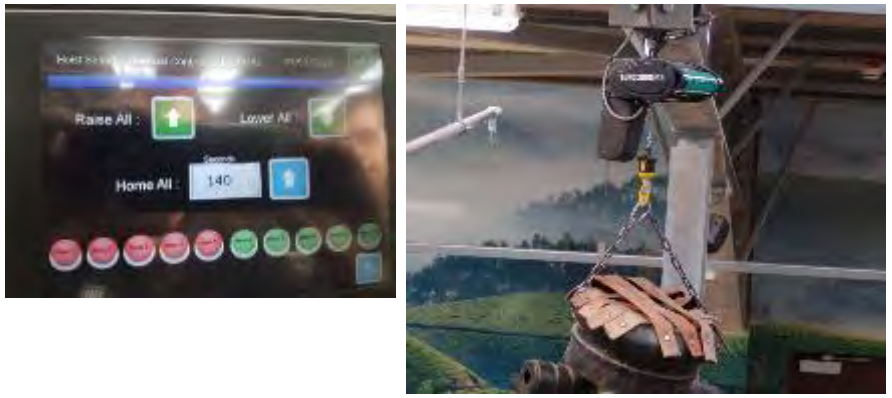
	24/7 Monitoring	Connected Health	Automated Nutrition	Smart safety
Farming Industry	▪ Animals are monitored constantly with sensors	▪ A farmer can use apps for on-the-spot diagnoses such as detecting metabolic diseases in cows and pigs from just a few snapshots.	▪ Automated calf feeders use sensors to read the electronic ID tag in a calf's ear and dispenses a set amount of milk formula, which can help ensure that calves are not hungry	▪ Animal-mounted collars to measure the height of grass and move the herd to fresh pastures by opening and closing virtual fences defined by stimuli based on sight, sound, or shock.
Veterinary Clinics	▪ Telemedicine: The technology is growing with pet owners, helping connect them directly to online veterinary services on-demand.	▪ The Montreal veterinary hospital is-piloting remote sensor to monitor post-operation stress level in an attempt to measure animal pain.	▪ The industry is moving towards the use of automated feeding machines for pets.	
郑州市动物园 ZHENGZHOU ZOO	▪ The park has established a digital security monitoring platform covering the entire park, with 316 cameras providing 24-hour comprehensive "insight" into the entire park. ▪ The monitoring system has been docked with the passenger flow system.	▪ A wildlife safety and technical defense management system, which can carry out real-time monitoring of animal cages in key areas. ▪ An infrared sensor system is installed inside, which clearly shows the location of the animals in the cage.	▪ Planned nutrition and automated feeding being explored	▪ Automatic activation of certain safety systems based on real time visitor monitoring ▪ Smart locks with automatic alarm activation ability

Source: Montreal Veterinary Clinic, WSP Analysis, Financial Times (2019), Zhengzhou Zoo (2020), Cainthus (2020), News Center, Plug and Play Tech Center (2019), Companies revolutionizing livestock management, National Geographic (2019), The future of livestock farming

Example of connected animal care best practices

Automated feeding is already developed in the pet and farming industry, in addition to some zoo applications

Example



An automated feeding system with its control panel

Automated cattle feed system with its dashboard

Case Studies

Blackpool Zoo: Automated Elephant Feeding

- The elephants had created an association between the sound of the motorised hoist engaging and being fed.
- A 7 inch HMI touch screen controller with a simple to operate graphic user interface was installed to control the hoists. This system had the ability to manually control the hoists alongside the feature to automate feeding times. Using this system, the zoo keepers were able to program automatic feeding times, sporadically throughout the day.

Feed software: towards smarter monitoring

- Feeding software such as the Ireland-based Cainthus uses computer vision and artificial intelligence to monitor the level of feed for animal in a farm
- A simple dashboard provides a snapshot of how the farm is performing across each key indicator – feeding and / or cow behavior. It highlights whether scores are on target, have increased or decreased as well as the 'lowest performing' pens for each indicator.

Source: HoistUK (2020), Feeding time at the Zoo, Cainthus (2020)

Example of connected animal care best practices

While the latest developments in surveillance are developed for humans, animals are also directly applicable

Example

An overview of an inmate being flagged

Ares' biometric security camera stores information not only about your appearance, but also your voice.

Case Studies

Hong-Kong Prison security

- Prisons are not a pleasant place to look for comparisons. However, Hong Kong's prison is pioneering with the use of machine learning to detect dangerous behaviour of inmates (such as self-harming acts, fighting and if an inmate has collapsed). The same technology can be applied to animal behaviour
- The wristband, which is similar to fitness products sold on the market, would allow officers to monitor an inmate's heart rate and whereabouts in real time. "If the pulse is irregular, staff will be alerted," Woo said. Should an inmate try to remove the wristband, the alarm will also be triggered.
- The wristbands and video surveillance system cost about HK$3.5 million in total, paid for by the Electrical and Mechanical Services Department.

What is the future of surveillance?

The most exotic of technologies in development today are mainly for people, however such algorithms can be developed for animals with ease.

- Walking Patterns: Chinese artificial intelligence start-up Watrix says its software can identify a person from 50 metres away – even if they have covered their face or have their back to a camera – making it more than a match for Sherlock Holmes.
- Heartbeat detection: The Pentagon is using a new laser-based system capable of identifying people at a distance of up to 200m. The technology, uses laser doppler vibrometry to detect surface movement caused by your heartbeat.
- Movement monitoring: Researchers from the University of California claim that they can monitor the subject's emotional sate.
- Odor biometrics: While the field of odor biometrics is in its infancy, scientists are ramping-up efforts to be able to create insights from scents.

Source: South China Morning Post (2019), Tracking wristbands, video monitoring systems and drug-detecting robots – Hong Kong tests how to make its prisons 'smart' , Mashable (2020), The Rise of the Machines

Example of connected animal care best practices

The rise of machine learning for animal care

Leading Practices

2 Connected Animal Care

Example

Case Studies

Using Machine learning to ensure animal safety

- In 2019, a paper was published in the journal Ecology and Evolution showing the use of deep learning for wildlife recognition.
- The frameworks achieved high accuracies, in the order of 98.05% for binary classification and 90.32% for multiclassification. Based on the deep learning framework, a detection process was also developed for identifying animals of interest in video footage.
- Algorithms used today are custom built mostly using the programming language Python

Oxford university pioneering in the field

- The study was led by researchers from Britain's University of Oxford. A facial recognition computer model was trained using more than 10 million images of the animals. The model was then used to search, recognize and track individual chimpanzees.
- The team said the system was able to identify individual chimpanzees correctly about 92 percent of the time. It successfully identified the animal's sex 96 percent of the time.
- The study included an experiment with humans to see how they could perform against the machine learning system in making identifications. The human subjects were able to correctly identify individual chimpanzees about 42 percent of the time.

Source: Ruilong Chen-Ruth Little-Lyudmila Mihaylova-Richard Delahay-Ruth Cox (2019), Wildlife surveillance using deep learning methods, Ecology and Evolution, Schofield, D., Nagrani, A., Zisserman, A., Hayashi, M., Matsuzawa, T., Biro, D., & Carvalho, S. (2019, September 01). Chimpanzee face recognition from videos in the wild using deep learning.

Example of connected animal care best practices

Chinese Zoos have been focusing on security systems, partnering with telecom firms

Example

Automated Gate

Control Centre

Case Studies

Portal security systems

- The Chinese company Zhai Guo Zi has developed a remote-controlled door system to prevent animals from leaving the zoo by using the service vehicle entrance
- It uses an unattended automatic control system to replace the watchtower-type manned security door, which can greatly improve the security level.
- The software responds to several emergency situations such as remote door opening an closing, organizing and controlling emergency response

Source: Zhai Guo Zi (2020)

toronto ZOO

Leading Practices

3 Conservation Centre of Excellence

Focus: Conservation Centre of Excellence

When it comes to conservation, Zoos and conservation agencies are partnering with big tech in order to bring conservation global. The leaders in this segment are Google, Resolve, and the Zoological Society of London

	Conservation without borders	Wildlife tracking	Advanced Analytics	Education platforms
WWF	▪ Information available online on initiatives globally	▪ Camera traps are being used for a diversity of purposes, including monitoring wildlife populations, surveilling protected areas, and capturing captivating images and video for the public.	▪ AI: use of bioacoustics with killer whales to tell ships to avoid area	▪ Provides teaching resources across different subjects for free
Google	▪ The Wildlife insights platform allows to share information with the scientific community	▪ Scientists can input animal information on the platform and use the research of other scientists	▪ A powerful computer vision algorithm recognizes animals and gets constantly trained on new datasets	▪ The platform is free of charge and available for everybody to use
ZSL LONDON ZOO	▪ The Instant Wild App allows to review conservation efforts form anywhere in the world on your mobile phone ▪ ZSL's partners include Google and Iridium, the satellite communications operator ▪ ZSL regularly publishes articles about leveraging technology	▪ ZLS's instant wild app makes camera trap images accessible online for volunteers to identify and tag animals ▪ This allows conservationists to gather data from hard to reach areas so they can monitor wildlife behaviour and changes to their remote habitats.	▪ ZSL worked with Google to develop the Instant Detect app, allowing to track wildlife and make a positive impact. ▪ Instant Detect is also being used to help tackle the poaching of threatened species by providing an early warning system of illegal activity.	▪ Instant Wild 2.0 will be integrated within education and learning landscapes and as a platform for calls to action on conservation issues, helping more citizen scientists than ever before support ZSL's work around the world.

Source: World Wildlife Fund, Google Wildlife Insights, Zoological Society of London

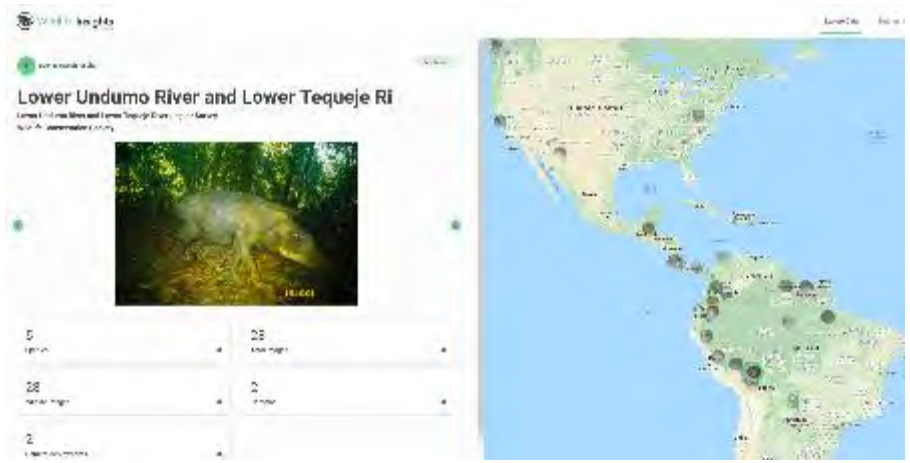
Example of conservation best practices

When it comes to conservation, Zoos and conservation agencies are partnering with big tech in order to bring conservation global. The leaders in this segment are Google, Resolve, and the Zoological Society of London

Leading Practices

3 Conservation Centre of Excellence

Examples



Wildlife Insights interface

A circuit board manufactured by Intel for TrailGuard AI

Case Study

Wildlife Insights: Google enabling saving wildlife

- Wildlife Insights is a partnership between Conservation International, Google, the Smithsonian's National Zoo and Conservation Biology Institute, Wildlife Conservation Society, the North Carolina Museum of Natural Sciences, World Wide Fund for Nature, the Zoological Society of London and Yale University's Map of Life.
- Thanks to the combination of advanced technology, data sharing, interinstitutional partnerships and science-based analytics, analysis that used to take months now takes minutes with Wildlife Insights.
- Any Wildlife Insight products and other add-ons will be shared, as well as the camera-trap photos themselves, under Creative Commons licenses.

TrailGuard AI: Resolve's high-tech response to wildlife threats

- Resolve's TrailGuard, which incorporates Intel vision-processing chips in its cameras, does carry out AI image analysis locally, so that only pictures of human intruders are transmitted.
- The first version of TrailGuard, operating in the Grumeti reserve in Tanzania last year, detected more than 50 intruders and enabled rangers to make 30 arrests from 20 different poaching gangs and seize 1,000kg of illegal bushmeat.
- Installation would cost a park an estimated $17,000 in the first year and slightly more in the second year, with future operating expenses for data transmission at about $200 a year — much less than alternative protection measures such as flying drones to spot poachers.

Source: Google Wildlife Insights, Resolve

Example of conservation best practices

The offering of Massive Online Open Courses has yet to see a lot of Zoos involved in it. Most conservation courses are given by Universities.

Leading Practices

3 Conservation Centre of Excellence

Example

Case Study

Massive Online Open Courses

- Online platforms such as EdEx or Coursera provide several courses about Zoology and conservation, however, most of these courses are taught by universities
- There are almost no courses online given by Zoos, most conservation courses are given by universities or museums
- Roughly 10 million more learners were enrolled in MOOCs in 2019 than in 2018, leading to an estimated global enrolment of 110 million and 10% year-over-growth in student numbers

Source: Coursera (2020)

Focus: A Resilient Organization

The stadium industry is pushing the envelope regarding smart infrastructure, directly impacting efficiency and revenue. Partnerships are often the most relevant ways to get large infrastructure installed.

	Centralized data systems	Digital Revenue Stream	Smart Infrastructure	Easing accessibility	Commercial partnerships
US Bank Stadium	▪ Seamless integration of internal applications	▪ Paid targeted marketing through app, team direct e-commerce ▪ App adoption through external parties	▪ Used a digital platform called Arc, monitoring the venue's on water use, energy efficiency, waste management and other sustainability aspects.	▪ Integrate google maps, uber, and social media feeds into app to ease access (traffic, attendance..)	▪ Using the stadium as a platform to experiment
Taronga Zoo	▪ Planned guest tracking with application	▪ Partnerships with brands: Coca Cola, Unilever, Canon, Woolworths and sports teams	▪ Sensors on the infrastructure allow management to understand guest flow	▪ Partnership with transit authorities	▪ A hackathon was organized to get ides on how to convey scientific information through technology and using drones for remote animal feeding
Tottenham Hotspur Stadium	▪ Fans can see a data centre in action from the stadium concourse albeit behind some pretty heavy glass, it as a significant symbolic statement for the stadium's commitment towards technology.	▪ 100% cashless in catering, retail and even programme sales ▪ The club uses HP's Devices-as-a-Service (DaaS) platform to proactively monitor hardware in order to optimise performance and enable proactive maintenance.	▪ The stadium has a neutral host solutions. Some operators didn't want one of their rivals involved. The vision was that all fans have the same experience and the sadium was successful to deliver it.	▪ The stadium has over 250 wheelchair accessible bays and over 500 dedicated easily accessible seats. These are located throughout the stadium on all levels, giving supporters with access requirements a great variety of viewing options.	▪ Partnered with Hewett Packard, supplying all the computer hardware and printer devices, including 600 retail point of sale (POS) systems, desktop and notebook PCs, commercial printers and display monitors.

Source: The Sustainability Report (2019), US Bank Stadium, Tottenham Hotspur Stadium, Sydney Taronga Zoo

Example of resilient best practices

Thanks to its partnership with HP, The Tottenham Hotspur Stadium is now a leading smart facility

Examples

Tottenham stadium visible server room

Tottenham stadium automated gates

Digital wayfinding

Case Study

Becoming one of the most advanced stadiums

- The stadium is operationally smart. The platform is integrated into the venue's architecture to provide real-time monitoring for preventative maintenance and personalised visitor experiences, including aspects such as temperature and lighting conditions.
- The stadium's electrical infrastructure will be monitored constantly from Schneider Electric's remote field services bureau, while the company's product experts will also be on-site to personally monitor the stadium's power infrastructure on match days.
- Its Building Analytics software will perform system checks every five minutes, 60,000 checks in total every hour onsite.
- In addition, the network supports over 650 CCTV cameras, door access systems, stadium lighting and elevators. As well as supporting more entertainment-related elements including TV studios, full broadcast capabilities, video galleries, 1800+ IPTV screens, and the largest in-bowl sound system.BD

Source: Tottenham Hotspur Stadium , IT Pro (2019), Inside Europe's most technologically advanced stadium; Aruba Networks (2019), Tottenham Hotspur FC - Connected Stadium Case Study.

Example of resilient best practices

Ocean Park Hong-Kong needed to reinvent itself, technology is now part of its DNA

Example

Ocean, park app advertising

Ocean Park's monitoring dashboard app in action

Case Studies

Data app and learning experiences

- Decided to adopt technology to become competitive
- Technology enables to equip roller coasters with VR to build stories. An example is the integration of a VR story about the amazon and the integration of a conservation message in it through the use of VR
- Online performance management system in video format, with the content involving real-life data such as public announcements and a user's guide to make learning fun and engaging.
- The making of the video involved a call for staff to volunteer as "guest stars" and there was an enthusiastic response. Too many people who wanted to be in the film (mostly millennials), it proved to be a success, with the subscription rate reaching 98 per cent

Efficient Back Office

- Ocean Park runs SAP SuccessFactors Performance and Goals solution, as well as Learning Management System to optimize workforce performance, engagement and productivity. With the convenience of anytime, anywhere, any-device access, the SuccessFactors solutions allow for thoughtful goal setting, ongoing dialogue and continuous development.
- It supports Ocean Park to develop and deliver learning experiences that are relevant to employee goals and align with the organization's mission to provide memorable experiences to all our guests as a world-class theme park resort.
- The internal dashboarding app allow to monitor Guest flow, Guest ATT Mix (tour groups, Free independent travelers, locals), Registered people, Redeem Rate, wait time per attraction

Source: Ocean Park Hong Kong, South China Morning Post (2019), SAP

Example of resilient best practices

A deep dive into data monetization

Leading Practices

4 A Resilient Organization

Example

Walt Disney World App

Illustration of the consumer data and analytics industry

Case Study

Driving monetization through app:

- The Disney app lets smartphone users buy tickets and renew annual passes. They can make restaurant reservations across the entire resort. Now they can even buy in-park merchandise directly from the app.
- Disney created a smartphone app that's essential to optimizing the theme-park experience and eventually incorporated revenue streams. The app does so many things that folks can't complain about the no-brainer monetization that turns it into a printing press for money.

Monetizing wi-fi networks:

- Tiered service: In the most basic setup, a simple low-bandwidth connection is free, while giving customers the option to spend money for a faster connection.
- Director ordering: Including direct links to order products and services from your business
- Popup ads: When a free wifi service is provided, there is an opportunity to funnel ads through the wifi homepage, allowing to generated revenue automatically.
- Selling data: Several marketing firms purchase consumer data to create a profile, this profile allows have specifically targeted ads.

Source: Walt Disney World (2020), Fastcompany (2019) Here are the data brokers quietly buying your information

Example of resilient best practices

Tech driving sustainability practices

Leading Practices

4 A Resilient Organization

Example

Case Study

Using smart microgrids

- After the rail disaster in 2013, Lac-Mégantic is looking to rebuild a future focusing on innovation and sustainable development.
- Implementing a microgrid to integrate solar panels, BESS and charging stations to study new technology before applying it to other locations
- The microgrid involves approximately 30 buildings, including institutional, commercial and residential buildings located within the study area perimeter (150,000 m2), a solar park (800 kWDC) and BESS (1,200 kWh) connected to the 25-kV MV network and located close to the study area perimeter..

Source: WSP (2020), Hydro Québec (2020),

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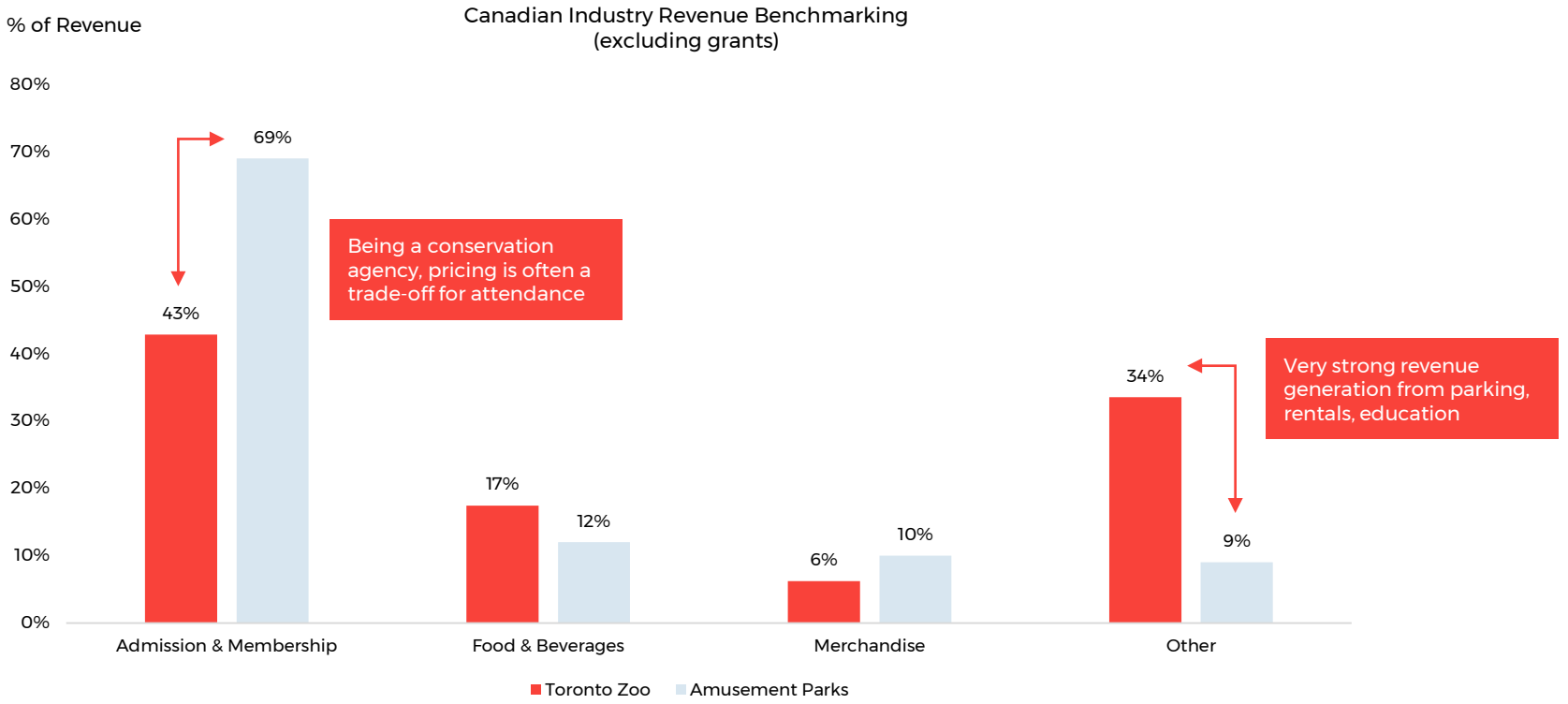
Drawing parallels from the amusement park industry in Canada

The Canadian amusement park industry generated $609M. In revenue in 2019, the industry is forecasted to grow at a 3.2% CAGR after COVID until 2025.

Toronto Zoo is higher than industry benchmark for food and beverages but not for admission & memberships



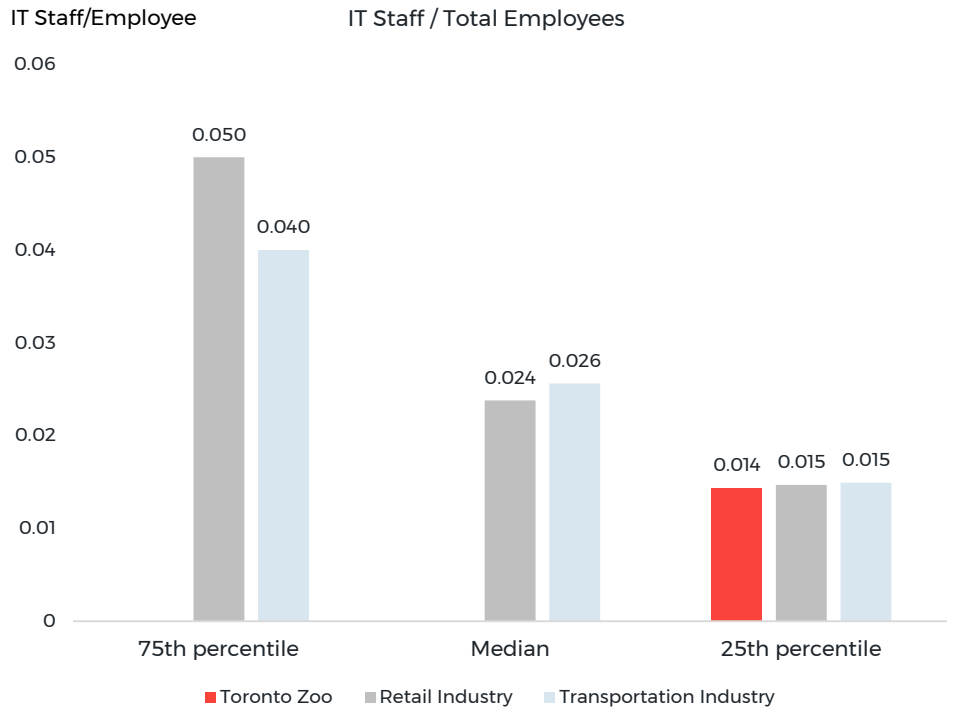
Source: Ibis World

Comparing IT Investments against various industries

Comparing current staffing levels and investment against other industries show that the Toronto Zoo's IT Budget will be on the lower end of benchmarks

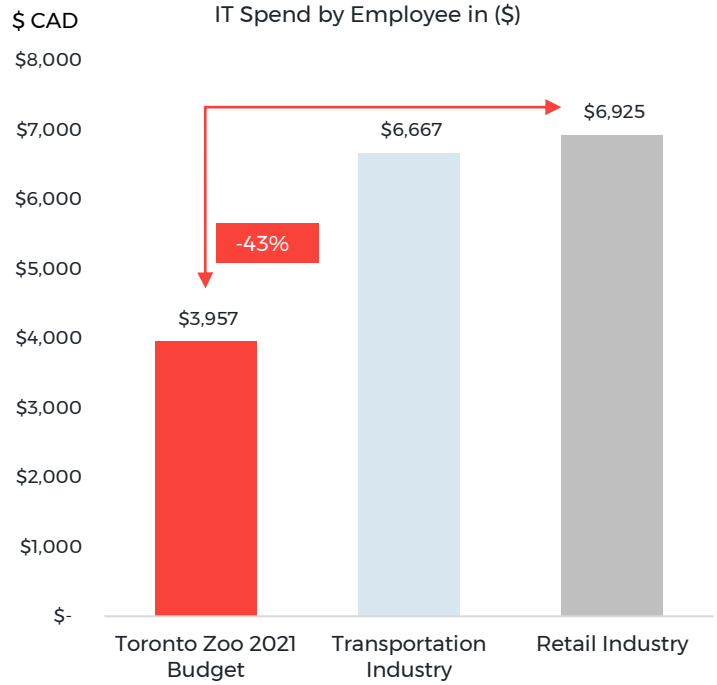
Current Situation

The number of IT staff per employee at the Toronto Zoo is less than industry median



Source: WSP Benchmarks

IT spend per employee for 2021 would be still 43% less than in other industries



Source: WSP Benchmarks

Notes: Assumes 278 full time employees and 4 permanent IT staff

Current Situation

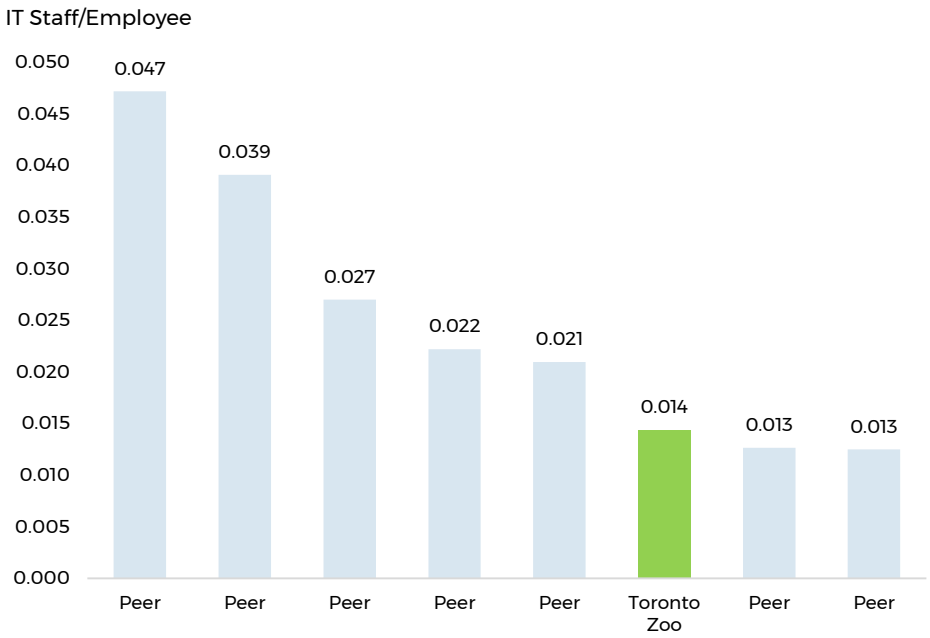
Warning:

Peer sample size = 7, hence results are preliminary

Results from Zoo Survey

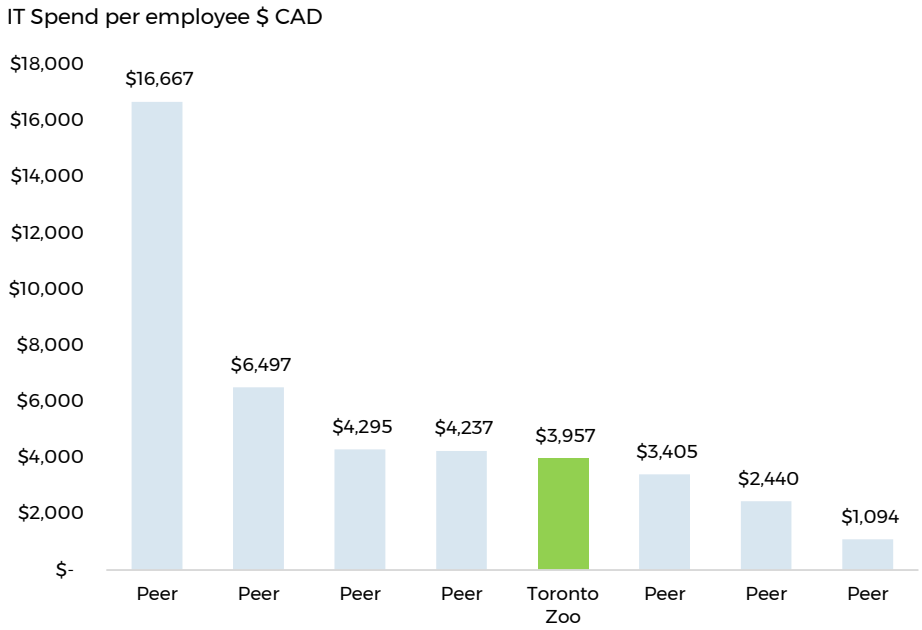
Comparing current staffing levels and investment against other industries show that the Toronto Zoo's IT Budget and IT staff is on the lower end of benchmarks

IT staff / employee is 35% less than the median, it would take 6 staff to reach median and 13 to lead



Source: Zoo Survey

IT spend per employee is 7% less than the median*, it would take a spend of $4.6M. /y to be leading



Source: Zoo Survey

*Assumes a $1.1M. Budget for the Toronto Zoo

Notes:
Assumes 278 full time employees and 4 permanent IT staff for the Toronto Zoo
Sorting on the charts is based on values, not peer name

Results from Zoo Survey

Current Situation

Warning:

Peer sample size = 7, hence results are preliminary

◆ **Toronto Zoo**

The 7 zoos surveyed showed a good maturity related to Information systems, wi-fi, animal systems, ticketing, marketing, and work order management.

	Planned	Deployment	Deployed	Software
Wi-fi across site	0	1	5	XFINITY Aruba Meraki Microsoft/Azure Nutanix
Cloud Infrastructure	1	3	2	ZIMS, Facility Dude Work Order Management, Facility Dude Help Desk, ZenDesk, HRB, HSI AWS, iLand (DRaaS)
Identity management	1	0	4	Cisco DUO Okta Azure
Content Management	0	0	4	Kentico CMS EpiServer
ERP (incl. finance, HR, and LMS)	0	2	3	Serenic Navigator, ADP, HRB Sage Adaptive, Sage Intacct, HCM selection in progress (UKG, ADP), LMS: Litmos NetSuite and ADP
Customer Relationship Management (CRM)	2	1	◆ 3	N/A Tessitura, Salesforce Raiser's Edge
Asset Management platform	1	1	3	Spiceworks ARCHIBUS, Connectwise Facilities Dude
Safety & incident management platform	1	0	◆ 3	HSI, SDS under evaluation Omni-go
Fleet management system and GPS tracking	0	0	◆ 1	N/A unknown
Animal-centric Information Systems	◆	0	6	ZIMs, Fortis, Tracks, SmartPACS TRACKS ZIMS
Ticketing / Membership systems	0	0	◆ 7	RTP|ONE Tessitura Gateway ticketing (POS) & Doubleknot (WEB)
Digital marketing (incl. digital stores)	0	0	◆ 6	Pivvit Ecommerce Wordfly email, Shopify online store, Marketing Automation tool selection in progress Wordpress
Work order management platform	1	◆	6	Facility Dude Work Order Management, Facility Dude Help Desk Freshservice for IT orders, ARCHIBUS for facilities work orders
Fiber and VoIP	0	1	5	XFINITY Wi-Fi, Comcast Metro - E, Mitel PBX Comcast Business (transitioning from AT&T), Zoom Phone (transitioning from Cisco UCM) Gigapop (Indiana universities partnership)

Source: Zoo Survey

% of IT staff by function across various industries

Comparing the percentage of IT staff by IT function allows to drive conclusions on the current situation

The current IT organization is lacking capabilities in data management and project management

		Transportation Industry	Retail Industry	By Group	Toronto Zoo
IT Management	IT Manager	9.4%	10.6%	19.3% - 17.9%	33.3%
	Finance staff, purchasing, contracts	1.2%	0.9%		
	Project Management	6.8%	4.5%		
	IT Administrative staff	1.9%	1.9%		
Infrastructure	Database administrator	3.8%	3.1%	22.5% - 25.4%	
	System engineering and administration	8.2%	8.9%		
	Production Management	2.9%	3.7%		
	Network and messaging support	7.3%	7.0%		
	Cybersecurity	1.3%	2.0%		
Applications	Software engineering and system analysts	24.9%	22.8%	38.4% - 38.9%	33.3%
	Business Analysts	6.7%	5.5%		
	Webmasters and ecommerce	3.9%	5.4%		
	Data management and Business intelligence	2.9%	2.2%		
	Quality insurance	2.2%	3.0%		
Technical Services	Helpdesk	8.7%	10.1%	17.2% - 17.5%	33.3%
	Technical support	7.0%	6.4%		
	Training and Processes	1.5%	1.0%		
Other	Other	0.5%	0.2%		

Source: WSP Benchmark, Interviews

Summary: Mobile Apps

We reviewed 13 leading Zoos and Parks around the world

Benchmarks

(full detail in appendix)

Features Table

	Rating	Map	In-App Purchases	Animal Directory	Events	Members/ Tickets/ Rewards	Virtual Guide	Conservation	**Total Yes**
Ocean Park Hong Kong	3.9	Yes	Yes	No	Yes	Yes	No	No	**4**
Columbus Zoo	N/A								**0**
San Diego Zoo	3.5	Yes	No	Yes	Yes	No	No	No	**3**
San Francisco Zoo	3.8	Yes	No	Yes	Yes	Yes	No	No	**4**
London Zoo	4.5	No	No	Yes	No	No	No	Yes	**2**
Minnesota Zoo	N/A	Yes	No	No	Yes	No	Yes	No	**3**
Brookfield Zoo	N/A	Yes	No	No	No	Yes	No	No	**2**
St. Louis Zoo	3.3	Yes	No	Yes	Yes	No	No	No	**3**
North Carolina Zoo	N/A								**0**
Melbourne Zoo	N/A								**0**
Indianapolis Zoo	N/A	Yes	No	No	Yes	Yes	No	No	**3**
Beijing Zoo	N/A	Yes	Yes	Yes	Yes	Yes	Yes	No	**6**
Disney World	4.6	Yes	Yes	No	Yes	Yes	No	No	**4**
Total Yes		**9**	**3**	**5**	**8**	**6**	**2**	**1**	

Special case app created for an event

Implications

- Most zoo apps have limited features: predominantly maps, animal directory, events, and sometimes tickets and memberships
- Virtual guides, interactive features, and in-app purchases are not present on most apps
- Very little conservation information, most apps focus on the kind of animals present within the zoo

There is an opportunity to overtake other zoos by integrating conservation, in-app purchases, and interactive elements

Apps: Ocean Park Hong Kong

Play store: 3.9 https://play.google.com/store/apps/details?id=com.oceanpark.mobileapp

Interface

Functionalities

- **Virtual Guided Tour:** Location base video and audio as guests explore animal exhibits for a more fun and in-depth visit
- **eScheduler:** Ability to pick three favourite attractions and the app will help reserve the visit time for you to avoid long queues
- **eCoupon:** Access amazing discounts and privileges throughout the park!
- Just a few clicks to get the showing time and information for various attractions and shows, you could plan your visit in an efficient way!
- Latest update with Ocean Park's latest events and offers
- Explore the park map with pins for your quick references!
- Transportation and other useful information of Ocean Park!
- Some of the functionalities are only available when you connect to the Wi-Fi in the Park

Apps: Minnesota Zoo

Play store: N/A https://play.google.com/store/apps/details?id=com.infiniteach.accessibility.minnesotazoo&hl=en_CA&gl=US

Interface

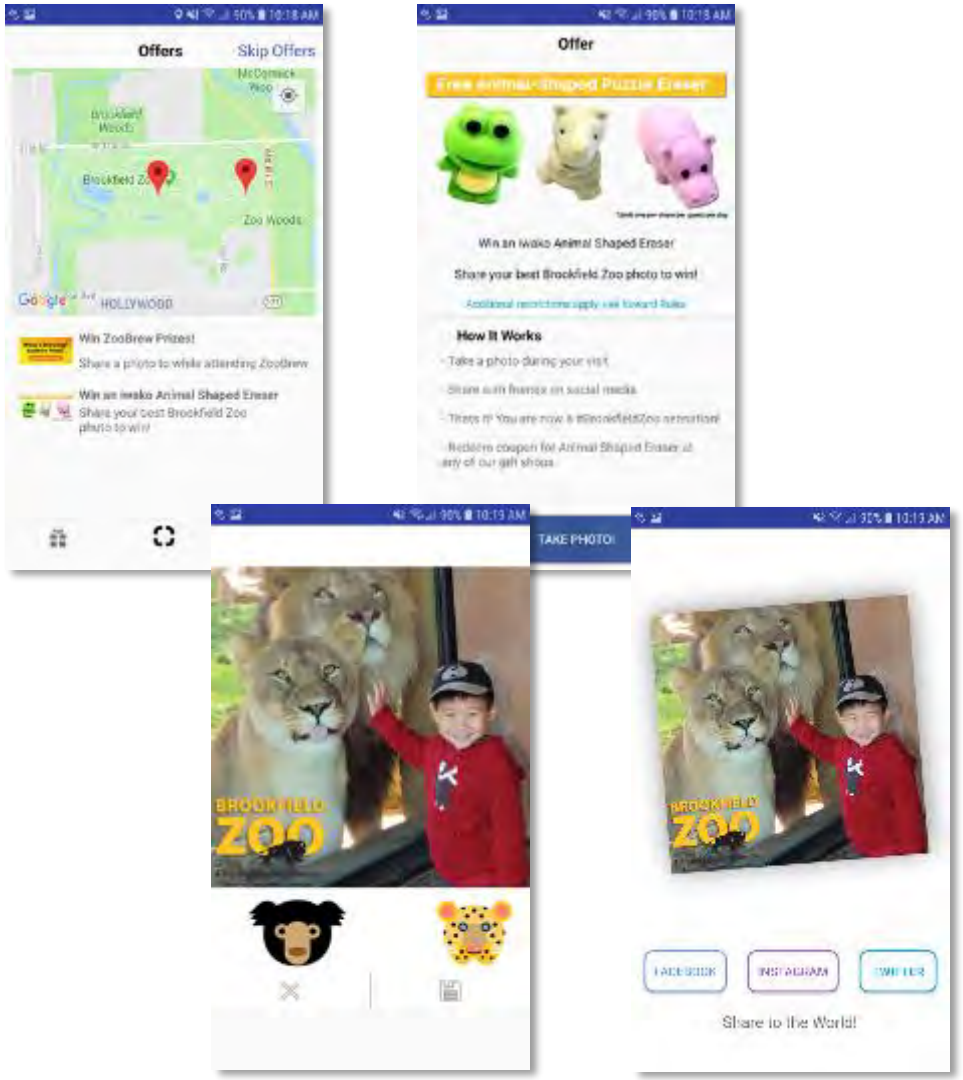
Functionalities

- The free MNZoo4All app allows you to preview our spaces and experiences with social guides, as well as customize a visual schedule, explore a sensory-friendly map and more.
- The app is designed for all guests, including those with autism or disabilities, to feel welcomed and supported before, during and after their visit.
- This app is part of our ZooUnlimited initiative to ensure that everyone – people of all cultures, communities, abilities, background and means – should have an equal chance to connect with the natural world in amazing ways.
- Our commitment is unwavering. And the possibilities are unlimited.

Apps: Brookfield Zoo

Play store: 3.1 https://play.google.com/store/apps/details?id=com.octothorpeplus.brookfieldzoo&hl=en_CA&gl=US

Interface



Functionalities

- Smile, nature lover (SNAP!) you just earned a reward! The Brookfield Zoo App rewards you for taking a photo inside the zoo and sharing your
- Brookfield Zoo experience with friends on Facebook, Instagram, and Twitter. Just download the app, aim, snap, and share.
- Your reward is instantly sent to your email. Check for new rewards in different areas of the park.
- See you at your next visit. Thanks for sharing!

Apps: San Diego Zoo

Play store: 3.5 https://play.google.com/store/apps/details?id=com.seamgen.sandiegozoo.zoo

Interface

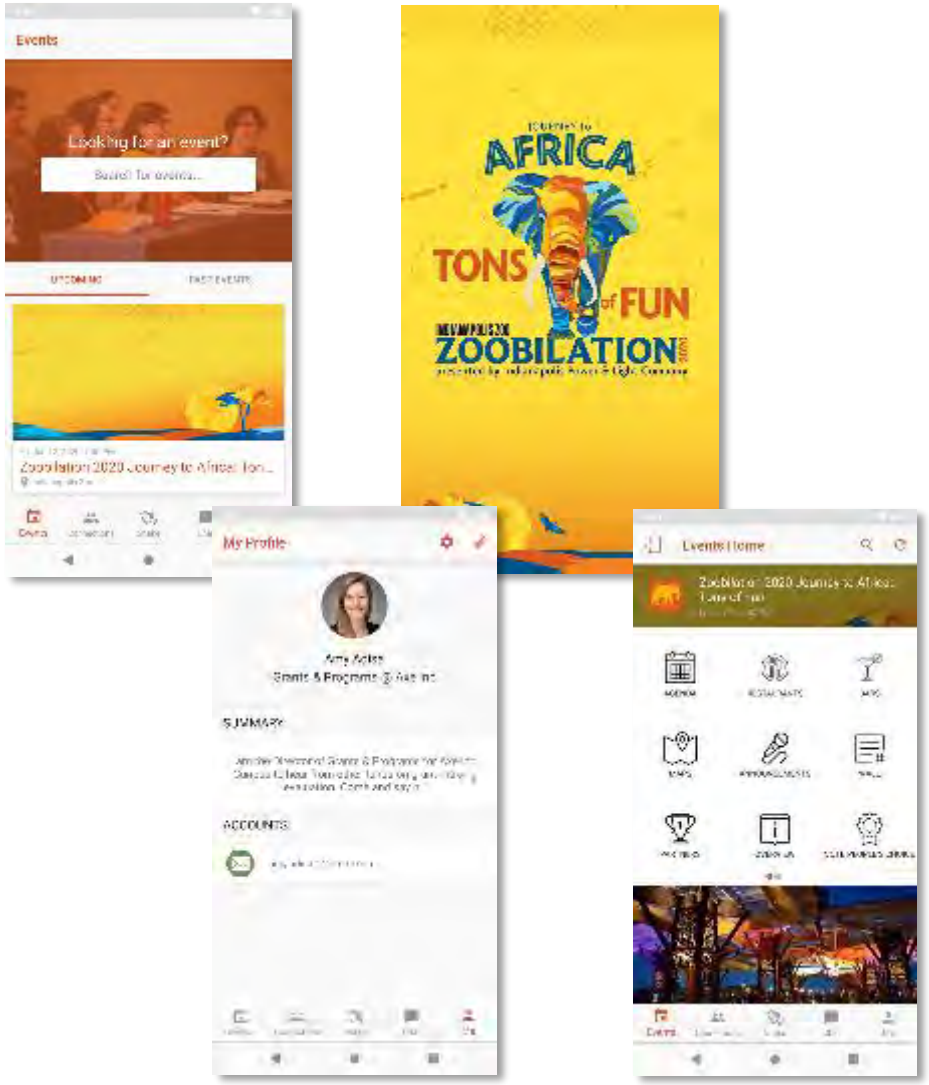
Functionalities

- Use the San Diego Zoo app to get the most out of your visit to either the Zoo or the Safari Park.
- Follow one of the preset walking paths or find directions to your favorite animal.
- Finding your way around has never been easier! The GPS-enabled app will keep you on the right path.

Apps: Indianapolis Zoo - Zoobilation

Play store: N/A https://play.google.com/store/apps/details?id=events.socio.app1014&hl=en_CA&gl=US

Interface



Functionalities

- Discover every indulgence Zoobilation has to offer with our easy-to-use app! It's like squeezing the entire event program into your phone.
- Navigate the Indianapolis Zoo to find more than 70 restaurants, preview their offerings, highlight your favorite foods and vote for the People's Choice Award. Set reminders to catch all the must-see entertainment. See what other party-goers are buzzing about on social media. Plus learn more about the Zoo, including other upcoming events as well as information about the animals, education programs and conservation initiatives Zoobilation supports.
- View the Zoobilation map that includes restaurants, bars, stages, dens, photo booths and more.
- Preview menu offerings for participating restaurants.
- Favorite all the foods and restaurants you want to remember after the event.
- Cast your vote for the People's Choice Award.
- Schedule connects with your calendar to remind you of upcoming performances.
- Notifications alert you to special event announcements.
- Provide feedback about your event experience.
- Twitter feed shows you what other party goers are saying.

Apps: Disney World

Play store: 4.6 https://play.google.com/store/apps/details?id=com.disney.wdw.android

Interface

Functionalities

- Quickly access real-time wait times, park hours, Character greetings, parade showtimes and more.
- Use the interactive, GPS-enabled map to explore Walt Disney World Resort and easily see the dining options, attractions and more nearest to you.
- Find your way around with step-by-step directions to locations across Walt Disney World Resort.
- Purchase your theme park tickets.†
- Buy merchandise from Shop Disney Parks on the app. Browse keepsakes, find items in the park and ship to most U.S. addresses.
- Browse restaurant menus, make dining reservations, modify existing ones and even order your meal right from your phone at select locations.
- Download, edit and share your Disney PhotoPass photos and videos throughout your vacation once you've purchased Memory Maker, a product that gets you unlimited photos taken by our complimentary photographers at select locations.
- Search and filter activities to find exactly what you're looking for.
- Keep select Disney Resort hotel reservations, dining plans and activities organized—all in one spot with My Plans.
- Save time by starting your Disney Resort hotel check-in process right on the app.

Apps: Disney World (Cont-d)

Play store: 4.6 https://play.google.com/store/apps/details?id=com.disney.wdw.android

Interface

Functionalities

- Visit My Account to manage your Disney Resort reservations, tickets, MagicBands and cards, share plans with others and sign out.
- Some features in this app will require your full name, country, birthdate and email address, as well as access to your location data. If Bluetooth is enabled on your device, this app will also collect your precise location information through beacon technology in order to improve your in-park experience, such as wait times. To facilitate the sign-in process, the app will also require access to your email address, stored within Account Manager.
- This app will request access to your camera to scan credit cards for purchases, link tickets and passes to your account, and scan and link PhotoPass cards. The app will request access to your external storage to cache certain data for offline browsing. The app will request access to your contacts to assign purchased PhotoPass images to your contacts.
- Optional planning tools may also ask you to provide details about your travel party. Some features in this app include the ability to make purchases and will require a Wi-Fi or mobile carrier data connection. Guests must be 18 years or older to make purchases.
- This app contains in-app purchases that cost real money. This app provides you with the option to receive push notifications for information relating to your visit to a Park or stay at a Disney Resort hotel.

Apps: San Francisco Zoo

Play store: 3.8 https://play.google.com/store/apps/details?id=org.sfzoo.app

Interface

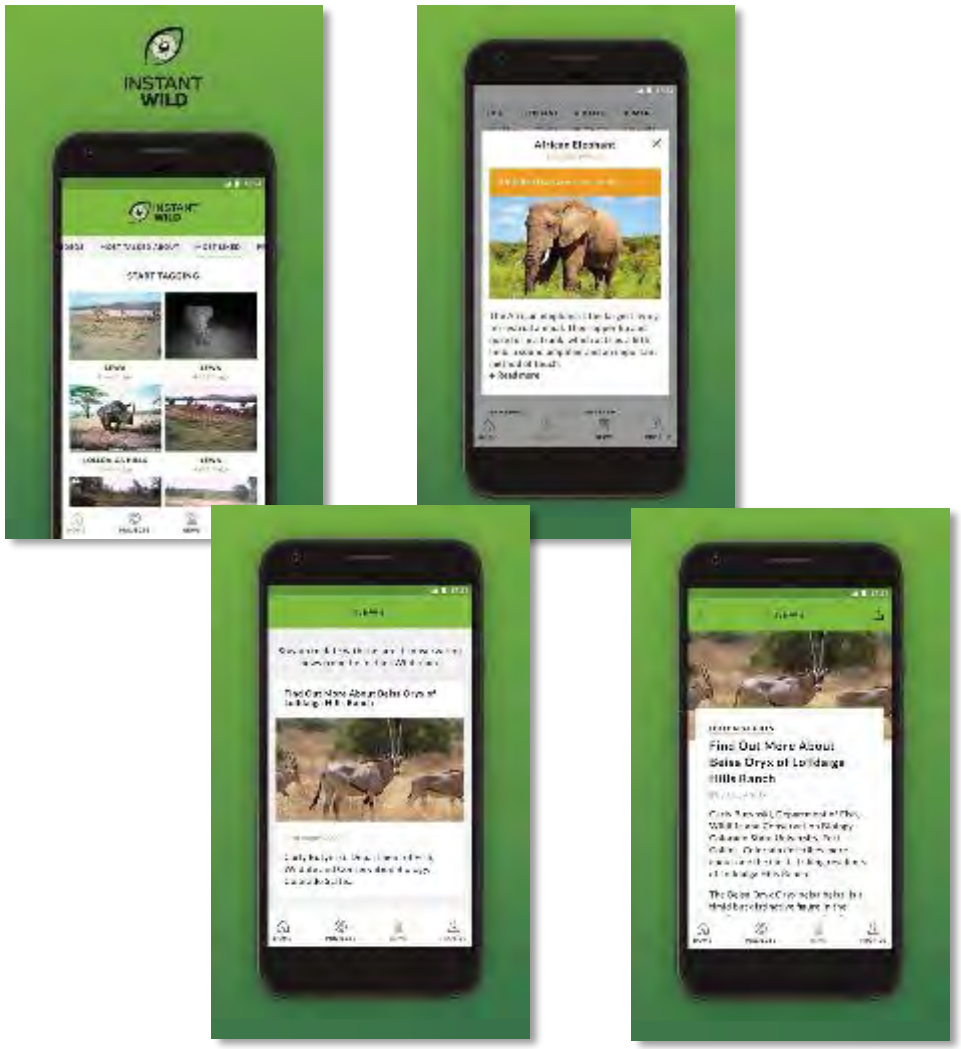
Functionalities

- A scavenger hunt for all ages *New Feature!*
- Map with location finder
- Route planner to find your next animals, exhibit, cafe or rest room
- Detailed information on all the animals
- A guide to all the Exhibits
- Latest Zoo news
- How to get to the San Francisco Zoo

Apps: Zoological Society of London

Play store: 4.5 https://play.google.com/store/apps/details?id=org.zsl.instantwild

Interface



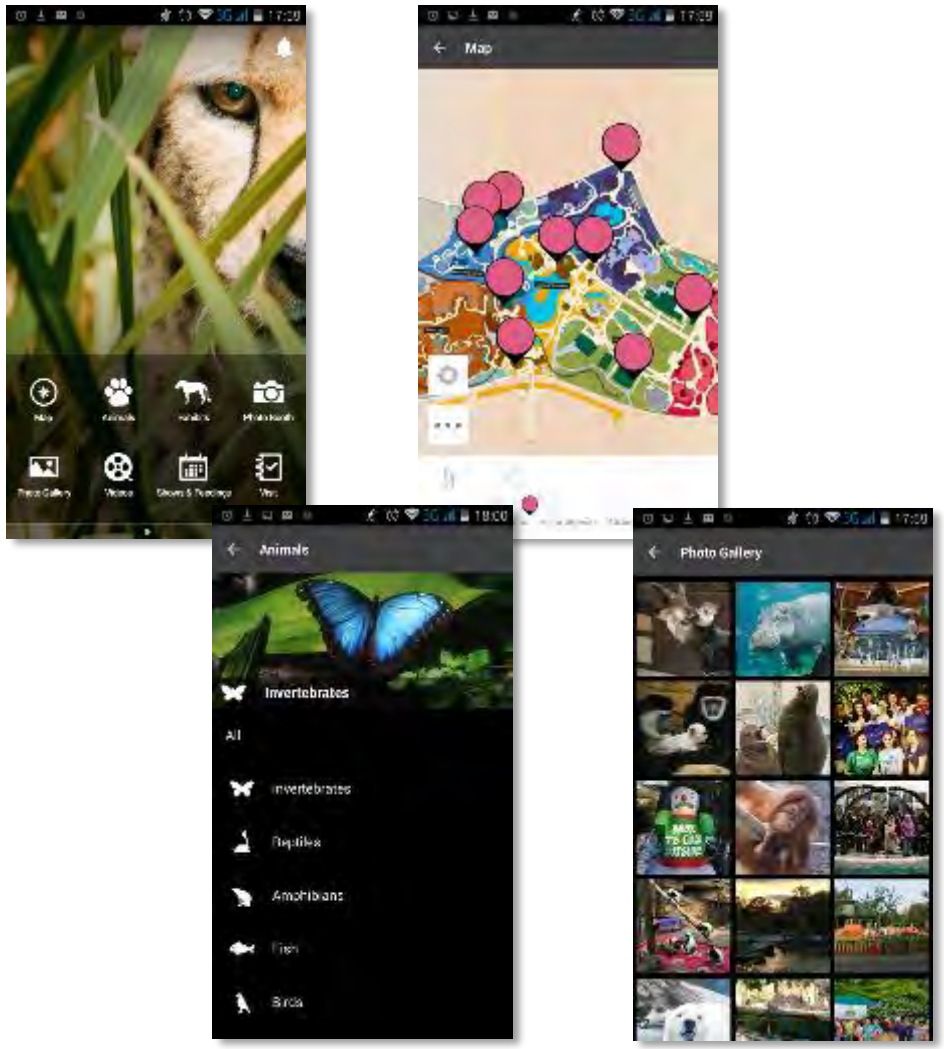
Functionalities

- View and identify images and video transmitted live from the field and contribute to conservation research wherever you are.
- Follow projects to support conservation work that you're specifically interested in and curate your own feed on your home page.
- Gain badges, work towards being one of our daily Top Spotters and get shout outs for your hard work.
- See exactly how many animals – including endangered ones you've spotted and save favourite images to your profile.
- Check out the leaderboards to see how you stack up against those leading the way in species identification both overall and for the rarest sightings.
- See latest news on Instant Wild and stay up to date with the latest conservation news from the Instant Wild team.
- Join our bustling Instant Wild community and discuss what's been spotted in each photograph.
- Receive alerts to keep you updated on the latest from projects you follow.
- Share the most interesting images and videos on social media.

Apps: St Louis Zoo

Play store: 3.3 https://play.google.com/store/apps/details?id=net.manageapps.app_42741

Interface



Functionalities

The Saint Louis Zoo's official app featuring an interactive map, photos, videos, visitor information and more! Navigate around the Zoo, learn more about your favorite animals and stay connected with wildlife at the Saint Louis Zoo. Can you come out and play?

Apps: Beijing Zoo

Not on the play store

Interface

Functionalities

The official tour guide of the Beijing Zoo, a collection of guide explanations, strategy maps, and traffic guides, allows

Features of Beijing Zoo

- Audio guide: professional guides explain scenic spots, watch and listen to scenic stories.
- Hand-painted map: Customize a hand-painted map for the scenic area, so that you can easily understand and never
- get lost.
- Recommended route: professional play route, in-depth experience gameplay, thoroughly play each scenic spot.
- Traffic route: accurate and fast traffic guidance, leaving more time to play.

Beijing Zoo highlights

- Real-person voice intelligent explanation, multiple styles and multiple languages, styles are changeable, and
- everything is available, making your journey full of fun.
- Multiple styles: Royal Sister, Doll, Gentleman, Your Majesty... DIY tour guides can be realized.
- Multilingual: Chinese, English, French, Japanese, Russian, Korean...

Table of Contents

Resulting business & IT requirements

Appendix

Manage Animal Wellness

- Vet. services
- Keepers
- Nutrition
- Welfare Science
- Behavioural Husbandry

Business Requirements

- Keep animals in good physical and metal health
- Prepare high quality food for animals and determine the right diets for 300+ species
- Constantly undertake nutrition research and analyze data for diets
- Source the right amount of food, at the right time, and at the right quantity

Value Drivers Impacted

- Operating Margin – Reduce staff on site at all times to take care of animals
- Revenue – Preservation of key animals to ensure guest attraction
- Asset Efficiency – Inventory – Improve inventory efficiency
- Operating Margin – Material Costs – Improve service provision efficiency

Current IT Assessment

- Keepers are the only source of knowledge regarding animals
- Staff fills a paper report after looking at animals, there is no immediate request to signal that an animal is in distress
- The need for animal diagnostic is based on experience rather than technology
- No current purchasing software allowing quick fulfillment of food orders for animals
- No current effective nutrition communication system for Zoo staff

Desired IT Requirements

- Procurement software to manage inventory and quickly source
- Strong communication platform for nutrition information
- Tracking animals across the site to know exactly where they are at all times
- Central database for each animals shared across departments
- Sensors on animals to detect their stress levels, abnormal health metrics
- Cameras inside enclosures at all times to monitor animals remotely from home

Resulting business & IT requirements

Appendix

Manage Conservation Programs

- Reproduction
- Endocrinology
- Education
- Species Recovery

Create and Deploy Conservation Giving Opportunities

- Philanthropic Impact
- Reward System
- Tap to Donate

Business Requirements

- Reproduction research, develop tools and techniques, run 3 labs and soon another genetics lab
- Collect data on animals based on fecal samples, biobank, assist agencies like Environment Canada
- Participate in animal reproduction by insemination
- Implement welfare research programs, including breeding, birthing, cortisol levels, behavioural observations

Value Drivers Impacted

- Revenue – Guest attraction due to reputation in conservation
- Revenue – Additional funding due to global research projects

Current IT Assessment

- More advanced than other parts of the Zoo
- Currently unable to track animals within the Zoo with IoT or cameras
- No common platform regrouping genetic material with welfare information for all Zoo species

Desired IT Requirements

- Being able to monitor animals 24/7, monitor how they are doing, abnormal behaviour, what kind of cues, we want to know what is happening with them.
- Being able to share information easily
- Easily broadcast the conservation work to guests
- Grow conservation beyond the Toronto Zoo and spread research results

Resulting business & IT requirements

Appendix

Market Products and Services

- Digital Marketing
- Loyalty
- Partnerships
- Guest Analytics
- Marketing Means
- Campaign Awareness

Business Requirements

- Get as many people on site as possible pre-COVID, capacity limited during COVID
- Create engagement on social media to grow popularity and online purchasing
- Get guests to spend as much as possible on site

Value Drivers Impacted

- Revenue – Generating revenue from ticket and membership sales
- Revenue – Targeting the right crowd, apply dynamic pricing and suggest content

Current IT Assessment

- Web store currently unable to reach customer
- CRM installed but it is not effective, connected with custom software
- No mass email software available, it takes staff 48 hours to send mass emails, resulting in outdated information when the customer is reached

Desired IT Requirements

- Email software management urgently needed by staff
- Online store with a wide variety of memberships available
- Dynamic pricing for tickets on the website
- VIP loyalty programs to extract added value from wealthier guests

Resulting business & IT requirements

Appendix

Sell Products and Services

- Entrance / Signage
- Experiences
- Food
- Merchandises
- Online Platforms

Business Requirements

- Generate revenue from membership and tickets
- Sell tickets rapidly to avoid crowds at the Zoo entrance
- Sell online to respect COIVD public health guidelines
- Sell food and beverages on site, as well as additional merchandise

Value Drivers Impacted

- Operating Margin – Inventory - optimize fulfillment process for the on-site stores and equipment
- Revenue – Ability to do dynamic pricing for tickets and specific memberships
- Operating margin – Optimize cost of vendors on site

Current IT Assessment

- Staff is positioned at the Zoo entrance and provide basic ticket services and membership
- Admission process is slow due to outdated entrance infrastructure (relying on software wrote by standalone developer)
- Data from compass is not hosted on the Zoo network
- On-site purchasing cannot be done with one single gift card
- Compass systems not easily connected
- Smart pricing not possible with current infrastructure

Desired IT Requirements

- Ability to purchase gift cards to embark on a “journey” and enable microtransactions within the Zoo
- Connected database with customer insights for both members and non-members resulting from a purchase either online or on site
- Infrastructure to receive microtransactions at stores, point of sales, etc.

Resulting business & IT requirements

Appendix

Design and Manage Guest Experience

- Exhibits / Rides
- Zones and pavilions
- Community Events
- Digital
- Outside the Zoo
- Drive Through

Business Requirements

- Create an unforgettable experience
- Attract a large number of guests
- Maintain satisfaction within the Zoo
- Provide basic personal service
- Ability to purchase tickets
- Fast flow in the Zoo

Value Drivers Impacted

- Revenue - Guest perception for attraction
- Revenue - Guest experience on the site and likelihood to refer the Zoo to a friend or family
- Operating Margin – Saving costs regarding on-site personal

Current IT Assessment

- Few screens provide information to guests, most information is paper based
- Maps are located around the Zoo, there is no app
- Exhibits do not use technology to engage with guests, aside from a few screens not connected to a network
- Limited public outreach outside of the Zoo, halted during COVID
- Limited digital outreach outside of the Toronto Zoo

Desired IT Requirements

- Zoo application with map and recommended animals to see
- A recommended experience based on the guest profile
- Ability for gests to connect to Zoo network anywhere and at no cost
- VR, and AR used in exhibits to engage with guests
- Digital material connected to a master network
- Data collection on guests before, during, and after the Zoo

Resulting business & IT requirements

Appendix

Manage Safety & Security

- Site access
- Dangerous animals
- H&S
- Surveillance

Business Requirements

- Maintain the public safe inside the Zoo
- Control animals by installing strong security measures, particularly for dangerous animals
- Collect safety and security data
- Act rapidly in the event of an emergency
- Respect public heath guidelines during COVID-19

Value Drivers Impacted

- Revenue - Ability to attract the public and ensure a safe space for everyone
- Revenue - Rapid emergency resolution preventing loss in attendance (lost child, animal waning etc.)
- Revenue – Preventing loss of funding and reputational damage by mitigating events
- Operating Margin – Labour Costs – Reduce dependency on staff by automating safety monitoring

Current IT Assessment

- Control centre at the entrance with temperature cameras and mask detection, live cameras for the parking lot and Zoo entrance
- Animal locks are manual, a set of key is distributed to Zoo staff when they get on premises (Key control is moving to a digital key press system)
- Need staff on site at all times to monitor safety
- Staff is currently tracked by GPS on their radio
- Animals are not monitored
- IT server rooms with water damage, rust, and dust

Desired IT Requirements

- 24/7 cameras in animal enclosure to get live feed of animals (and other technology such as heat camera)
- Smart locks for buildings and animal enclosures controlled by Zoo staff
- GPS tracking of guests inside the Zoo, cellphone for officers
- Emergency communication and response system
- Create incident report directly through patrolling rounds using a QRS code at patrol point locations

Resulting business & IT requirements

Appendix

Manage Facilities and Equipment

- Parking
- Buildings
- Equipment
- Habitats
- Roads and Paths

Business Requirements

- Maximize capacity and people flow
- Allow easy access to the Zoo
- Increase building sustainability
- Reduce building energy and water consumption
- Allow easier access to the Zoo via transit

Value Drivers Impacted

- Revenue – Provide spaces where guests feel welcome and can use their technology
- Operating margin – Reduce building consumption
- Operating margin – Reduce equipment failure by maintaining buildings

Current IT Assessment

- Some buildings do not have LTE coverage
- Most of the Zoo does not have wi-fi coverage
- Server rooms inside buildings are filled with dust, rust, and water damage
- There are power cuts every other week, IT infrastructure running on generators
- Buildings don't have the equipment required to implement advanced security systems

Desired IT Requirements

- Fast entry and exit from the Zoo through QR code scan, automated doors
- No power cuts
- Smart building monitoring
- LTE coverage inside buildings
- Guest tracking at all times inside the Zoo

Resulting business & IT requirements

Appendix

Manage Procurement and Inventory

- Procurement
- Inventory
- Resell
- Tendering Process

Business Requirements

- Allow staff to quickly source materials needed to do their job duties
- Ensure that processes are quick
- Allow to quickly source professional services
- Prioritize the Zoo's interests over the City's

Value Drivers Impacted

- Operating Margin – Minimizing paper process to expedite contracts
- Revenue – Allow critical revenue-generating work orders to be quickly fulfilled for revenue-generating applications

Current IT Assessment

- Work order through workplace is only possible at set locations, processes are heavily paper based
- Nutrition and procurement have a separate order system, with no plans to connect
- Signatures are not electronic, printing is required
- Staff cannot place work orders outside of the network

Desired IT Requirements

- Centralized fast and efficient procurement process for all departments of the Zoo (Procure to Pay, P2P)
- Supplier relationships management software
- Remote work order system all around site
- E signatures for procurement
- Paperless processes
- Having a dashboard providing PO issued that day, orders from the warehouse, drill down features

Resulting business & IT requirements

Appendix

Manage Programs

- Program initiation
- Manage scope
- (...)

Business Requirements

- Manage program timelines and budgets
- Plan for short, medium, and long term
- Contract-out major programs to mitigate risk

Value Drivers Impacted

- Revenue – Drive revenue by making the right investment decisions
- Operating Margin – Find cost effective alternatives

Current IT Assessment

- Priorities are shifting, delaying programs (ex: wi-fi)
- Limited laptops for Zoo staff
- Limited mobile devices
- No program or project management software suite available to Zoo staff
- Online presence is limited for guest-facing programs

Desired IT Requirements

- Project management software, forecasting and communication
- Increase online presence for key programs

Resulting business & IT requirements

Appendix

Manage Stakeholders

- Governments
- Interests groups
- Partnerships
- Donors
- Animals

Business Requirements

- Grow education programs within the Zoo
- Maintain relationship with the City of Toronto to get funding
- Maintain relationship with TTC for site accessibility
- Partnerships with universities for research staff
- Partnerships with institutions for joint projects
- Engage the community and attract a different demographic

Value Drivers Impacted

- Revenue – Government funds the city which drives attendance
- Operating Margin – Research grants and other staff programs

Current IT Assessment

- No mass email platform to communicate to the community
- No animal directory or inside view in the Zoo
- No holistic strategy for partnership development, each department does its own thing

Desired IT Requirements

- Engage stakeholders beyond the Zoo on an app, on the Zoo's website, or other means of communication
- Leverage non-profit status to get reduced pricing on ERP implementation or other IT related work

Resulting business & IT requirements

Appendix

Plan & Manage The Business

- Goal Alignment
- Making the hidden zoo go extinct
- Leverage guest data

Business Requirements

- Create WOW for guests
- Revolutionize Zoo technology and get people to think differently about technology
- Making the “hidden Zoo” go extinct
- Leverage guest data from all of their interactions with the Zoo
- Price accordingly, make quick, data-driven decisions
- Communicate effectively to staff and stakeholders

Value Drivers Impacted

- Operating Margin – SG&A – Improve Corporate/Shared Services Efficiency
- Revenue – Understanding business operations and processes to make better investment decisions

Current IT Assessment

- Lack of guest metrics, all the analysis is done on Excel with very limited databases
- Data accessibility is difficult, hence process times are long
- Business decisions are not always data-driven, varying from department to department
- Outdated systems do not provide sufficient business insights, integration between each software is poor

Desired IT Requirements

- Integrated database with guest information across the Zoo
- Integrated database with animal data across the Zoo
- Real time tracking for both guests and animals
- Real time dashboards to monitor occupancy levels in the Zoo and other metrics
- Clear guest metrics

Resulting business & IT requirements

Appendix

Manage HR

- Attract and hire
- Payroll, retention
- Employee experience

Business Requirements

- Attract the right people
- Retain people
- Compensate people
- Engage employees and build a strong culture

Value Drivers Impacted

- Revenue – Drive the right people to increase revenue
- Operating Margin - Direct Labor – Retain the right employees and pay adequately
- Operating Margin – Overheads – Ensure fast onboarding process

Current IT Assessment

- Paper-based onboarding process in the process of being replaced by ADP Workforce Now, future process will be automated
- No e signatures
- Training coordinated by an external vendor
- No employee database providing requisitions, voluntary and involuntary turnover

Desired IT Requirements

- Automated onboarding process
- Online onboarding video content for new employees
- Live employee metrics
- Automated payroll
- Need an IT partner with the skills to assist on project planning for HR and help in the digital transformation

Resulting business & IT requirements

Appendix

Manage IT

- Provide technology
- Optimize back office
- Support guest experience

Business Requirements

- Have a stable network: Ensure stability of network to enable all front and back office activities at the zoo
- Provide a strong technology experience to guests: Provide a personalized experience and create a journey, track guests along the way
- Optimize back office: Ensure that all applications talk to each other and allow back office processes to run efficiently

Value Drivers Impacted

- Revenue – Guest experience and attraction through technology
- Operating Margin – IT department and systems cost
- Operating Margin – Impact of IT on back office systems

Current IT Assessment

- The Toronto Zoo uses the City of Toronto's network, which prevents staff from using a wide variety of applications and customize exhibits in the way needed for guests experience
- IT severely lacks budget in order to undertake upgrades needed for network and others
- There is a skills gap, need flexibility
- There is no IT architecture map, processes were lost in time or documented on paper

Desired IT Requirements

- Increase staff number to meet demand from Zoo employees
- Upgrading the network for the Zoo's own network is a must-have
- Document IT processes and systems digitally
- Need increased funding for the IT organization
- Replace multiple outdated software by a simplified piece of software for the whole Zoo

Resulting business & IT requirements

Appendix

Manage Finance and risks

- Manage risk & funds
- Optimize costs
- Accounting

Business Requirements	Value Drivers Impacted
▪ Manage funds ▪ Minimize risk within the Zoo ▪ Optimize costs around the Zoo ▪ Fund the Zoo's strategic ambitions	Revenue – Guest attraction resulting from investments Revenue – Increased attendance due to better KPIs Operating Margin – Reduce time required for reporting Cash – Reduce risk of human error in financial reporting

Current IT Assessment	Desired IT Requirements
▪ Current ERP is out of date with threat of data loss ▪ In-depth financial analysis not possible due to lack of data collection ▪ No dashboards providing reporting ▪ Information transfer from main accounting system is satisfactory ▪ Invoices are paper based, making it difficult to organize data	▪ Automated financial dashboards including: sales, payables, bank balance, other metrics ▪ Easy access to financial data and metrics out of the ERP system (remote and quick) ▪ Automated accounting and reporting ▪ Integrated budgeting tool

Resulting business & IT requirements

Appendix

Manage Support Services

- Provide timely support
- Consultant engagement
- Project management

Business Requirements

- Minimize cost while ensuring best service
- Provide timely support during and outside of business hours

Value Drivers Impacted

- Revenue – Responding to request in a timely manner
- Operating Margin – Efficient allocation of resources
- Operating Margin – Labour costs

Current IT Assessment

- No dedicated IT resource for 24/7 support
- IT equipment for support staff is outdated, difficulties for remote access
- No central e-signatures across the Zoo departments, making processes slow

Desired IT Requirements

- Portable devices for staff and remote access capabilities
- Upgraded IT infrastructure
- 24/7 support team
- E-signature system

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Risk Criteria Definition and Scoring

Current Situation

Criteria	Definition	Scoring
Project Owner is Identified	Evaluate the risk associated with the absence of a project owner.	1: Project owner is identified and engaged. 3: Project owner is identified. 5: No project owner has been identified.
Stakeholders Alignment and Support	Refers to any perceived risks associated with the alignment of stakeholders, such as misalignment of objectives, working styles, political opinions, etc. and support to the project.	1: The project has the support of key stakeholders. 3: The project has moderate support of stakeholders OR key stakeholders are indifferent to the project success. 5: Key stakeholders are non-supportive of the project.
Project and/or Technology Novelty	Evaluates the risk associated with the experience of the company with respect to this type of project and/or technology.	1: Similar projects/technology have previously been realized/implemented within the industry. 3: Certain similar elements have been realized/implemented in previous projects in the industry. 5: No similar projects/technology have been realized/implemented in the past in the industry.
Project Size, Duration and Complexity	Evaluates the complexity of the project realization in terms of duration, scoping, objectives and evaluation criteria definition…etc.	1: Project scope and objectives are well defined and will not change AND project affect a reasonable number of departments/units AND project duration is less than 4 months. 3: Project scope and objectives are ill-defined and/or are continually changing AND/OR project affect a large number of departments/units AND/OR project duration is between 4 and 12 months. 5: Project scope and objectives are ill-defined and/or are continually changing AND project affect a large number of departments/units AND/or project duration is more than 12 months.
Dependencies and Inter-relationships	Evaluates the risk associated with the interdependencies with other projects and/or external parties (ex. other department, other organization…etc). For example, a phase of the under-study project may see it success being dependent of the success of another project.	1: There is no external dependency for the project. 3: There are weak dependencies or other projects are dependent on the successful realization of this project. 5: Depends on the successful realization of other external projects.
Limited Financial Resources and/or Schedules	Evaluates the risk associated with a lack of financial resources and/or to tight schedule.	1: There is sufficient financial resources that can be allocated to the project AND the time that can be allocated is realist. 3: There is sufficient financial resources that can be allocated to the project BUT not enough time can be allocated. 5: Financial resources are insufficient AND not enough time can be allocated.
Availability of Skilled Resources	Evaluates the risk associated with the competence, experience or availability of the resources required by the project. Also evaluates the availability of resources who are not constrained by dose capacity.	1: Resource demand both IT and business can be fully met by internal resource supply or external resources who have worked with Our Toronto Zoo in the past year. 3: Resource demand can be met >75% by internal resource supply AND external resources. 5: Resource demand can NOT met >75% by internal resource supply AND/OR external resources. Internal and/or external resources are scarce.
Degree of Change	Evaluates the risk associated with the degree of change required with respect to work methods, processes, procedures and training upon completion of the project.	1: Little change which will be easily implemented and accepted by the business. 3: Moderate change that will be challenging to implement and components of the change will be accepted by the business. 5: High degree of change that will be difficult to implement and not easily accepted by the business.

Risk Criteria Definition and Scoring

Current Situation

Criteria	Definition	Scoring
Impacts the Priority Value Drivers	Assessment of the strategic alignment of the project. The impact of the project is measured by aligning it to drivers of value.	5: Project benefit fully aligned to priority value drivers. 3: Project benefit partially aligned to priority value drivers. 1: Project benefit NOT aligned to priority value drivers.
Value at Risk	Evaluates the potential loss that would result in the non-realization of the project. Only the costs incurred by the status quo should be taken into account.	5: Protects an important financial value or regulatory / legal requirements. 3: Protects a minor financial value or intangible value. 1: Does not protect any value (but can create value).
Compliance with Regulatory Requirements	Evaluates the necessity of the project to help the company comply with current or future regulatory requirements.	5: Required to comply with current regulatory requirements. 3: Required to comply with impending regulatory requirements. 1: Required to operate in accordance with industry best practices.
Impacts on the Critical Business Processes	Assessment of the impact on the critical business processes. The impact of a project is measured by identifying and assigning impacts to the sub-process of the business process framework.	5: Contributes to the improvement of the core business processes. 3: Contributes to the improvement of the main infrastructure processes of the business. 1: Contributes to the improvement of other processes.
Foundation-builder	Refers to investments in infrastructure required by other investments to deliver their intended outcomes. Other invest-ments or outcome improvements that will be enabled by critical foundational elements are easily identifiable.	5: Enables the execution of projects that are expected to create important value. 3: Enables the execution of projects that are expected to create a moderate value. 1: Does not enables any other project.
Financial Benefits Created	Evaluation of the projected Return on investment (ROI) of the initiative.	5: Generates a ROI greater than20%. 3: Generates a ROI between 0 and 20%. 1: A return on investment has not been identified.
Impacts the Priority Value Drivers	Assessment of the strategic alignment of the project. The impact of the project is measured by aligning it to drivers of value.	5: Project benefit fully aligned to priority value drivers. 3: Project benefit partially aligned to priority value drivers. 1: Project benefit NOT aligned to priority value drivers.
Value at Risk	Evaluates the potential loss that would result in the non-realization of the project. Only the costs incurred by the status quo should be taken into account.	5: Protects an important financial value or regulatory / legal requirements. 3: Protects a minor financial value or intangible value. 1: Does not protect any value (but can create value).

Criteria Weight

Risk Criteria

Maintenance	Growth	Innovation	Productivity	Criteria
10%	20%	15%	15%	Project Owner is Identified
10%	15%	15%	10%	Stakeholders Alignment and Support
10%	15%	10%	15%	Project and/or Technology Novelty
15%	10%	10%	10%	Project Size, Duration and Complexity
15%	10%	10%	15%	Dependencies and Inter-relationships
15%	10%	15%	10%	Limited Financial Resources and/or Schedules
10%	10%	15%	10%	Availability of Skilled Resources
15%	10%	10%	15%	Degree of Change

Value Criteria

Maintenance	Growth	Innovation	Productivity	Criteria
20%	25%	30%	25%	Impacts the Priority Value Drivers
30%	5%	5%	5%	Value at Risk
20%	20%	10%	10%	Compliance with Regulatory Requirements
20%	10%	30%	25%	Impacts on the Critical Business Processes
5%	20%	20%	5%	Foundation-builder
5%	20%	5%	30%	Financial Benefits Created

2021 Technology Project Portfolio

Current Situation

	Projects	Type	Value
1	Implement Wifi site wide / Install Bell Network / Investigate 5G Network /	Growth	High
2	Provide wireless devices and laptops to staff	Growth	Medium
3	VoIP telephone system	Growth	Medium
4	Improve electrical network to avoid power cuts, and support equipment (UPS)	Maintenance	Medium
5	Implement cloud services for inhouse servers	Growth	High
6	Identify and integrate Hidden IT (Safety, finance, others)	Productivity	Medium
7	Implement guest distress system / zoo-wide alarm	Productivity	Medium
8	Develop CyberSecurity Platforms	Maintenance	Medium
9	Plan a holistic software ecosystem & architecture	Growth	Medium
10	Manage Technology Partnerships / Become an innovation zone	Innovation	High
11	Grow the IT team with qualified staff 8 (3 applications, 2 infra, 2 service desk 1 ar)	Growth	Medium
12	Build Technology Reputation / IT marketing plan	Growth	Low
13	Improve Project management (less complications)	Productivity	Medium
14	Finalize governance of funds and planning of recurring costs	Maintenance	Low
15	Implement Zoo-wide e-signature software	Productivity	Low
16	Implement Dynamics ERP	Growth	High
17	Build a data warehouse (Azure, AWS, Oracle...)	Growth	Medium
18	Update and centralise work order system across all departments (harmonize infra + nutrition)	Productivity	High
19	Launch Electronic Mail Management	Productivity	Low
20	Implement improved CRM	Growth	Medium
21	Implement ADP Workforce Now	Productivity	Low
22	Digitalize Employee Onboarding	Productivity	Low
23	Build a quick turnaround digital hiring process	Growth	Low
24	Replace ADMITS	Growth	High
25	Develop Employee Training	Growth	High
26	Implement Centralized Inventory Management System	Productivity	Medium
27	Automate processes through (Service Now)	Productivity	Low
28	Implement Supplier Relationship System	Productivity	Medium
29	Develop segment and personal customer journeys	Growth	Medium
30	Installation of guest tracking system i.e. heat maps, cameras, sensors	Innovation	Medium
31	Implement smart signage across the zoo / interactive maps	Productivity	Medium
32	Display management tool	Productivity	Low
33	Implement AV equipment for boardrooms and event spaces	Productivity	High
34	Improve Last mile to get to the zoo	Innovation	Very High
35	Source and implement IT Equipment for Orangutan Exhibit	Growth	Medium
36	Source and implement IT Equipment for Canadian Pavilion	Growth	Medium
37	Source and implement IT Equipment for Welcome Area	Growth	Medium
38	Install automated gates for guests	Growth	Medium
39	Implement new kiosks and ticketless system	Growth	Medium
40	Upgrade audio equipment around the zoo	Maintenance	Medium
41	Build Zoo App V2: Interactive Map	Growth	Low
42	Build Zoo App V2: In-App purchases / donations	Growth	Low
43	Build Zoo App V2: Animal Directory + Donation	Growth	Low
44	Build Zoo App V2: Audio Guide	Growth	Low
45	Build Zoo App V2: Augmented Reality	Growth	Low
46	Build Zoo App V2: Digital tickets & Membership	Growth	Low
47	Build Zoo App V2: Conservation	Growth	Low
48	Build Zoo App Education V2	Growth	Low
49	Implement VR experience for camp programs	Innovation	Low
50	Implement children tracking for camp programs	Innovation	Low
51	Expand the zoo experience at home	Innovation	Medium
52	Expand online education presence	Growth	Low
53	Allow guests to feed animals digitally (sync with nutrition system)	Innovation	Medium
54	Integrating on site donations options with the network; Explore data collection opportunities	Growth	Medium
55	Develop conservation digital exhibit	Innovation	Medium
56	Digitalize reproduction lab expertise and achievements (Hidden Zoo)	Innovation	Low
57	Implement smart locks for enclosures	Maintenance	Medium
58	Implement smart gates for vehicles	Maintenance	Medium
59	Scale Machine Learning to identify threatening guest and animal behaviour	Innovation	Medium
60	Scale worldwide conservation: Animal tracking	Innovation	Medium
61	Scale worldwide conservation: Poaching tracking	Innovation	Medium
62	Implement animal cameras and sensors (heat, location)	Maintenance	High
63	Automate diet planning	Productivity	Medium
64	Implement automated animal meal production system	Productivity	High
65	Implement automated feeding system (distribution)	Productivity	Medium
66	Predictive care based on history and sensors	Innovation	Medium
67	Centralized Animal Database in warehouse (reproduction, welfare, nutrition...)	Productivity	High
68	Digitize nutrition information to Zoo staff & guests	Productivity	Low
69	Develop dynamic pricing, VIP programs	Growth	Low
70	Improve presentation of Zoo to partners with technology	Growth	Medium
71	Rebuild retail and conservancy "store"	Growth	Medium
72	Launch Virtual products	Growth	Low
73	Compass food APP food delivery inside the zoo	Innovation	Low
74	Implement Virtual queueing	Growth	Low
75	Implement Mobile/Online payment for parking (Precise Park)	Growth	Low
76	Build a reporting dashboard ecosystem on PowerBI or Tableau	Productivity	Medium
77	Automate reporting for CCAC, OMAFRA, AZA, CAZA	Productivity	Medium
78	Implement sensors for building health monitoring & consumption	Productivity	High
79	Track key nutrition metrics	Productivity	Low
80	Partner with tech company to implement digial infrastructure	Innovation	High
81	Digitalize paper records across the organization	Productivity	Low
82	Measure and automate sustainability reporting	Productivity	Low
83	Digitize building & infrastructure drawings	Productivity	Medium
84	Develop a digital twin of the zoo	Productivity	High
85	Install tracking system on zoo vehicles	Maintenance	Low
86	Install moisture sensors for garden beds/greenhouse	Maintenance	Low
87	Implement Smart Washroom Facilities	Innovation	Medium
88	Tap to donate implementation (Conservancy)	Growth	Medium

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How to establish a dynamic strategy?

Ultimately, the IT organization would dynamically maintain four rolling plans:

1 Establish your baseline value IT strategy

- Review business issues, strategic objectives, market trends and IT leading practices
- Develop prioritization and investment frameworks and define value drivers and check against benchmarks
- Perform scenario analysis and develop high-level to-be and "not to-be" business model
- Review current state in terms of application, organization, information and infrastructure
- Analyze and prioritize projects and group projects into programs
- Conduct sensitivity analysis and define current project portfolio
- Perform gap analysis and develop new initiatives to close gaps
- Describe initiatives, prioritize and develop master plans (portfolio, IT solutions, human resources and financial)

2 Define your "sensing" network to keep track of present and future opportunities

- *(I.E.: What business and technology indicators have changes since the last planning cycle)*
- Business indicators
  - Dimension #1: customers
  - Dimension #2: business model evolution
  - Dimension #3: value drivers
- Technology indicators
  - Dimension #1: new technologies
  - Dimension #2: obsolescence

3 Develop and update your continuous rolling plans

- Establish a process to regularly update your four rolling plans according to the sensing network changes