Detailed Work Packages and Standard Structural Repair and Retrofit Drawings

Technical Assistance for Resilience to Climate Variability in the Building Sector of Antigua and Barbuda

Submitted to

Climate Technology Centre and Network
United Nations Industrial Development Organization

By

ECMC

1st Flr. Marie-Colette Building|#9 Lawjanv Crescent | Rodney Bay Commercial Blvd.
P O Box RB 2446 | Rodney Bay Post Office | Gros Islet | LC01 401 |Saint Lucia
t: 758-453-2093 | f: 758-452-1731 | e: ecmc@candw.lc | w: www.ecmcstlucia.com

October 2018

Project No: 18106
Issue: V01 **Status**: Final
Date: October 18, 2018

Overall Condition rating

The summary condition rating is based on an overall assessment of the ratings provided against 24 parameters identified in the inspection reports. Scores were ascribed to each of the three categories of the condition rating. High was given a score of 3, Average taken as 2 and Low was scored as 1. This meant that the highest score which could have been achieved is 96.

Based on the condition criteria provided in the guidance notes and presented in Table 1, Good reflected a condition of High, Fair/Average was equated to Low and the status of Poor and Very poor, taken as Low. The overall rating was then developed using the following limits:

- Scores less than or equal to 50% considered to reflect a Low condition
- Scores between 51% and 69% considered Average, and
- Building with scores greater than or equal to 70%, considered to have a High condition rating.

Table 1 - Condition index

Status	Definition of rating/condition of building asset	Condition	Score
Good	Minor defects	**High**	**3**
	Superficial wear and tear		
	Some deterioration to finishes		
	Major maintenance not required		
Fair/ Average	Significant defects are evident	**Average**	**2**
	Worn finishes require maintenance		
	Services are functional but need attention		
	Deferred maintenance work exists		
Poor	Badly deteriorated	**Low**	**1**
	Potential structural problems		
	Inferior appearance		
	Major defects		
	Components fail frequently		
Very Poor	Building has failed		
	Not operational or viable		
	Unfit for occupancy or normal use		

Table 2 - Summary Condition Rating of Buildings

No.	Building	Percentage Rating	Overall Condition
1	All Saints Clinic	57%	Average
2	All Saints Fire Station	56%	Average
3	All Saints Police Station – Magistrate's Court	42%	Low
4	Analytical Services 1 – Agro Processing Building	53%	Average
5	Analytical Services 2 – Laboratory Building	53%	Average
6	Antigua State College 1 – Administration Building	58%	Average
7	Antigua State College 2 – Staff Room	45%	Low
8	Bendals Clinic	59%	Average
9	Bolans Clinic	50%	Low
10	Clear View Psychiatric Hospital 1 – Female Ward	57%	Average
11	Clear View Psychiatric Hosp. 2 – Occupational Therapy and Macahlay Ward	55%	Average
12	Clear View Psychiatric Hosp. 3 - Dormitory	55%	Average
13	Clearview Psychiatric Hosp. 4 – Clear View Hospital	56%	Average
14	Courthouse – High Court of Justice	64%	Average
15	Defence Force Building 1	47%	Low
16	Defence Force Building T – Building T	44%	Low
17	DOE 1 – DOE Main Building	73%	High
18	DOE 2 – DOE Conference Room	71%	High
19	Fines 1 – Governor Building	58%	Average
20	Fines 2 - Kitchen	68%	Average
21	Good Shepherd Home	58%	Average
22	Met Office – Airport Terminal	58%	Average
23	Ministry of Finance	68%	Average
24	Ministry of Tourism	70%	High
25	National Archives	59%	Average
26	National Office of Disaster Services (NODS)	73%	High
27	Parahm Clinic	59%	Average
28	Police HQ – Constable Quarters	44%	Low
29	Potters Clinic	56%	Average
30	Prison Block – B Block	38%	Low
31	St. Johns Fire Station	48%	Low
32	Swetes Clinic	68%	Average
33	Victory Centre	65%	Average
34	Nyabingi School	NE	Low

TECHNICAL ASSISTANCE FOR RESILIENCE TO CLIMATE VULNERABILITY IN THE BUILDING SECTOR OF ANTIGUA AND BARBUDA

Summary of Indicative Costs for 34 Work Packages

No.	Property	Costs in USD				
		Base Cost	Demolition of defective works	Preliminaries	Contingencies	Total
1	18106-Bldg-All Saints Clinic	336,274	10,088	25,221	74,317	445,899
2	18106-Bldg-All Saints Fire Station	316,902	9,507	23,768	70,035	420,212
3	18106-Bldg-All Saints Police Station - Magistrate's Court	850,118	25,504	63,759	187,876	1,127,257
4	Analytical Services 1 - Agro Processing Building	565,253	16,958	42,394	124,921	749,525
5	Analytical Services 2 - Laboratory Building	356,800	10,704	26,760	78,853	473,116
6	18106-Bldg-Antigua State College 1 - Administration Building	1,027,908	30,837	77,093	227,168	1,363,006
7	18106-Bldg-Antigua State College 2 - Staff Room	282,560	8,477	21,192	62,446	374,675
8	18106-Bldg-Bendals Clinic	282,060	8,462	21,155	62,335	374,012
9	18106-Bldg-Bolans Clinic	234,077	7,022	17,556	51,731	310,386
10	18106-Bldg-Clear View Psychiatric Hospital 1 - Female Ward	664,513	19,935	49,838	146,857	881,144
11	18106-Bldg-Clear View Psychiatric Hospital 2 - Occupational Therapy and Macahlay Ward	409,205	12,276	30,690	90,434	542,605
12	18106-Bldg-Clear View Psychiatric Hospital 3 - Dormitory	258,758	7,763	19,407	57,185	343,113
13	18106-Bldg-Clear View Psychiatric Hospital 4 - Clear View Hospital	375,521	11,266	28,164	82,990	497,940
14	18106-Bldg-Courthouse - High Court of Justice	257,175	7,715	19,288	56,836	341,014
15	18106-Bldg-Defence Force Building 1	778,516	23,355	58,389	172,052	1,032,312
16	18106-Bldg-Defence Force Building T	805,123	24,154	60,384	177,932	1,067,593
17	18106-Bldg-DOE 1 - Main Building	312,354	9,371	23,427	69,030	414,181
18	18106-Bldg-DOE 2 - Conference Room	289,023	8,671	21,677	63,874	383,244
19	18106-Bldg-Fines 1 - Governor Building	320,403	9,612	24,030	70,809	424,855
20	18106-Bldg-Fines 2 - Kitchen	358,240	10,747	26,868	79,171	475,026
21	18106-Bldg-Good Shepherd Home	322,932	9,688	24,220	71,368	428,207
22	18106-Bldg-Met Office - Airport Terminal	277,150	8,314	20,786	61,250	367,500
23	18106-Bldg-Ministry of Finance	723,774	21,713	54,283	159,954	959,724
24	18106-Bldg-Ministry of Tourisim	641,578	19,247	48,118	141,789	850,732
25	18106-Bldg-National Archives	404,545	12,136	30,341	89,404	536,427
26	18106-Bldg-National Offiice of Disaster Services (NODS)	250,948	7,528	18,821	55,459	332,757
27	18106-Bldg-Parahm Clinic	240,518	7,216	18,039	53,154	318,927
28	18106-Bldg-Police HQ - Constable Quarters	1,022,391	30,672	76,679	225,948	1,355,690
29	18106-Bldg-Potters Clinic	323,065	9,692	24,230	71,397	428,384
30	18106-Bldg-Prison Block - B Block	753,541	22,606	56,516	166,533	999,196
31	18106-Bldg-St John's Fire Station	518,699	15,561	38,902	114,633	687,795
32	18106-Bldg-Swetes Clinic	308,529	9,256	23,140	68,185	409,109
33	Victory Centre	203,321	6,100	15,249	44,934	269,603
34	18106-Bldg-Nyabinghi School	111,000	3,330	8,325	24,531	147,186
	Base Cost	**15,182,769**	**455,483**	**1,138,708**	**3,355,392**	**20,132,352**
	Allow 15% detailed engineering design and supervision	**2,277,415**	**68,322**	**170,806**	**503,309**	**3,019,853**
	Allow 10% of engineering fees as reimbursable cost	**227,742**	**6,832**	**17,081**	**50,331**	**301,985**
	Project Administration cost - 3% of base cost	**455,483**	**13,664**	**34,161**	**100,662**	**603,971**
	Sub-total	**18,143,410**	**544,302**	**1,360,756**	**4,009,694**	**24,058,161**
	Value Added Tax - 15% of Sub-total	2,721,511	81,645	204,113	601,454	3,608,724
	Total	**20,864,921**	**625,948**	**1,564,869**	**4,611,148**	**27,666,885**

All Saints Clinic

Building and Construction Data

Facility Name:	All Saints Clinic	Year built:	
Building Name:	All Saints Clinic	Year(s) remodeled:	
Building Address:	All Saints	Original Design Code:	OECS Building Code
Latitude:	17.0643909	Area (m2):	446
Longitude:	61.795558	Length (m):	35
Use:	Medical	Width (m):	20
Risk Category:	II	No. of storeys:	1
Occupancy Group:	Group A	Storey height (m):	10
No. of occupants:	30	Total height (m):	13
Roof shape:	Hip	Walls	Concrete Blocks
Roofing:	Metal Sheeting	Structural system	Concrete Frame
Overall Condition	Average		
Comments	Inspection suggested that the building is in good condition. The main issue appears to be the parking area which is minimal, shared with other buildings and is unpaved		

Task No.	Interventions/Improvements	Unit	Quantity	Unit Rate (USD)	Total (USD)
ASC-01	**Condition of construction materials - repair as detailed in drawings**				
	Repair small cracks with a high strength epoxy grout	sum	1	2,500	2,500
ASC-02	**Structural Integrity of Roofs**				
	Retrofit roof with collars at top third of roof height	lm	300	16	4,800
	Strengthening overhangs at gable end walls	m^2	32	31	978
ASC-03	**Exterior Doors, Exits and Entrances**				
	Protecting existing door with an impact-resistant covering	nr	6	1,000	6,000
	Install threshold to prevent ingress of water	nr	6	100	600
	Fasten door frames into concrete surrounds with bolts or screws	nr	6	30	180
ASC-04	**Windows and shutters**				
	Replace existing windows with standard operable or fixed windows and install shutters with Miami Dade NOA	m^2	10	1,270	12,700
ASC-05	**Other Elements of the Building Envelope**				
	Repair cracks > 6 mm using a welded mesh	sum	1	3,500	3,500
ASC-06	**Safety of roofing**				
	Inspect roof and then Install hurricane straps at the eaves/ring beams and ridge to rafter connections	nr	210	5	1,050
	Fixing roof sheathing with minimum 75 mm screws into rafters and ridges	nr	600	1	600
	Decreasing spacing of fasteners, particularly at eaves, hips, ridge & edges of gable roofs	nr	420	1	420
ASC-07	**Parapets and other outside Elements (railings, ornaments)**				
	Repair cracks > 6 mm using a welded mesh	sum	1	2,500	2,500
ASC-08	**Internal walls - concrete masonry units finishd with mortar plastering**				
	Reconstruct wall where cracks are greater than 6 mm	sum	1	2,500	2,500
	Repair small cracks with epoxy grout	sum	1	1,500	1,500
	Replace entire wall with new ring beam	m2	60	202	12,120
ASC-09	**False or Suspended Ceilings**				
	Replace and retrofit up to 50% of ceiling	m^2	223	40	8,920
ASC-10	**Condition and safety of floor coverings**				
	Allow for repairs to defective areas of the floor finish - allow for 10% of floor area	m^2	45	88	3,960
ASC-11	**Water Reserves**				
	Install potable water storage tanks to accommodate a 5-day supply	Litres	6,750	0.75	5,063
ASC-12	**Alternate water supply to regular water supply**				
	Install rainwater tanks with capacity equivalent to 30% of building consumption - include potable water backup connection	Litres	2,025	0.75	1,519
	Re-plumbing of building to facilitate dual water use - potable and non-potable	sum	1	7,500	7,500
	Installation of pump or upgrade of existing	nr	1	2,500	2,500
ASC-13	**Water Distribution System**				
	Supply and install 80 Gall solar water heaters on roof	nr	1	2,500	2,500
	Source, repair chronic pipe leaks and retrofit plumbing	sum	1	2,500	2,500
	Install low volume water fixtures	nr	6	800	4,800
	To Collection				**91,209**

Task No.	Interventions/Improvements	Unit	Quantity	Unit Rate (USD)	Total (USD)
ASC-14	**Wastewater System**				
	Empty and improve site septic units and filtration systems	sum	1	2,500	2,500
ASC-15	**Storm Drainage System - site**				
	Improve stormwater drainage on the compound	lm	103	110	11,330
ASC-16	**Alternate Sources of Electricity**				
	16.5 KVA generator plus automatic transfer switch	sum	1	25,000	25,000
	Allow for 500-litre fuel tank and accessories	sum	1	6,000	6,000
	Install roof mounted solar photovoltaic system as per legal statutes - 25 KW tied to the national grid	KW	25	3,500	87,500
ASC-17	**Safety of Electrical Equipment**				
	Re-inspection and certification of building as required	sum	1	2,500	2,500
	Undertake complete rewiring of the building as required	m^2	446	55	24,530
	Improve electrical panels with the change to residual-current devices	sum	1	1,000	1,000
ASC-18	**Lighting System**				
	Improve lighting using LED tubes and light fixtures	m^2	446	15	6,690
ASC-19	**Safety of HVAC Components**				
	Install a central AC system	m^2	446	175	78,050
	To Collection				**245,100**
	Collection				
		Page 1			91,209
		Page 2			245,100
	Base Cost				**336,309**
	Allowance for Demolition of works to be repaired - 3% of Base Cost	Sum			10,089
	Allowance for preliminaries - 7.5% of Base Cost	Sum			25,223
	Sub-total				**371,621**
	Allow 20% contingencies due to the nature of repairs and retrofit works	Sum			74,324
	Total				**445,946**
	Value Added Tax - 15% of Total				66,892
	Total Construction cost of repairs and retrofit works - All Saints Clinic				**512,838**

All Saints Fire Station

Building and Construction Data

Facility Name:	All Saints Fire Station	Year built:	
Building Name:	All Saints Fire Station	Year(s) remodeled:	
Building Address:	All Saints	Original Design Code:	OECS Building Code
Latitude:	17.0643993	Area (m2):	200
Longitude:	61.7963752	Length (m):	10
Use:	Military	Width (m):	20
Risk Category:	III	No. of storeys:	1
Occupancy Group:	Group A	Storey height (m):	3
No. of occupants:	15	Total height (m):	5
Roof shape:	Hip	Walls	Concrete Blocks
Roofing:	Metal sheeting	Structural system	Concrete Frame
Overall Condition	Average		
Comments	Although rated in average condition, works on this building are absolutely necessary as the overall score was only 56%		

Task No.	Interventions/Improvements	Unit	Quantity	Unit Rate (USD)	Total (USD)
ASFS-01	**Condition of the building - as per Engineer's drawings and specifications**				
	Reconstruct slab on grade by cutting out damaged section and replacing with engineered section	m^2	30	135	4,050
	Increase capacity of columns	nr	5	300	1,500
	Increase capacity of beams	lm	15	300	4,500
	Increasing flexural and shear strength by adding reinforcing bars and stirrups	sum	1	2,500	2,500
	Repair beams spalling and honeycombing as detailed	lm	6	150	900
ASFS-02	**Condition of construction materials - repair as detailed in drawings**				
	Repair small cracks with a high strength epoxy grout	sum	1	2,500	2,500
	Repair cracks > 6 mm using a welded mesh and non-shrink grout	sum	1	5,000	5,000
ASFS-03	**Structural Redundancy - as per typical detail and specifications**				
	Introduce new columns so as to improve redundancy of structure - location and design to be provided by Engineer	lm	20	495	9,900
ASFS-04	**Safety of Foundations - as per Engineer's details and specifications**				
	Reconstruct of severely damaged foundation walls, strip and spread footings	m^2	10	116	1,160
	Underpin subsided foundations				
	Improve the drainage of the area to prevent saturation of foundation soil - alignment identified on site and drainage plans	sum	1	1,000	1,000
	Introducing new load bearing members to the foundations to relieve the already overloaded members.	m^2	10	232	2,320
ASFS-05	**Structural Integrity of Roofs**				
	Retrofit roof with collars at top third of roof height	lm	300	16	4,800
	Strengthening overhangs at gable end walls	m^2	37	31	1,131
ASFS-06	**Exterior Doors, Exits and Entrances**				
	Protecting existing door with an impact-resistant covering	nr	4	1,000	4,000
	Fasten door frames into concrete surrounds with bolts or screws	nr	4	60	240
	Install threshold to prevent ingress of water	nr	4	100	400
ASFS-07	**Windows and shutters**				
	Replace existing windows with standard operable or fixed windows and install shutters with Miami Dade NOA	m^2	13	1,270	16,510
ASFS-08	**Other Elements of the Building Envelope**				
	Repair cracks > 6 mm using a welded mesh	sum	1	1,500	1,500
	Replace entire existing masonry wall with the inclusion of a ring beam	m^2	50	202	10,100
ASFS-09	**Safety of roofing**				
	Inspect roof and then Install hurricane straps at the eaves/ring beams and ridge to rafter connections	nr	210	5	1,050
	Fixing roof sheathing with minimum 75 mm screws into rafters and ridges	nr	600	1	600
	Decreasing spacing of fasteners, particularly at eaves, hips, ridge & edges of gable roofs	nr	420	1	420
ASFS-10	**Parapets and other outside Elements (railings, ornaments)**				
	Repair cracks > 6 mm using a welded mesh	sum	1	2,500	2,500
	Reconstruct wall where cracks are greater than 6 mm	m^2	50	202	10,100
	To Collection				**88,681**

Task No.	Interventions/Improvements	Unit	Quantity	Unit Rate (USD)	Total (USD)
ASFS-11	**Internal walls - concrete masonry units finishd with mortar plastering**				
	Reconstruct wall where cracks are greater than 6 mm	sum	1	2,500	2,500
	Repair small cracks with epoxy grout	sum	1	1,500	1,500
	Replace entire wall with new ring beam	m^2	60	202	12,120
ASFS-12	**False or Suspended Ceilings**				
	Replace and retrofit entire ceiling	m^2	200	80	16,000
ASFS-13	**Safety of stairways and Ramps**				
	Reconstruct entire staircase	sum	1	6,000.00	6000
	Reinstate balustrade bolted to stair treads	lm	10	600.00	6000
ASFS-14	**Condition and safety of floor coverings**				
	Allow for repairs to defective areas of the floor finish - allow for 100% of floor area	m^2	200	88	17,600
ASFS-15	**Water Reserves**				
	Install potable water storage tanks to accommodate a 5-day supply	Litres	6,750	0.75	5,063
ASFS-16	**Alternate water supply to regular water supply**				
	Install rainwater tanks with capacity equivalent to 30% of building consumption - include potable water backup connection	Litres	2,025	0.75	1,519
	Re-plumbing of building to facilitate dual water use - potable and non-potable	sum	1	7,500	7,500
	Installation of pump or upgrade of existing	nr	1	2,500	2,500
ASFS-17	**Water Distribution System**				
	Supply and install 80 Gall solar water heaters on roof	nr	1	2,500	2,500
	Source, repair chronic pipe leaks and retrofit plumbing	sum	1	2,500	2,500
	Install low volume water fixtures	nr	3	800	2,400
ASFS-18	**Wastewater System**				
	Empty and improve site septic units and filtration systems	sum	1	2,500	2,500
ASFS-19	**Storm Drainage System - site**				
	Improve stormwater drainage on the compound	lm	72	110	7,920
ASFS-20	**Storm Drainage System - roof and gutters**				
	Install guttering to new roof structure inclusive of down pipes	lm	62	50	3,100
ASFS-21	**Alternate Sources of Electricity**				
	16.5 KVA generator plus automatic transfer switch	sum	1	25,000	25,000
	Allow for 500-litre fuel tank and accessories	sum	1	6,000	6,000
	Install roof mounted solar photovoltaic system as per legal statutes - 15 KW tied to the national grid	KW	15	3,500	52,500
	To Collection				**182,721**

Task No.	Interventions/Improvements	Unit	Quantity	Unit Rate (USD)	Total (USD)
ASFS-22	**Safety of Electrical Equipment**				
	Re-inspection and certification of building as required	sum	1	3,500	3,500
	Undertake complete rewiring of the building as required	m^2	200	120	24,000
	Improve electrical panels with the change to residual-current devices	sum	1	1,000	1,000
ASFS-23	**Lighting System**				
	Improve lighting using LED tubes and light fixtures	m^2	200	40	8,000
ASFS-24	**Safety of HVAC Components**				
	Allow for AC split units in specific rooms and offices	nr	6	3,500	21,000
	To Collection				**57,500**
	Collection				
		Page 1			88,681
		Page 2			182,721
		Page 3			57,500
	Base Cost				**328,902**
	Allowance for Demolition of works to be repaired - 3% of Base Cost	Sum			9,867
	Allowance for preliminaries - 7.5% of Base Cost	Sum			24,668
	Sub-total				**363,436**
	Allow 20% contingencies due to the nature of repairs and retrofit works	Sum			72,687
	Total				**436,124**
	Value Added Tax - 15% of Total				65,419
	Total Construction cost of repairs and retrofit works - All Saints Fire Station				**501,542**

All Saints Police Station

Building and Construction Data

Facility Name:	All Saints Police Station	Year built:	
Building Name:	All Saints Police Station/ Magistrate's Court	Year(s) remodeled:	
Building Address:	All Saints	Original Design Code:	OECS Building Code
Latitude:	17.0644635	Area (m2):	760
Longitude:	61.7957966	Length (m):	15
Use:	Military	Width (m):	39
Risk Category:	IV	No. of storeys:	2
Occupancy Group:	Group A	Storey height (m):	10
No. of occupants:	25	Total height (m):	13
Roof shape:	Hip and Valley	Walls	Concrete Blocks
Roofing:	Metal Sheeting	Structural system	Concrete Frame
Overall Condition	Low		
Comments	Although the police station occupies part of one building with the Magistrate's Court, both sections are included. The section of the Police Station which is in a southwest alignment is in a very poor condition		

Task No.	Interventions/Improvements	Unit	Quantity	Unit Rate (USD)	Total (USD)
ASPS-01	**Condition of the building - as per Engineer's drawings and specifications**				
	Reconstruct slab on grade by cutting out damaged section and replacing with engineered section	m^2	114	135	15,390
	Increase capacity of columns	nr	5	300	1,500
	Increase capacity of beams	lm	15	300	4,500
	Increasing flexural and shear strength by adding reinforcing bars and stirrups	sum	1	2,500	2,500
	Repair beams spalling and honeycombing as detailed	lm	6	150	900
ASPS-02	**Condition of construction materials - repair as detailed in drawings**				
	Repair small cracks with a high strength epoxy grout	sum	1	2,500	2,500
	Repair cracks > 6 mm using a welded mesh	sum	1	5,000	5,000
ASPS-03	**Structural Redundancy - as per typical detail and specifications**				
	Introduce new columns so as to improve redundancy of structure - location and design to be provided by Engineer	lm	20	495	9,900
ASPS-04	**Safety of Foundations - as per Engineer's details and specifications**				
	Reconstruction of severely damaged foundation walls, strip and spread footings	m^2	10	116	1,160
	Improving the drainage of the area to prevent saturation of foundation soil	sum	1	1,000	1,000
	Introducing new load bearing members to the foundations to relieve the already overloaded members.	m^2	10	232	2,320
ASPS-05	**Structural Integrity of Roofs**				
	Retrofit roof with collars at top third of roof height	lm	300	16	4,800
	Strengthening overhangs at gable end walls	m^2	37	31	1,131
ASPS-06	**Exterior Doors, Exits and Entrances**				
	Protecting existing door with an impact-resistant covering	nr	4	1,000	4,000
	Fasten door frames into concrete surrounds with bolts or screws	nr	4	60	240
	Install threshold to prevent ingress of water	nr	4	100	400
ASPS-07	**Windows and shutters**				
	Replace existing windows with standard operable or fixed windows and install shutters with Miami Dade NOA	m^2	80	1,270	101,600
ASPS-08	**Other Elements of the Building Envelope**				
	Repair cracks > 6 mm using a welded mesh	sum	1	1,500	1,500
	Replace entire existing masonry wall with the inclusion of a ring beam	m^2	50	202	10,100
ASPS-09	**Safety of roofing**				
	Inspect roof and then Install hurricane straps at the eaves/ring beams and ridge to rafter connections	nr	210	5	1,050
	Fixing roof sheathing with minimum 75 mm screws into rafters and ridges	nr	600	1	600
	Decreasing spacing of fasteners, particularly at eaves, hips, ridge & edges of gable roofs	nr	420	1	420
ASPS-10	**Parapets and other outside Elements (railings, ornaments)**				
	Repair cracks > 6 mm using a welded mesh	sum	1	2,500	2,500
	Reconstruct wall where cracks are greater than 6 mm	m^2	50	202	10,100
ASPS-11	**Internal walls - concrete masonry units finishd with mortar plastering**				
	Reconstruct wall where cracks are greater than 6 mm	sum	1	2,500	2,500
	Repair small cracks with epoxy grout	sum	1	1,500	1,500
	Replace entire wall with new ring beam	m^2	60	202	12,120
	To Collection				**201,231**

Task No.	Interventions/Improvements	Unit	Quantity	Unit Rate (USD)	Total (USD)
ASPS-12	**False or Suspended Ceilings**				
	Replace and retrofit entire ceiling	m^2	760	80	60,800
	Safety of stairways and Ramps				
ASPS-13	Reconstruct entire staircase	Flights	8	5,000	40,000
	Reinstate balustrade bolted to stair treads	lm	26	500	13,000
ASPS-14	**Condition and safety of floor coverings**				
	Allow for repairs to defective areas of the floor finish - allow for 100% of floor area	m^2	760	88	66,880
ASPS-15	**Water Reserves**				
	Install potable water storage tanks to accommodate a 5-day supply - allowance for 50 occupants	Litres	112,500	0.75	84,375
ASPS-16	**Alternate water supply to regular water supply**				
	Install rainwater tanks with capacity equivalent to 30% of building consumption - include potable water backup connection	Litres	33,750	0.75	25,313
	Re-plumbing of building to facilitate dual water use - potable and non-potable	sum	1	7,500	7,500
	Installation of pump or upgrade of existing	nr	1	2,500	2,500
ASPS-17	**Water Distribution System**				
	Supply and install 80 Gall solar water heaters on roof	nr	1	2,500	2,500
	Source, repair chronic pipe leaks and retrofit plumbing	sum	1	4,000	4,000
	Install low volume water fixtures	nr	3	800	2,400
ASPS-18	**Wastewater System**				
	Empty and improve site septic units and filtration systems	sum	1	2,500	2,500
ASPS-19	**Storm Drainage System - site**				
	Improve stormwater drainage on the compound	lm	72	110	7,920
ASPS-20	**Storm Drainage System - roof and gutters**				
	Install guttering to roof structure inclusive of down pipes	lm	62	50	3,100
ASPS-21	**Alternate Sources of Electricity**				
	200 KVA generator plus automatic transfer switch	sum	1	70,000	70,000
	Allow for 500-litre fuel tank and accessories	sum	1	6,000	6,000
	Install roof mounted solar photovoltaic system as per legal statutes - 15 KW tied to the national grid	KW	15	3,500	52,500
ASPS-22	**Safety of Electrical Equipment**				
	Re-inspection and certification of building as required	sum	1	5,000	5,000
	Undertake complete rewiring of the building as required	m^2	760	120	91,200
	Improve electrical panels with the change to residual-current devices	sum	1	1,000	1,000
ASPS-23	**Lighting System**				
	Improve lighting using LED tubes and light fixtures	m^2	760	40	30,400
ASPS-24	**Safety of HVAC Components**				
	Allow for AC split units in specific rooms and offices	nr	20	3,500	70,000
	To Collection				**648,888**

Task No.	Interventions/Improvements	Unit	Quantity	Unit Rate (USD)	Total (USD)
	Collection				
		Page 1			201,231
		Page 2			648,888
	Base Cost				**850,118**
	Allowance for Demolition of works to be repaired - 3% of Base Cost	Sum			25,504
	Allowance for preliminaries - 7.5% of Base Cost	Sum			63,759
	Sub-total				**939,380**
	Allow 20% contingencies due to the nature of repairs and retrofit works	Sum			187,876
	Total				**1,127,257**
	Value Added Tax - 15% of Total				169,088
	Total Construction cost of repairs and retrofit works - All Saints Police Station				**1,296,345**

Analytical Services 1

Building and Construction Data

Facility Name:	Analytical Services 1	Year built:	
Building Name:	Agro Processing Building	Year(s) remodeled:	
Building Address:	Friar's Hill Road	Original Design Code:	
Latitude:	17.1486338	Area (m2):	320
Longitude:	61.8315398	Length (m):	10
Use:	Medical	Width (m):	8
Risk Category:	II	No. of storeys:	2
Occupancy Group:	Group A	Storey height (m):	10
No. of occupants:	12	Total height (m):	13
Roof shape:	Gable	Walls	Concrete Blocks
Roofing:	Metal Sheeting	Structural system	Concrete Frame
Overall Condition	Average		
Comments	This building is considered only marginally average with a score of 53%		

Task No.	Interventions/Improvements	Unit	Quantity	Unit Rate (USD)	Total (USD)
AS-01	**Structural Integrity of Roofs**				
	Replace entire roof with trusses and roof angle of 25 degrees	m^2	320	200	64,000
AS-02	**Exterior Doors, Exits and Entrances**				
	Protecting existing door with an impact-resistant covering	nr	2	1,000	2,000
	Install threshold to prevent ingress of water	nr	2	100	200
	Install one impact resistant door with minimum opening of 2.0 metres	nr	1	2,500	2,500
AS-03	**Windows and shutters**				
	Replace existing windows with standard operable or fixed windows and install shutters with Miami Dade NOA	m^2	11	1,270	13,970
AS-04	**Other Elements of the Building Envelope**				
	Repair cracks > 6 mm using a welded mesh	sum	1	1,500	1,500
	Replace entire wall with new ring beam	m^2	50	202	10,100
AS-05	**Internal walls - concrete masonry units finishd with mortar plastering**				
	Reconstruct wall where cracks are greater than 6 mm	sum	1	2,500	2,500
	Repair small cracks with epoxy grout	sum	1	1,500	1,500
	Replace entire existing masonry wall with the inclusion of a ring beam	m^2	60	202	12,120
AS-06	**False or Suspended Ceilings**				
	Replace and retrofit entire ceiling	m^2	320	80	25,600
AS-07	**Safety of stairways and Ramps**				
	Repair and retrofit up to 50% of the staircase	flights	1	5,000	5,000
AS-08	**Condition and safety of floor coverings**				
	Allow for repairs to defective areas of the floor finish - allow for 20% of floor area	m^2	64	88	5,632
AS-09	**Water Reserves**				
	Install potable water storage tanks to accommodate a 5-day supply - allowance for 12 occupants plus 4,500 litres for operations of the laboratory	Litres	9,900	0.75	7,425
AS-10	**Alternate water supply to regular water supply**				
	Install rainwater tanks with capacity equivalent to 30% of building consumption - include potable water backup connection	Litres	2,970	0.75	2,228
	Re-plumbing of building to facilitate dual water use - potable and non-potable	sum	1	7,500	7,500
	Installation of pump or upgrade of existing	nr	1	2,500	2,500
AS-11	**Water Distribution System**				
	Supply and install 80 Gall solar water heaters on roof	nr	1	2,500	2,500
	Source, repair chronic pipe leaks and retrofit plumbing	sum	1	2,500	2,500
	Install low volume water fixtures	nr	4	800	3,200
AS-12	**Wastewater System**				
	Empty and improve site septic units and filtration systems	sum	1	2,500	2,500
AS-13	**Storm Drainage System - site**				
	Improve stormwater drainage on the compound	lm	100	110	11,000
	Total Collection				**187,975**

Task No.	Interventions/Improvements	Unit	Quantity	Unit Rate (USD)	Total (USD)
AS-14	**Storm Drainage System - roof and gutters**				
	Repair guttering inclusive of down pipes - to 50% of the roof	lm	62	50	3,100
AS-15	**Alternate Sources of Electricity**				
	16.5 KVA generator plus automatic transfer switch	sum	1	25	25
	Allow for 500-litre fuel tank and accessories	sum	1	6,000	6,000
	Install roof mounted solar photovoltaic system as per legal statutes - 15 KW tied to the national grid	KW	15	3,500	52,500
AS-16	**Safety of Electrical Equipment**				
	Re-inspection and certification of building as required	sum	1	2,500	2,500
	Undertake complete rewiring of the building as required	m^2	320	120	38,400
	Improve electrical panels with the change to residual-current devices	sum	1	1,000	1,000
AS-17	**Lighting System**				
	Improve lighting using LED tubes and light fixtures	m^2	320	40	12,800
AS-18	**Safety of HVAC Components**				
	Allow for AC split units in specific rooms and offices	nr	15	3,500	52,500
	Total Collection				**168,825**
	Collection				
		Page 1			187,975
		Page 2			168,825
	Base Cost				**356,800**
	Allowance for Demolition of works to be repaired - 3% of Base Cost	Sum			10,704
	Allowance for preliminaries - 7.5% of Base Cost	Sum			26,760
	Sub-total				**394,263**
	Allow 20% contingencies due to the nature of repairs and retrofit works	Sum			78,853
	Total				**473,116**
	Value Added Tax - 15% of Total				70,967
	Total Construction cost of repairs and retrofit works - Analytical Services				**544,084**

Analytical Services 2

Building and Construction Data

Facility Name:	Analytical Services 2	Year built:	
Building Name:	Laboratory Building	Year(s) remodeled:	
Building Address:	Friar's Hill Road	Original Design Code:	
Latitude:	17.1486337	Area (m2):	680
Longitude:	61.8315422	Length (m):	25
Use:	Medical	Width (m):	12
Risk Category:	II	No. of storeys:	2
Occupancy Group:	Group A	Storey height (m):	10
No. of occupants:	12	Total height (m):	13
Roof shape:	Gable	Walls	Concrete Blocks
Roofing:	Metal Sheeting	Structural system	Concrete Frame
Overall Condition	Average		
Comments	This building is considered only marginally average with a score of 53%		

Task No.	Interventions/Improvements	Unit	Quantity	Unit Rate (USD)	Total (USD)
AS2-01	**Condition of construction materials - repair as detailed in drawings**				
	Repair small cracks with a high strength epoxy grout	sum	1	2,500	2,500
AS2-02	**Structural Integrity of Roofs**				
	Replace entire roof with trusses and roof angle of 25 degrees	m^2	680	200	136,000
AS2-03	**Exterior Doors, Exits and Entrances**				
	Protecting existing doors with an impact-resistant covering	nr	2	1,000	2,000
	Install threshold to prevent ingress of water	nr	2	100	200
AS2-04	**Windows and shutters**				
	Replace existing windows with standard operable or fixed windows and install shutters with Miami Dade NOA	m^2	20	1,270	25,400
AS2-05	**Other Elements of the Building Envelope**				
	Repair cracks > 6 mm using a welded mesh	sum	1	1,500	1,500
AS2-06	**Parapets and other outside Elements (railings, ornaments)**				
	Repair small cracks with epoxy grout	sum	1	1,500	1,500
AS2-07	**Internal walls - concrete masonry units finishd with mortar plastering**				
	Reconstruct wall where cracks are greater than 6 mm	sum	1	2,500	2,500
	Repair small cracks with epoxy grout	sum	1	1,500	1,500
	Replace entire wall with new ring beam	m^2	60	202	12,120
AS2-08	**False or Suspended Ceilings**				
	Replace and retrofit entire ceiling	m^2	680	80	54,400
AS2-09	**Safety of stairways and Ramps**				
	Reconstruct up to 50% of the staircase	flights	2	2,500	5,000
AS2-10	**Condition and safety of floor coverings**				
	Allow for repairs to defective areas of the floor finish - allow for 20% of floor area	m^2	136	88	11,968
AS2-11	**Water Reserves**				
	Install potable water storage tanks to accommodate a 5-day supply - allowance for 50 occupants	Litres	5,400	1	4,050
AS2-12	**Alternate water supply to regular water supply**				
	Install rainwater tanks with capacity equivalent to 30% of building consumption - include potable water backup connection	Litres	1,620	1	1,215
	Re-plumbing of building to facilitate dual water use - potable and non-potable	sum	1	7,500	7,500
	Installation of pump or upgrade of existing	nr	1	2,500	2,500
AS2-13	**Wastewater System**				
	Empty and improve site septic units and filtration systems	sum	1	2,500	2,500
AS2-14	**Storm Drainage System - site**				
	Improve stormwater drainage on the compound	lm	60	110	6,600
AS2-15	**Storm Drainage System - roof and gutters**				
	Install guttering to 50% roof structure inclusive of down pipes	lm	70	50	3,500
	Total Collection				**284,453**

Task No.	Interventions/Improvements	Unit	Quantity	Unit Rate (USD)	Total (USD)
AS2-15	**Alternate Sources of Electricity**				
	16.5 KVA generator plus automatic transfer switch	sum	1	2,500	2,500
	Allow for 500-litre fuel tank and accessories	sum	1	6,000	6,000
	Install roof mounted solar photovoltaic system as per legal statutes - 25 KW tied to the national grid	KW	25	3,500	87,500
AS2-16	**Safety of Electrical Equipment**				
	Re-inspection and certification of building as required	sum	1	5,000	5,000
	Undertake complete rewiring of the building as required	m^2	680	120	81,600
	Improve electrical panels with the change to residual-current devices	sum	1	1,000	1,000
AS2-17	**Lighting System**				
	Improve lighting using LED tubes and light fixtures	m^2	680	40	27,200
AS2-18	**Safety of HVAC Components**				
	Allow for AC split units in specific rooms and offices	nr	20	3,500	70,000
	Total Collection				**280,800**
	Collection				
		Page 1			284,453
		Page 2			280,800
	Base Cost				**565,253**
	Allowance for Demolition of works to be repaired - 3% of Base Cost	Sum			16,958
	Allowance for preliminaries - 7.5% of Base Cost	Sum			42,394
	Sub-total				**624,605**
	Allow 20% contingencies due to the nature of repairs and retrofit works	Sum			124,921
	Total				**749,525**
	Value Added Tax - 15% of Total				112,429
	Total Construction cost of repairs and retrofit works - Analytical Services 2				**861,954**

Antigua State College 1

Building and Construction Data

Facility Name:	Antigua State College 1	Year built:	
Building Name:	Administration Building	Year(s) remodeled:	
Building Address:	Valley Road	Original Design Code:	
Latitude:	17.10019	Area (m2):	660
Longitude:	61.83966	Length (m):	66
Use:	Educational	Width (m):	10
Risk Category:	III	No. of storeys:	2
Occupancy Group:	Group A	Storey height (m):	4
No. of occupants:	500	Total height (m):	8
Roof shape:	Gable	Walls	Wooden
Roofing:	Metal Sheeting	Structural system	Wooden Frame on concrete column
Overall Condition	Average		
Comments	Marginally average with a score of 58%. Condition suggest that works are required in the immediate to short term		

Task No.	Interventions/Improvements	Unit	Quantity	Unit Rate (USD)	Total (USD)
ASC1-01	**Condition of the building - as per Engineer's drawings and specifications**				
	Introduce new columns so as to improve redundancy of structure	lm	20	495	9,900
	Stiffening of an existing floor and tying it into the walls	sum	1	5,000	5,000
	Increase capacity of columns	nr	10	300	3,000
	Increase capacity of beams	lm	20	300	6,000
	Introduce new collector beams to improve capacity of floor	lm	20	495	9,900
	Increasing flexural and shear strength by adding reinforcing bars and stirrups	sum	1	2,500	2,500
	Repair beams spalling and honeycombing as detailed	lm	20	150	3,000
	Repair slab soffits for spalling and honeycombing	m^2	75	320	24,000
ASC1-02	**Safety of Foundations - as per Engineer's details and specifications**				
	Underpin subsided foundation	lm	100	90	9,000
ASC1-03	**Structural Integrity of Roofs**				
	Replace entire roof with trusses and roof angle of 25 degrees	m^2	660	200	132,000
ASC1-04	**Exterior Doors, Exits and Entrances**				
	Protecting existing door with an impact-resistant covering	nr	3	1,000	3,000
	Install threshold to prevent ingress of water	nr	3	100	300
ASC1-05	**Windows and shutters**				
	Replace existing windows with standard operable or fixed windows and install shutters with Miami Dade NOA	m^2	45	1,270	57,150
ASC1-06	**Other Elements of the Building Envelope**				
	Repair cracks > 6 mm using a welded mesh	sum	1	2,500	2,500
	Replace entire existing masonry wall with the inclusion of a ring beam	sum	1	5,000	5,000
ASC1-07	**Internal walls - concrete masonry units finishd with mortar plastering**				
	Replace entire wall with new ring beam on both floors	m^2	104	203	21,081
ASC1-08	**False or Suspended Ceilings**				
	Replace and retrofit entire ceiling	m^2	1,320	31	40,920
ASC1-09	**Safety of stairways and Ramps**				
	Reconstruct up to 50% of the staircase	sum	1	5,000	5,000
ASC1-10	**Condition and safety of floor coverings**				
	Allow for repairs to defective areas of the floor finish - allow for 20% of floor area	m^2	264	88	23,232
ASC1-11	**Water Reserves**				
	Install potable water storage tanks to accommodate a 5-day supply	Litres	225,000	0.75	168,750
	Installation of pump or upgrade of existing	nr	1	5,000	5,000
	Total Collection				**536,233**

Task No.	Interventions/Improvements	Unit	Quantity	Unit Rate (USD)	Total (USD)
ASC1-12	**Alternate water supply to regular water supply**				
	Install rainwater tanks with capacity equivalent to 30% of building consumption - include potable water backup connection	Litres	67,500	0.75	50,625
	Re-plumbing of building to facilitate dual water use - potable and non-potable	sum	1	10,000	10,000
ASC1-13	**Water Distribution System**				
	Supply and install 80 Gall solar water heaters on roof	nr	2	2,500	5,000
	Source, repair chronic pipe leaks and retrofit plumbing	sum	1	5,000	5,000
	Install low volume water fixtures	nr	20	800	16,000
ASC1-14	**Wastewater System**				
	Construct new septic tank system to maximum size of 30 m^3	m^3	30	250	7,500
	Install field drains for the new septic system	sum	1	5,000	5,000
ASC1-15	**Storm Drainage System - site**				
	Improve stormwater drainage on the compound	lm	245	110	26,950
ASC1-16	**Storm Drainage System - roof and gutters**				
	Install guttering to new roof structure inclusive of down pipes	lm	152	50	7,600
ASC1-17	**Alternate Sources of Electricity**				
	200 KVA generator plus automatic transfer switch	sum	1	70,000	70,000
	Allow for 500-litre fuel tank and accessories	sum	1	6,000	6,000
	Install roof mounted solar photovoltaic system as per legal statutes - 25 KW tied to the national grid	KW	25	3,500	87,500
ASC1-18	**Safety of Electrical Equipment**				
	Re-inspection and certification of building as required	sum	1	2,500	2,500
	Undertake up to 50% rewiring of the building as required	m^2	660	120	79,200
ASC1-19	**Lighting System**				
	Improve lighting using LED tubes and light fixtures	m^2	1,320	40	52,800
ASC1-20	**Safety of HVAC Components**				
	Allow for AC split units in specific rooms and offices	nr	20	3,000	60,000
	Total Collection				**491,675**
	Collection				
		Page 1			536,233
		Page 2			491,675
	Base Cost				**1,027,908**
	Allowance for Demolition of works to be repaired - 3% of Base Cost	Sum			30,837
	Allowance for preliminaries - 7.5% of Base Cost	Sum			77,093
	Sub-total				**1,135,839**
	Allow 20% contingencies due to the nature of repairs and retrofit works	Sum			227,168
	Total				**1,363,006**
	Value Added Tax - 15% of Total				204,451
	Total Construction cost of repairs and retrofit works - Antigua State College 1				**1,567,457**

Antigua State College 2

Building and Construction Data

Facility Name:	Antigua State College 2	Year built:	
Building Name:	Staff Room	Year(s) remodeled:	
Building Address:	Valley Road	Original Design Code:	
Latitude:	17.10036	Area (m2):	189
Longitude:	61.83935	Length (m): 21	21
Use:	Educational	Width (m): 9	9
Risk Category:	III	No. of storeys	1
Occupancy Group:	Group A	Storey height (m):	6
No. of occupants:	500	Total height (m):	8
Roof shape:	Gable	Walls	Timber
Roofing:	Metal Sheeting	Structural system	Timber
Overall Condition	Low		
Comments	This is a timber is an all timber building supported on block work piers and reinforced concrete column as the foundation. Structurally, the building appears inadequate and due to the level of retrofit required, reconstruction is being recommended		

Task No.	Interventions/Improvements	Unit	Quantity	Unit Rate (USD)	Total (USD)
ASC2-01	**Condition of the building - as per Engineer's drawings and specifications**				
	Re-constructing entire building	m^2	189	1,720	325,080
ASC2-02	**Windows and shutters**				
	Installing shutters with Miami Dade NOA	m^2	55	750	41,250
ASC2-03	**Water Reserves**				
	Install potable water storage tanks to accommodate a 5-day supply	Litres	9,000	0.75	6,750
	Installation of pump or upgrade of existing	nr	1	5,000	5,000
ASC2-04	**Alternate water supply to regular water supply**				
	Install rainwater tanks with capacity equivalent to 30% of building consumption - include potable water backup connection	Litres	2,700	0.75	2,025
	Re-plumbing of building to facilitate dual water use - potable and non-potable	sum	1	5,000	5,000
ASC2-05	**Water Distribution System**				
	Install low volume water fixtures	nr	6	800	4,800
	Supply and install 80 Gall solar water heaters on roof	nr	2	2,500	5,000
ASC2-06	**Wastewater System**				
	Construct new septic tank system to maximum size of 15 m^3	m^3	15	250	3,750
	Install field drains for the new septic system	sum	1	1,500	1,500
ASC2-07	**Alternate Sources of Electricity**				
	Allow for 500-litre fuel tank and accessories	sum	1	6,000	6,000
	Install roof mounted solar photovoltaic system as per legal statutes - 15 KW tied to the national grid	KW	15	3,500	52,500
	Total Collection				**458,655**
	Collection				
		Page 1			458,655
	Base Cost				**458,655**
	Allowance for Demolition of works to be repaired - 3% of Base Cost	Sum			13,760
	Allowance for preliminaries - 7.5% of Base Cost	Sum			34,399
	Sub-total				**506,814**
	Allow 20% contingencies due to the nature of repairs and retrofit works	Sum			101,363
	Total				**608,177**
	Value Added Tax - 15% of Total				91,226
	Total Construction cost of repairs and retrofit works - Antigua State College 2 (New)				**699,403**

Bendals Clinic

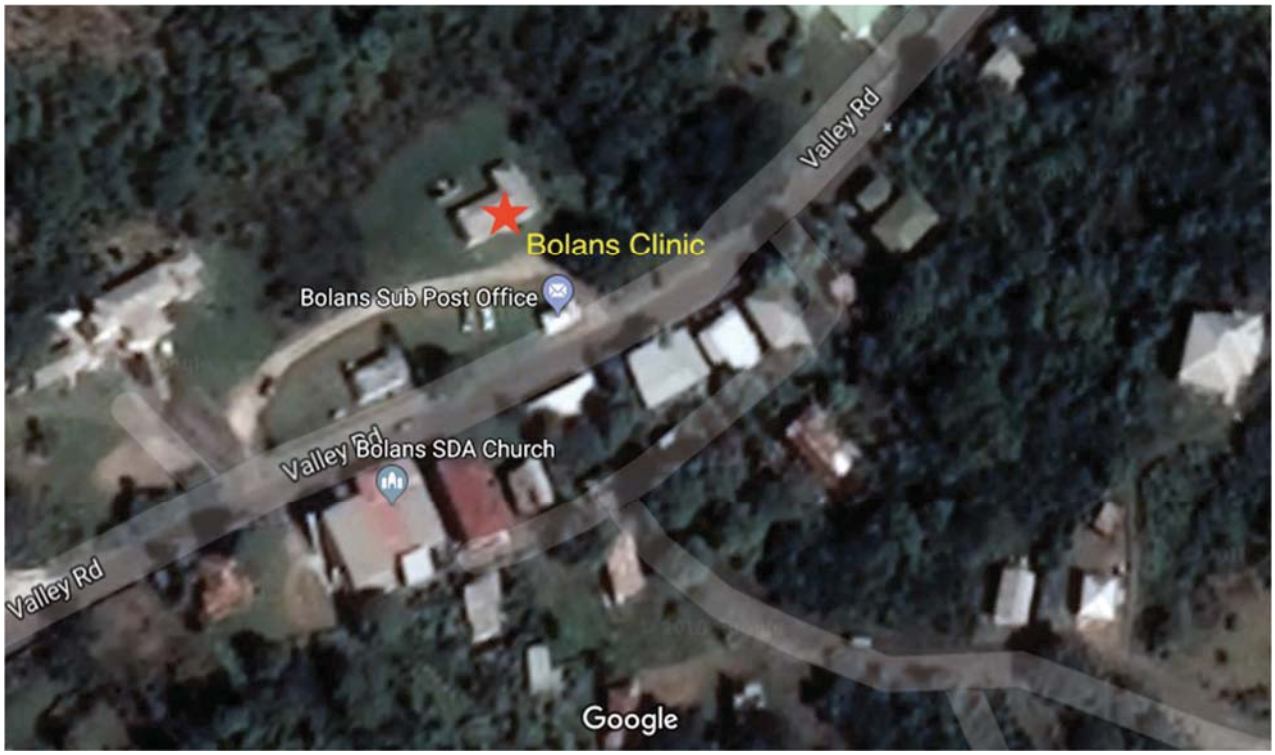
Building and Construction Data

Facility Name:	Bendals Clinic	Year built:	
Building Name:	Bendals Clinic	Year(s) remodeled:	
Building Address:	St John's, American road	Original Design Code:	OECS Building Code
Latitude:	17.1118254	Area (m2):	142
Longitude:	61.8318272	Length (m):	17.4
Use:	Government	Width (m):	8.2
Risk Category:	IV	No. of storeys:	2
Occupancy Group:	Group D	Storey height (m):	3.05
No. of occupants:	25	Total height (m):	7.9
Roof shape:	Hip	Walls	Concrete Blocks
Roofing:	Metal Sheeting	Structural system	Concrete Blocks
Overall Condition	Average		
Comments	Based on the Risk Category ascribed to the building, the retrofitting should be in the immediate term – particularly as the building only has a marginal average rating		

Task No.	Interventions/Improvements	Unit	Quantity	Unit Rate (USD)	Total (USD)
BC-01	**Exterior Doors, Exits and Entrances**				
	Replace existing windows with standard operable or fixed windows and install shutters with Miami Dade NOA	m^2	54	1,270	68,457
	Protecting existing door with an impact-resistant covering	nr	3	1,000	3,000
BC-02	**Windows and shutters**				
	Replace existing windows with standard operable or fixed windows and install shutters with Miami Dade NOA	m^2	39	1,270	49,572
BC-03	**Safety of roofing**				
	Retrofit roof with collars at top third of roof height	lm	372	8	2,975
	Retrofit roof with collars at top third of roof height	lm	113	20	2,267
BC-04	**Parapets and other outside Elements (railings, ornaments)**				
	Repair cracks > 6 mm using a welded mesh	sum	1	1,500	1,500
	Reconstruct wall where cracks are greater than 6 mm	m^2	20	202	4,040
BC-05	**Condition and safety of floor coverings**				
	Allow for repairs to defective areas of the floor finish - allow for 20% of floor area	m^2	28	88	2,499
BC-06	**Water Reserves**				
	Install potable water storage tanks to accommodate a 5-day supply - assumption of 40 users per day	litres	18,200	0.75	13,650
BC-07	**Alternate water supply to regular water supply**				
	Install rainwater tanks with capacity equivalent to 30% of building consumption - include potable water backup connection	litres	5,460	0.75	4,095
	Re-plumbing of building to facilitate dual water use - potable and non-potable	sum	1	7,500	7,500
	Installation of pump or upgrade of existing	nr	1	2,500	2,500
BC-08	**Water Distribution System**				
	Source, repair chronic pipe leaks and retrofit plumbing	sum	1	1,500	1,500
	Installation of pump or upgrade of existing	nr	1	2,000	2,000
	Supply and install 80 Gall solar water heaters on roof	nr	1	2,500	2,500
BC-09	**Wastewater System**				
	Construct new septic tank system to maximum size of 15 m^3	m^3	15	250	3,750
	Install low volume water fixtures	nr	4	800	3,200
	Install solar hot water units	nr	1	2,625	2,625
BC-10	**Storm Drainage System - site**				
	Improve stormwater drainage on the compound	lm	75	110	8,250
BC-11	**Storm Drainage System - roof and gutters**				
	Install guttering to roof structure inclusive of down pipes	lm	50	50	2,500
BC-12	**Alternate Sources of Electricity**				
	16.5 KVA generator plus automatic transfer switch	sum	1	25,000	25,000
	Allow for 500-litre fuel tank and accessories	sum	1	6,000	6,000
	Install roof mounted solar photovoltaic system as per legal statutes - 15 KW tied to the national grid	KW	15	3,500	52,500
	To Collection				**271,880**

Task No.	Interventions/Improvements	Unit	Quantity	Unit Rate (USD)	Total (USD)
BC-13	**Safety of Electrical Equipment**				
	Re-inspection and certification of building as required	sum	1	3,500	3,500
	Improve electrical panels with the change to residual-current devices	sum	1	1,000	1,000
BC-14	**Lighting System**				
	Improve lighting using LED tubes and light fixtures	m^2	142	40	5,680
	To Collection				**10,180**
	Collection				
		Page 1			271,880
		Page 2			10,180
	Base Cost				**282,060**
	Allowance for Demolition of works to be repaired - 3% of Base Cost	Sum			8,462
	Allowance for preliminaries - 7.5% of Base Cost	Sum			21,155
	Sub-total				**311,677**
	Allow 20% contingencies due to the nature of repairs and retrofit works	Sum			62,335
	Total				**374,012**
	Value Added Tax - 15% of Total				56,102
	Total Construction cost of repairs and retrofit works- Bendals Clinic				**374,012**

Bolans Clinic



Building and Construction Data

Facility Name:	Bolans Clinic	Year built:	
Building Name:	Bolans Clinic	Year(s) remodelled:	
Building Address:	Bolans Main Road	Original Design Code:	Unknown
Latitude:	17.0643005	Area (m2):	114
Longitude:	61.881495	Length (m):	15.5
Use:	Medical	Width (m):	7.4
Risk Category:	IV	No. of storeys:	Single
Occupancy Group:	Group D	Storey height (m):	2.7
No. of occupants:	35	Total height (m):	4.8
Roof shape:	Hip	Walls	Concrete Blocks
Roofing:	Metal Sheeting	Structural system	Concrete Frame
Overall Condition	Low		
Comments	Given the Risk Category and the rating of Low, retrofit needs to be in the immediate term		

Task No.	Interventions/Improvements	Unit	Quantity	Unit Rate (USD)	Total (USD)
BC-01	**Safety of Foundations - as per Engineer's details and specifications**				
	Reconstruct severely damaged foundation walls, strip and spread footings	m^2	10	116	1,160
	Underpin subsided foundation				
	Improve the drainage of the area to prevent saturation of foundation soil - alignment identified on site and drainage plans	sum	1	1,000	1,000
	Introducing new load bearing members to the foundations to relieve the already overloaded members.	m^2	10	232	2,320
BC-02	**Structural Integrity of Roofs**				
	Replace and retrofit entire ceiling	m^2	114	200	22,800
BC-03	**Exterior Doors, Exits and Entrances**				
	Protecting existing door with an impact-resistant covering	nr	3	1,000	3,000
	Install threshold to prevent ingress of water	nr	3	200	600
BC-04	**Windows and shutters**				
	Replace existing windows with standard operable or fixed windows and install shutters with Miami Dade NOA	m^2	27	1,270	34,229
BC-05	**Other Elements of the Building Envelope**				
	Repair cracks > 6 mm using a welded mesh	lm	100	16	1,587
	Replace entire existing masonry wall with the inclusion of a ring beam	m^2	20	191	3,817
BC-06	**Internal walls - concrete masonry units finishd with mortar plastering**				
	Reconstruct wall where cracks are greater than 6 mm	sum	1	2,500	2,500
	Repair small cracks with epoxy grout	sum	1	1,500	1,500
	Replace entire wall with new ring beam	m^2	20	202	4,040
BC-07	**False or Suspended Ceilings**				
	Replace and retrofit entire ceiling - drywall	m^2	114	80	9,120
BC-08	**Condition and safety of floor coverings**				
	Allow for repairs to defective areas of the floor finish - allow for 20% of floor area	m^2	23	88	2,006
BC-09	**Water Reserves**				
	Install potable water storage tanks to accommodate a 5-day supply - assuming an average daily occupancy of 30	Litres	13,650	0.75	10,238
BC-10	**Alternate water supply to regular water supply**				
	Install rainwater tanks with capacity equivalent to 30% of building consumption - include potable water backup connection	Litres	4,095	0.75	3,071
	Re-plumbing of building to facilitate dual water use - potable and non-potable	sum	1	5,000	5,000
	Source, repair chronic pipe leaks and retrofit plumbing	sum	1	2,500	2,500
	Installation of pump or upgrade of existing	sum	1	2,000	2,000
	To Collection				**112,487**

Task No.	Interventions/Improvements	Unit	Quantity	Unit Rate (USD)	Total (USD)
BC-11	**Water Distribution System**				
	Supply and install 80 Gall solar water heaters on roof	nr	1	2,500	2,500
	Source, repair chronic pipe leaks and retrofit plumbing	sum	1	1,000	1,000
	Install low volume water fixtures	nr	4	800	3,200
BC-12	**Wastewater System**				
	Construct new septic tank system to maximum size of 15 m^3	m^3	15	250	3,750
BC-13	**Storm Drainage System - site**				
	Improve stormwater drainage on the compound	lm	40	110	4,400
BC-14	**Storm Drainage System - roof and gutters**				
	Install guttering to new roof structure inclusive of down pipes	lm	50	50	2,500
BC-15	**Alternate Sources of Electricity**				
	16.5 KVA generator plus automatic transfer switch	sum	1	25,000	25,000
	Allow for 500-litre fuel tank and accessories	sum	1	6,000	6,000
	Install roof mounted solar photovoltaic system as per legal statutes - 15 KW tied to the national grid	KW	15	3,500	52,500
BC-16	**Safety of Electrical Equipment**				
	Re-inspection and certification of building as required	sum	1	1,500	1,500
	Undertake complete rewiring of the building as required	m^2	114	120	13,680
	Improve electrical panels with the change to residual-current devices	sum	1	1,000	1,000
BC-17	**Lighting System**				
	Improve lighting using LED tubes and light fixtures	sum	114	40	4,560
	To Collection				**121,590**
	Collection				
		Page 1			112,487
		Page 2			121,590
	Base Cost				**234,077**
	Allowance for Demolition of works to be repaired - 3% of Base Cost	Sum			7,022
	Allowance for preliminaries - 7.5% of Base Cost	Sum			17,556
	Sub-total				**258,655**
	Allow 20% contingencies due to the nature of repairs and retrofit works	Sum			51,731
	Total				**310,386**
	Value Added Tax - 15% of Total				46,558
	Total Construction cost of repairs and retrofit works- Bolans Clinic				**356,944**

Clearview Psychiatric Hospital 1

Building and Construction Data

Facility Name:	Clearview Psychiatric Hospital 1	Year built:	
Building Name:	Female Ward	Year(s) remodeled:	
Building Address:	Simon Bolivar Dr	Original Design Code:	
Latitude:	17.1219315	Area (m2):	580
Longitude:	61.8276335	Length (m):	29 m
Use:	Medical	Width (m):	20 m
Risk Category:	IV	No. of storeys:	Single
Occupancy Group:	Group B	Storey height (m):	3.35 m
No. of occupants:	150	Total height (m):	4.5 m
Roof shape:	Gable	Walls	Concrete Blocks
Roofing:	Metal Sheeting	Structural system	Concrete Frame
Overall Condition	Average		
Comments	Retrofit is likely required in the immediate to short term, particularly given the Risk Category of IV		

Task No.	Interventions/Improvements	Unit	Quantity	Unit Rate (USD)	Total (USD)
CH1-01	**Structural Integrity of Roofs**				
	Replace entire roof with trusses and roof angle of 25 degrees	m^2	580	125	72,500
CH1-02	**Exterior Doors, Exits and Entrances**				
	Replace doors by providing an impact-resistant door	nr	6	1,000	6,000
	Fasten door frames into concrete surrounds with bolts or screws	nr	6	30	180
	Install threshold to prevent ingress of water	nr	6	100	600
CH1-03	**Windows and shutters**				
	Replace existing windows with standard operable or fixed windows and install shutters with Miami Dade NOA	m^2	31	1,270	39,370
CH1-04	**Other Elements of the Building Envelope**				
	Repair small cracks with epoxy grout	sum	1	2,500	2,500
CH1-05	**Safety of roofing**				
	Replace entire roof with trusses and roof angle of 25 degrees	m^2	580	200	116,000
CH1-06	**Internal walls - concrete masonry units finishd with mortar plastering**				
	Repair cracks > 6 mm using a welded mesh	sum	1	5,000	5,000
CH1-07	**False or Suspended Ceilings**				
	Replace and retrofit entire ceiling	m^2	580	80	46,400
CH1-08	**Condition and safety of floor coverings**				
	Allow for repairs to defective areas of the floor finish - allow for 50% of floor area	m^2	290	88	25,520
CH1-09	**Water Reserves**				
	Install potable water storage tanks to accommodate a 5-day supply	Litres	67,500	0.75	50,625
CH1-10	**Alternate water supply to regular water supply**				
	Install rainwater tanks with capacity equivalent to 30% of building consumption - include potable water backup connection	Litres	20,250	0.75	15,188
	Re-plumbing of building to facilitate dual water use - potable and non-potable	sum	1	7,500	7,500
	Installation of pump or upgrade of existing	nr	1	2,500	2,500
CH1-11	**Water Distribution System**				
	Supply and install 80 Gall solar water heaters on roof	nr	1	2,500	2,500
	Source, repair chronic pipe leaks and retrofit plumbing	sum	1	5,000	5,000
	Install low volume water fixtures	nr	8	800	6,400
CH1-12	**Wastewater System**				
	Construct new septic tank system to maximum size of 15 m3	m^3	15	250	3,750
	Total Collection				**407,533**

Task No.	Interventions/Improvements	Unit	Quantity	Unit Rate (USD)	Total (USD)
CH1-13	**Storm Drainage System - site**				
	Improve stormwater drainage on the compound	sum	100	110	11,000
CH1-14	**Storm Drainage System - roof and gutters**				
	Replace roof guttering	lm	58	60	3,480
CH1-15	**Alternate Sources of Electricity**				
	200 KVA generator plus automatic transfer switch	sum	1	70,000	70,000
	Allow for 500-litre fuel tank and accessories	sum	1	6,000	6,000
	Install roof mounted solar photovoltaic system as per legal statutes - 25 KW tied to the national grid	KW	25	3,500	87,500
CH1-16	**Safety of Electrical Equipment**				
	Up to 50% of the building needs to be rewired	m^2	290	120	34,800
CH1-17	**Lighting System**				
	Improve lighting using LED tubes and light fixtures	m^2	580	40	23,200
CH1-18	**Safety of HVAC Components**				
	Allow for AC split units in specific rooms and offices	nr	6	3,500	21,000
	Total Collection				**256,980**
	Collection				
		Page 1			407,533
		Page 2			256,980
	Base Cost				**664,513**
	Allowance for Demolition of works to be repaired - 3% of Base Cost	Sum			19,935
	Allowance for preliminaries - 7.5% of Base Cost	Sum			49,838
	Sub-total				**734,286**
	Allow 20% contingencies due to the nature of repairs and retrofit works	Sum			146,857
	Total				**881,144**
	Value Added Tax - 15% of Total				132,172
	Total Construction cost of repairs and retrofit works - Clearview Hospital 1				**1,013,315**

Clearview Psychiatric Hospital 2

Building and Construction Data

Facility Name:	Clearview Psychiatric Hospital 2	Year built:	
Building Name:	Occupational Therapy & Macahlay Ward	Year(s) remodeled:	
Building Address:	Simon Bolivar Dr	Original Design Code:	
Latitude:	17.1222141	Area (m2): 418	203
Longitude:	61.8276148	Length (m): 30	17
Use:	Medical	Width (m): 26	13
Risk Category:	IV	No. of storeys:	Single
Occupancy Group:	Group B	Storey height (m):	4
No. of occupants:	30	Total height (m):	4
Roof shape:	Hip and Valley	Walls	Concrete Blocks
Roofing:	Metal Sheeting	Structural system	Concrete Frame
Overall Condition	Average		
Comments	Retrofit is likely required in the immediate to short term, particularly given the Risk Category of IV		

Task No.	Interventions/Improvements	Unit	Quantity	Unit Rate (USD)	Total (USD)
CH2-01	**Condition of the building - as per Engineer's drawings and specifications**				
	Repair small cracks with epoxy grout	sum	1	1,500	1,500
CH2-02	**Condition of construction materials - repair as detailed in drawings**				
	Repair small cracks with a high strength epoxy grout	sum	1	1,500	1,500
	Repair cracks > 6 mm using a welded mesh and non-shrink grout	sum	1	2,500	2,500
CH2-03	**Structural Integrity of Roofs**				
	Inspect roof and then Install hurricane straps at the eaves/ring beams and ridge to rafter connections	sum	1	2,500	2,500
	Roof coverings capable of resisting high winds	m^2	203	68	13,804
	Fixing roof sheathing with minimum 75 mm screws into rafters and ridges	sum	1	1,000	1,000
	Decreasing spacing of fasteners, particularly at eaves, hips, ridge & edges of gable roofs	sum	1	500	500
	Retrofit roof with collars at top third of roof height	lm	100	22	2,200
	Strengthening overhangs at gable end walls	sum	1	2,000	2,000
CH2-04	**Exterior Doors, Exits and Entrances**				
	Protecting existing door with an impact-resistant covering	nr	8	1,000	8,000
	Install threshold to prevent ingress of water	nr	8	100	800
	Fasten door frames into concrete surrounds with bolts or screws	nr	8	30	240
CH2-05	**Windows and shutters**				
	Replace existing windows with standard operable or fixed windows and install shutters with Miami Dade NOA	m^2	31	750	23,250
CH2-06	**Other Elements of the Building Envelope**				
	Repair small cracks with epoxy grout	sum	1	1,500	1,500
CH2-07	**Safety of roofing**				
	install gypsum board ceiling	m^2	203	80	16,240
CH2-08	**Internal walls - concrete masonry units finishd with mortar plastering**				
	Repair cracks > 6 mm using a welded mesh	m^2	1	5,000	5,000
CH2-09	**False or Suspended Ceilings**				
	Replace and retrofit entire ceiling	m^2	580	80	46,400
CH2-10	**Condition and safety of floor coverings**				
	Allow for repairs to defective areas of the floor finish - allow for 20% of floor area	m^2	116	88	10,208
CH2-11	**Water Reserves**				
	Install potable water storage tanks to accommodate a 5-day supply	Litres	67,500	0.75	50,625
	Total Collection				**189,767**

Task No.	Interventions/Improvements	Unit	Quantity	Unit Rate (USD)	Total (USD)
CH2-12	**Alternate water supply to regular water supply**				
	Install rainwater tanks with capacity equivalent to 30% of building consumption - include potable water backup connection	Litres	20,250	0.75	15,188
	Re-plumbing of building to facilitate dual water use - potable and non-potable	sum	1	5,000	5,000
	Installation of pump or upgrade of existing	nr	1	2,500	2,500
CH2-13	**Water Distribution System**				
	Supply and install 80 Gall solar water heaters on roof	nr	1	2,500	2,500
	Source, repair chronic pipe leaks and retrofit plumbing	sum	1	5,000	5,000
	Install low volume water fixtures	nr	4	800	3,200
CH2-14	**Wastewater System**				
	Construct new septic tank system to maximum size of 15 m3	m^3	15	250	3,750
CH2-15	**Storm Drainage System - site**				
	Improve stormwater drainage on the compound	lm	150	110	16,500
CH2-16	**Storm Drainage System - roof and gutters**				
	Install guttering to roof structure inclusive of down pipes	lm	100	60	6,000
CH2-17	**Alternate Sources of Electricity**				
	16.5 KVA generator plus automatic transfer switch	sum	1	25,000	25,000
	Allow for 500-litre fuel tank and accessories	sum	1	6,000	6,000
	Install roof mounted solar photovoltaic system as per legal statutes - 25 KW tied to the national grid	KW	25	3,500	87,500
CH2-18	**Safety of Electrical Equipment**				
	Undertake 50% rewiring of the building as required	m^2	102	120	12,240
CH2-19	**Lighting System**				
	Improve lighting using LED tubes and light fixtures	m^2	203	40	8,120
CH2-20	**Safety of HVAC Components**				
	Allow for AC split units in specific rooms and offices	nr	6	3,500	21,000
	Total Collection				**219,498**
	Collection				
		Page 1			189,767
		Page 2			219,498
	Base Cost				**409,265**
	Allowance for Demolition of works to be repaired - 3% of Base Cost	Sum			12,278
	Allowance for preliminaries - 7.5% of Base Cost	Sum			30,695
	Sub-total				**452,237**
	Allow 20% contingencies due to the nature of repairs and retrofit works	Sum			90,447
	Total				**542,685**
	Value Added Tax - 15% of Total				81,403
	Total Construction cost of repairs and retrofit works - Clearview Hospital 2				**624,087**

Clearview Psychiatric Hospital 3

Building and Construction Data

Facility Name:	Clearview Psychiatric Hospital 3	Year built:	
Building Name:	Dormitory	Year(s) remodeled:	
Building Address:	Simon Bolivar Dr	Original Design Code:	
Latitude:	17.1221714	Area (m2):	159
Longitude:	61.8275631	Length (m):	19.8
Use:	Medical	Width (m):	8
Risk Category:	IV	No. of storeys:	1
Occupancy Group:	Group B	Storey height (m):	
No. of occupants:	150	Total height (m):	4
Roof shape:	Hip and Valley	Walls	Concrete Blocks
Roofing:	Metal Sheeting	Structural system	Concrete Frame
Overall Condition	Average		
Comments	Retrofit is likely required in the immediate to short term, particularly given the Risk Category of IV		

Task No.	Interventions/Improvements	Unit	Quantity	Unit Rate (USD)	Total (USD)
CH3-01	**Structural Integrity of Roofs**				
	Inspect roof and then Install hurricane straps at the eaves/ring beams and ridge to rafter connections	sum	1	2,500	2,500
	Roof coverings capable of resisting high winds	m^2	192	68	13,056
	Fixing roof sheathing with minimum 75 mm screws into rafters and ridges	sum	1	1,000	1,000
	Decreasing spacing of fasteners, particularly at eaves, hips, ridge & edges of gable roofs	sum	1	500	500
	Strengthening overhangs at gable end walls	sum	1	2,000	2,000
	Retrofit roof with collars at top third of roof height	lm	100	22	2,200
CH3-02	**Exterior Doors, Exits and Entrances**				
	Protecting existing door with an impact-resistant covering	nr	4	1,000	4,000
	Install threshold to prevent ingress of water	nr	4	100	400
	Fasten door frames into concrete surrounds with bolts or screws	nr	4	30	120
CH3-03	**Windows and shutters**				
	Replace existing windows with standard operable or fixed windows and install shutters with Miami Dade NOA	m^2	31	750	23,250
CH3-04	**Other Elements of the Building Envelope**				
	Repair small cracks with epoxy grout	sum	1	1,500	1,500
	Repair cracks > 6 mm using a welded mesh	sum	1	2,500	2,500
CH3-05	**Internal walls - concrete masonry units finishd with mortar plastering**				
	Repair cracks > 6 mm using a welded mesh	m^2	1	500	500
CH3-06	**False or Suspended Ceilings**				
	Install gypsum board ceiling	m^2	192	80	15,360
CH3-07	**Condition and safety of floor coverings**				
	Allow for repairs to defective areas of the floor finish - allow for 20% of floor area	m^2	38	88	3,379
CH3-08	**Water Reserves**				
	Install potable water storage tanks to accommodate a 5-day supply	Litres	27,000	0.75	20,250
	Install rainwater tanks with capacity equivalent to 30% of building consumption - include potable water backup connection	Litres	8,100	0.75	6,075
	Re-plumbing of building to facilitate dual water use - potable and non-potable	sum	1	7,500	7,500
	Installation of pump or upgrade of existing	nr	1	2,500	2,500
CH3-09	**Water Distribution System**				
	Supply and install 80 Gall solar water heaters on roof	nr	1	2,500	2,500
	Source, repair chronic pipe leaks and retrofit plumbing	sum	1	5,000	5,000
	Install low volume water fixtures	nr	6	800	4,800
CH3-10	**Wastewater System**				
	Construct new septic tank system to maximum size of 15 m^3	m^3	15	250	3,750
	Total Collection				**124,640**

Task No.	Interventions/Improvements	Unit	Quantity	Unit Rate (USD)	Total (USD)
CH3-11	**Storm Drainage System - site**				
	Improve stormwater drainage on the compound	lm	39	110	4,340
CH3-12	**Storm Drainage System - roof and gutters**				
	Install guttering to roof structure inclusive of down pipes	lm	26	60	1,578
CH3-13	**Alternate Sources of Electricity**				
	16.5 KVA generator plus automatic transfer switch	sum	1	25,000	25,000
	Allow for 500-litre fuel tank and accessories	sum	1	6,000	6,000
	Install roof mounted solar photovoltaic system as per legal statutes - 15 KW tied to the national grid	KW	15	3,500	52,500
CH3-14	**Safety of Electrical Equipment**				
	Re-inspection and certification of building required as required	sum	1	3,500	3,500
	Undertake up to 50% rewiring of the building as required	m^2	96	120	11,520
	Improve electrical panels with the change to residual-current devices	sum	1	1,000	1,000
CH3-15	**Lighting System**				
	Improve lighting using LED tubes and light fixtures	m^2	192	40	7,680
CH3-16	**Safety of HVAC Components**				
	Allow for AC split units in specific rooms and offices	nr	6	3,500	21,000
	Total Collection				**134,118**
	Collection				
		Page 1			124,640
		Page 2			134,118
	Base Cost				**258,758**
	Allowance for Demolition of works to be repaired - 3% of Base Cost	Sum			7,763
	Allowance for preliminaries - 7.5% of Base Cost	Sum			19,407
	Sub-total				**285,927**
	Allow 20% contingencies due to the nature of repairs and retrofit works	Sum			57,185
	Total				**343,113**
	Value Added Tax - 15% of Total				51,467
	Total Construction cost of repairs and retrofit works - Clearview Hospital 3				**394,580**

Clearview Psychiatric Hospital 4

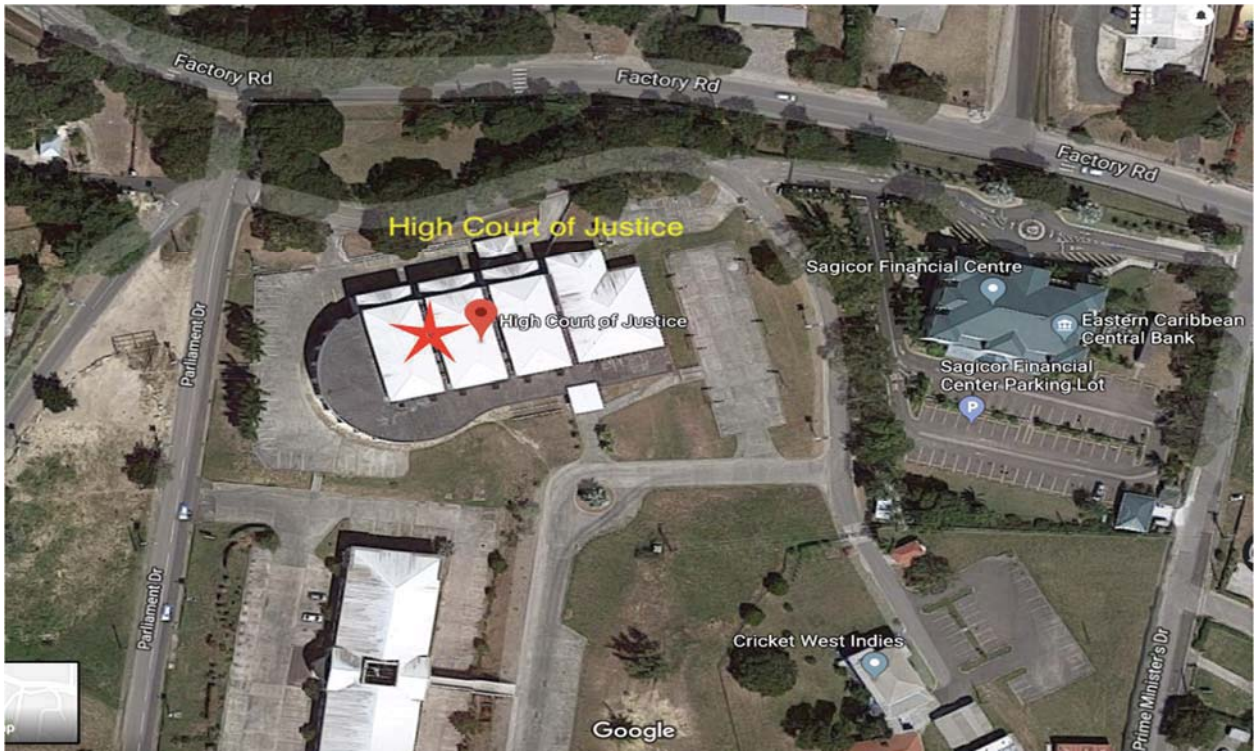
Building and Construction Data

Facility Name:	Clearview Psychiatric Hospital 4	Year built:	
Building Name:	Clear View Hospital	Year(s) remodeled:	
Building Address:	Simon Bolivar Dr	Original Design Code:	
Latitude:	17.1223653	Area (m2):	270
Longitude:	61.8266947	Length (m):	32
Use:	Medical	Width (m):	9
Risk Category:	IV	No. of storeys:	Single
Occupancy Group:	Group B	Storey height (m):	3.35
No. of occupants:	150	Total height (m):	4
Roof shape:	Hip	Walls	Concrete Blocks
Roofing:	Metal Sheeting	Structural system	Concrete Frame
Overall Condition	Average		
Comments	Retrofit is likely required in the immediate to short term, particularly given the Risk Category of IV. Additionally, the rating is only a marginal average		

Task No.	Interventions/Improvements	Unit	Quantity	Unit Rate (USD)	Total (USD)
CH4-01	**Condition of the building - as per Engineer's drawings and specifications**				
	Structural retrofit of building and elements	sum	1	20,000	20,000
CH4-02	**Condition of construction materials - repair as detailed in drawings**				
	Repair small cracks with a high strength epoxy grout	sum	1	1,500	1,500
CH4-03	**Structural Integrity of Roofs**				
	Replace entire roof with trusses and roof angle of 25 degrees	m^2	270	200	54,000
CH4-04	**Exterior Doors, Exits and Entrances**				
	Protecting existing door with an impact-resistant covering	nr	3	1,000	3,000
	Install threshold to prevent ingress of water	nr	3	100	300
	Fasten door frames into concrete surrounds with bolts or screws	nr	3	30	90
CH4-05	**Windows and shutters**				
	Replace existing windows with standard operable or fixed windows and install shutters with Miami Dade NOA	m^2	13	1,270	16,510
CH4-06	**Other Elements of the Building Envelope**				
	Repair small cracks with epoxy grout	sum	1	1,500	1,500
CH4-07	**Internal walls - concrete masonry units finishd with mortar plastering**				
	Repair cracks > 6 mm using a welded mesh	sum	1	5,000	5,000
CH4-08	**False or Suspended Ceilings**				
	Install gypsum board ceiling	m^2	270	80	21,600
CH4-09	**Condition and safety of floor coverings**				
	Allow for repairs to defective areas of the floor finish - allow for 20% of floor area	m^2	116	88	10,208
CH4-10	**Water Reserves**				
	Install potable water storage tanks to accommodate a 5-day supply	Litres	67,500	0.75	50,625
CH4-11	**Alternate water supply to regular water supply**				
	Install rainwater tanks with capacity equivalent to 30% of building consumption - include potable water backup connection	Litres	20,250	0.75	15,188
	Re-plumbing of building to facilitate dual water use - potable and non-potable	sum	1	10,000	10,000
	Installation of pump or upgrade of existing	nr	1	2,500	2,500
CH4-12	**Water Distribution System**				
	Supply and install 80 Gall solar water heaters on roof	nr	1	2,500	2,500
	Source, repair chronic pipe leaks and retrofit plumbing	sum	1	5,000	5,000
	Install low volume water fixtures	nr	6	800	4,800
	Total Collection				**224,321**

Task No.	Interventions/Improvements	Unit	Quantity	Unit Rate (USD)	Total (USD)
CH4-13	**Wastewater System**				
	Construct new septic tank system to maximum size of 15 m^3	m^3	15	250	3,750
CH4-14	**Storm drainage System - site**				
	Improve stormwater drainage on the compound	lm	123	110	13,530
CH4-15	**Storm Drainage System - roof and gutters**				
	Install guttering to roof structure inclusive of down pipes	lm	82	60	4,920
CH4-16	**Alternate Sources of Electricity**				
	16.5 KVA generator plus automatic transfer switch	sum	1	25,000	25,000
	Allow for 500-litre fuel tank and accessories	sum	1	6,000	6,000
	Install roof mounted solar photovoltaic system as per legal statutes - 25 KW tied to the national grid	sum	1	50,000	50,000
CH4-17	**Safety of Electrical Equipment**				
	Undertake 50% rewiring of the building as required	m^2	135	120	16,200
CH4-18	**Lighting System**				
	Improve lighting using LED tubes and light fixtures	m^2	270	40	10,800
CH4-19	**Safety of HVAC Components**				
	Allow for AC split units in specific rooms and offices	nr	6	3,500	21,000
	Total Collection				**151,200**
	Collection				
		Page 1			224,321
		Page 2			151,200
	Base Cost				**375,521**
	Allowance for Demolition of works to be repaired - 3% of Base Cost	Sum			11,266
	Allowance for preliminaries - 7.5% of Base Cost	Sum			28,164
	Sub-total				**414,950**
	Allow 20% contingencies due to the nature of repairs and retrofit works	Sum			82,990
	Total				**497,940**
	Value Added Tax - 15% of Total				74,691
	Total Construction cost of repairs and retrofit works - Clearview Hospital 4				**572,631**

Courthouse



Building and Construction Data

Facility Name:	Government Complex	Year built:	1995
Building Name:	High Court of Justice	Year(s) remodeled:	
Building Address:	Parliament Drive	Original Design Code:	OECS Building Code
Latitude:	17.120384	Area (m2):	2416.4
Longitude:	61.835148	Length (m):	72
Use:	Government	Width (m):	33.52
Risk Category:	II	No. of storeys:	3
Occupancy Group:	Group D	Storey height (m):	10'
No. of occupants:	50	Total height (m):	36'
Roof shape:	Hip and Valley	Walls	Concrete Block
Roofing:	Metal Sheeting	Structural system	Steel Frame
Overall Condition	Average		
Comments	Building is in good condition with a high average rating of 64%		

Task No.	Interventions/Improvements	Unit	Quantity	Unit Rate (USD)	Total (USD)
CH- 01	**Safety of roofing**				
	Retrofit roof with collars at top third of roof height	lm	400	25	10,000
	Inspect roof and then Install hurricane straps at the eaves/ring beams and ridge to rafter connections	sum	1	2,000	2,000
	Install horizontal bracing to existing trusses	lm	292	15	4,380
	Decreasing spacing of fasteners, particularly at eaves, hips, ridge & edges of gable roofs	sum	1	1,500	1,500
CH- 02	**Parapets and other outside Elements (railings, ornaments)**				
	Repair small cracks with epoxy grout	sum	1	1,500	1,500
CH- 03	**Condition and safety of internal walls**				
	Repair small cracks with epoxy grout	sum	1	2,500	2,500
	Repair cracks > 6 mm using a welded mesh	sum	1	3,500	3,500
CH- 04	**Condition and safety of false or suspended ceilings**				
	Replace and retrofit up to 30% of the ceilings - assuming at lease 725 m^2 requiring attention	m^2	725	31	22,472
CH- 05	**Condition and safety of floor coverings**				
	Allow for repairs to defective areas of the floor finish - allow for 20% of floor area	m^2	483	91	43,978
CH- 06	**Water Reserves**				
	Supply and install 80 Gall solar water heaters on roof	nr	1	2,500	2,500
	Source, repair chronic pipe leaks and retrofit plumbing	sum	1	5,000	5,000
	Install low volume water fixtures	nr	10	800	8,000
	Installation of pump or upgrade of existing	nr	1	2,500	2,500
CH- 07	**Alternate water supply to regular water supply**				
	Install potable water storage tanks to accommodate a 5-day supply - allowing for 100 persons per day	Litres	45,000	0.75	33,750
	Install rainwater tanks with capacity equivalent to 30% of building consumption - include potable water backup connection	Litres	13,500	0.75	10,125
	Re-plumbing of building to facilitate dual water use - potable and non-potable	sum	1	10,000	10,000
CH- 08	**Wastewater System**				
	Empty and improve site septic units and filtration systems	sum	1	2,500	2,500
CH- 09	**Storm Drainage System - site**				
	Improve stormwater drainage on the compound	lm	321	55	17,655
CH- 10	**Alternate Sources of Electricity**				
	Install roof mounted solar photovoltaic system as per legal statutes - 25 KW tied to the national grid	sum	1	87,500	87,500
	220 KVA generator plus automatic transfer switch	sum	1	75,000	75,000
	Allow for 500-litre fuel tank and accessories	sum	1	6,000	6,000
	To Collection				**352,360**

Task No.	Interventions/Improvements	Unit	Quantity	Unit Rate (USD)	Total (USD)
CH- 11	**Safety of Electrical Equipment**				
	Re-inspection and certification of building as required	sum	1	5,000	5,000
	Undertake up to 25% rewiring of the building as required	m^2	604	120	72,491
CH- 12	**Lighting System**				
	Improve lighting using LED tubes and light fixtures	m^2	2,416	40	96,654
CH- 13	**Safety of HVAC Components**				
	Perform major repairs and maintenance	sum	1	30,000	30,000
	To Collection				**204,145**
	Collection				
		Page 1			352,360
		Page 2			204,145
	Base Cost				**556,505**
	Allowance for Demolition of works to be repaired - 3% of Base Cost	Sum			16,695
	Allowance for preliminaries - 7.5% of Base Cost	Sum			41,738
	Sub-total				**614,938**
	Allow 20% contingencies due to the nature of repairs and retrofit works	Sum			122,988
	Total				**737,925**
	Value Added Tax - 15% of Total				110,689
	Total Construction cost of repairs and retrofit works - Court House				**848,614**

Defence Force Building 1

Building and Construction Data

Facility Name:	Defence Force Building 1	Year built:	
Building Name:	Defence Force Building 1	Year(s) remodelled:	
Building Address:	Defence Force Building 1	Original Design Code:	Built By US army
Latitude:	17.1575905	Area (m2):	234
Longitude:	61.7950701	Length (m):	30.8
Use:	Military	Width (m):	7.6
Risk Category:	IV	No. of storeys:	2
Occupancy Group:	Group B	Storey height (m):	3.06
No. of occupants:	100	Total height (m):	6.1
Roof shape:	Flat	Walls	Concrete Blocks
Roofing:	Concrete	Structural system	Concrete Frame
Overall Condition	Low		
Comments	Building is in very poor condition and is in urgent need of repairs. The Risk Category also suggest that urgent action is required		

Task No.	Interventions/Improvements	Unit	Quantity	Unit Rate (USD)	Total (USD)
DFB1-01	**Condition of the building - as per Engineer's drawings and specifications**				
	Introduce new columns so as to improve redundancy of structure	lm	20	495	9,900
	Stiffening of an existing floor and tying it into the walls	sum	1	5,000	5,000
	Increase capacity of columns	nr	10	300	3,000
	Increase capacity of beams	lm	20	300	6,000
	Introduce new collector beams to improve capacity of floor	lm	20	495	9,900
	Increasing flexural and shear strength by adding reinforcing bars and stirrups	sum	1	2,500	2,500
	Repair beams spalling and honeycombing as detailed	lm	20	150	3,000
	Repair slab soffits for spalling and honeycombing	m^2	75	320	24,000
DFB1-02	**Safety of Foundations - as per Engineer's details and specifications**				
	Reconstruct severely damaged foundation walls, strip and spread footings	lm	20	470	9,400
DFB1-03	**Structural Integrity of Roofs**				
	Installing and improving secondary underlayments	m^2	234	60	14,040
	Replace and retrofit entire ceiling	m^2	468	88	41,184
DFB1-04	**Exterior Doors, Exits and Entrances**				
	Protecting existing door with an impact-resistant covering	nr	4	1,000	4,000
	Install threshold to prevent ingress of water	nr	4	100	400
	Fasten door frames into concrete surrounds with bolts or screws	nr	4	30	120
DFB1-05	**Windows and shutters**				
	Replace existing windows with standard operable or fixed windows and install shutters with Miami Dade NOA	m^2	135	1,270	171,450
DFB1-06	**Other Elements of the Building Envelope**				
	Repair cracks > 6 mm using a welded mesh	sum	1	15,000	15,000
DFB1-07	**Safety of roofing**				
	Repair small cracks with epoxy grout	sum	1	3,500	3,500
DFB1-08	**Parapets and other outside Elements (railings, ornaments)**				
	Repair cracks > 6 mm using a welded mesh	sum	1	5,000	5,000
DFB1-09	**Internal walls - concrete masonry units finishd with mortar plastering**				
	Replace entire existing masonry wall with the inclusion of a ring beam	m^2	72	475	34,200
DFB1-10	**False or Suspended Ceilings**				
	Replace and retrofit entire ceiling	m^2	468	31	14,508
DFB1-11	**Safety of stairways and Ramps**				
	Reconstruct up to 50% of the staircase	sum	1	3,750	3,750
DFB1-12	**Condition and safety of floor coverings**				
	Allow for repairs to defective areas of the floor finish - allow for 100% of floor area	m^2	468	88	41,184
	To Collection				**421,036**

Task No.	Interventions/Improvements	Unit	Quantity	Unit Rate (USD)	Total (USD)
DFB1-13	**Water Reserves**				
	Supply and install 80 Gall solar water heaters on roof	nr	1	2,500	2,500
	Source, repair chronic pipe leaks and retrofit plumbing	sum	1	5,000	5,000
	Install low volume water fixtures	nr	6	800	4,800
	Install potable water storage tanks to accommodate a 5-day supply	Litres	30,000	0.75	22,500
	Install rainwater tanks with capacity equivalent to 30% of building consumption - include potable water backup connection	Litres	9,000	0.75	6,750
	Installation of pump or upgrade of existing	nr	1	2,500	2,500
DFB1-14	**Alternate water supply to regular water supply**				
	Re-plumbing of building to facilitate dual water use - potable and non-potable	sum	1	7,500	7,500
DFB1-15	**Water Distribution System**				
	Source, repair chronic pipe leaks and retrofit plumbing	sum	1	2,500	2,500
DFB1-16	**Storm Drainage System - site**				
	Improve stormwater drainage on the compound	lm	111	110	12,210
DFB1-17	**Storm Drainage System - roof and gutters**				
	Install guttering to roof structure inclusive of down pipes	lm	74	60	4,440
DFB1-18	**Alternate Sources of Electricity**				
	Install roof mounted solar photovoltaic system as per legal statutes - 25 KW tied to the national grid	KW	25	3,500	87,500
	16.5 KVA generator plus automatic transfer switch	sum	1	25,000	25,000
	Allow for 500-litre fuel tank and accessories	sum	1	6,000	6,000
DFB1-19	**Safety of Electrical Equipment**				
	Re-inspection and certification of building as required	sum	1	2,500	2,500
	Undertake complete rewiring of the building as required	m^2	468	120	56,160
	Improve electrical panels with the change to residual-current devices	sum	1	1,000	1,000
DFB1-20	**Lighting System**				
	Improve lighting using LED tubes and light fixtures	m^2	468	40	18,720
DFB1-21	**Safety of HVAC Components**				
	Replace HVAC system	m^2	468	175	81,900
	To Collection				**349,480**

Task No.	Interventions/Improvements	Unit	Quantity	Unit Rate (USD)	Total (USD)
	Collection				
		Page 1			421,036
		Page 2			349,480
	Base Cost				**770,516**
	Allowance for Demolition of works to be repaired - 3% of Base Cost	Sum			23,115.48
	Allowance for preliminaries - 7.5% of Base Cost	Sum			57,789
	Sub-total				**851,420**
	Allow 20% contingencies due to the nature of repairs and retrofit works	Sum			170,284
	Total				**1,021,704**
	Value Added Tax - 15% of Total				153,256
	Total Construction cost of repairs and retrofit works - Defence Force Building 1				**1,174,960**

Defence Force Building T

Building and Construction Data

Facility Name:	Defence Force Building T	Year built:	
Building Name:	Defence Force Building T	Year(s) remodelled:	
Building Address:	Building T	Original Design Code:	Built By US Army
Latitude:	17.1575905	Area (m2):	609
Longitude:	61.7950701	Length (m):	30.8
Use:	Military	Width (m):	19.6
Risk Category:	IV	No. of storeys:	1
Occupancy Group:	Group B	Storey height (m):	3.06
No. of occupants:	50	Total height (m):	4.6
Roof shape:	Flat	Walls	Concrete Blocks
Roofing:	Concrete	Structural system	Concrete Frame
Overall Condition	Low		
Comments	In an extremely poor condition and the exposure to the sea warrants works being undertaken in the immediate term. The Risk Category also suggest that urgent action is required		

Task No.	Interventions/Improvements	Unit	Quantity	Unit Rate (USD)	Total (USD)
DFTB-01	**Condition of the building - as per Engineer's drawings and specifications**				
	Introduce new columns so as to improve redundancy of structure	lm	20	495	9,900
	Stiffening of an existing floor and tying it into the walls	sum	1	5,000	5,000
	Increase capacity of columns	nr	10	300	3,000
	Increase capacity of beams	lm	20	300	6,000
	Introduce new collector beams to improve capacity of floor	lm	20	495	9,900
	Increasing flexural and shear strength by adding reinforcing bars and stirrups	sum	1	2,500	2,500
	Repair beams spalling and honeycombing as detailed	lm	20	150	3,000
	Repair slab soffits for spalling and honeycombing	m^2	75	320	24,000
DFTB-02	**Safety of Foundations - as per Engineer's details and specifications**				
	Reconstruction of severely damaged foundation walls, strip and spread footings	lm	40	470	18,800
DFTB-03	**Structural Integrity of Roofs**				
	Repair small cracks with epoxy grout	lm	100	5	500
DFTB-04	**Exterior Doors, Exits and Entrances**				
	Protecting existing door with an impact-resistant covering	nr	4	1,000	4,000
	Install threshold to prevent ingress of water	nr	4	100	400
	Fasten door frames into concrete surrounds with bolts or screws	nr	4	30	120
DFTB-05	**Windows and shutters**				
	Replace existing windows with standard operable or fixed windows and install shutters with Miami Dade NOA	m^2	135	1,270	171,450
DFTB-06	**Other Elements of the Building Envelope**				
	Repair cracks > 6 mm using a welded mesh	sum	1	10,000	10,000
DFTB-07	**Safety of roofing**				
	Installing and improving new built-up roofing with proper underlayments	m^2	609	60	36,540
DFTB-08	**Internal walls - concrete masonry units finishd with mortar plastering**				
	Replace entire existing masonry wall with the inclusion of a ring beam	m^2	175	475	83,125
DFTB-09	**False or Suspended Ceilings**				
	Replace and retrofit entire ceiling	m^2	609	31	18,879
DFTB-10	**Condition and safety of floor coverings**				
	Allow for repairs to defective areas of the floor finish - allow for 100% of floor area	m^2	609	91	55,419
	To Collection				**462,533**

Task No.	Interventions/Improvements	Unit	Quantity	Unit Rate (USD)	Total (USD)
DFTB-11	**Water Reserves**				
	Supply and install 80 Gall solar water heaters on roof	nr	1	2,500	2,500
	Source, repair chronic pipe leaks and retrofit plumbing	sum	1	5,000	5,000
	Install low volume water fixtures	nr	6	800	4,800
	Installation of pump or upgrade of existing	nr	1	2,500	2,500
DFTB-12	**Alternate water supply to regular water supply**				
	Install potable water storage tanks to accommodate a 5-day supply	Litres	30,000	0.75	22,500
	Install rainwater tanks with capacity equivalent to 30% of building consumption - include potable water backup connection	Litres	9,000	0.75	6,750
	Re-plumbing of building to facilitate dual water use - potable and non-potable	sum	1	3,000	3,000
DFTB-13	**Water Distribution System**				
	Source, repair chronic pipe leaks and retrofit plumbing	sum	1	2,500	2,500
DFTB-14	**Wastewater System**				
	Construct new septic tank system to maximum size of 15 m3	m^3	15	250	3,750
DFTB-15	**Storm Drainage System - site**				
	Improve stormwater drainage on the compound	lm	153	110	16,830
DFTB-16	**Storm Drainage System - roof and gutters**				
	Install guttering to roof structure inclusive of down pipes	lm	102	60	6,120
DFTB-17	**Alternate Sources of Electricity**				
	Install roof mounted solar photovoltaic system as per legal statutes - 15 KW tied to the national grid	KW	15	3,500	52,500
	16.5 KVA generator plus automatic transfer switch	sum	1	25,000	25,000
	Allow for 500-litre fuel tank and accessories	sum	1	6,000	6,000
DFTB-18	**Safety of Electrical Equipment**				
	Re-inspection and certification of building as required	sum	1	2,500	2,500
	Undertake complete rewiring of the building as required	m^2	609	120	73,080
	Improve electrical panels with the change to residual-current devices	sum	1	1,000	1,000
DFTB-19	**Lighting System**				
	Improve lighting using LED tubes and light fixtures	m^2	609	40	24,360
DFTB-20	**Safety of HVAC Components**				
	Replace HVAC system	m^2	468	175	81,900
	To Collection				**342,590**

Task No.	Interventions/Improvements	Unit	Quantity	Unit Rate (USD)	Total (USD)
	Collection				
		Page 1			462,533
		Page 2			342,590
	Base Cost				**805,123**
	Allowance for Demolition of works to be repaired - 3% of Base Cost	Sum			24,154
	Allowance for preliminaries - 7.5% of Base Cost	Sum			60,384
	Sub-total				**889,661**
	Allow 20% contingencies due to the nature of repairs and retrofit works	Sum			177,932
	Total				**1,067,593**
	Value Added Tax - 15% of Total				160,139
	Total Construction cost of repairs and retrofit works - Defence Force T Building				**1,227,732**

Department of the Environment 1

Building and Construction Data

Facility Name:	Department of Environment 1	Year built:	1981
Building Name:	DOE Main Building	Year(s) remodeled:	
Building Address:	Factory Road	Original Design Code:	
Latitude:	17.1208782	Area (m2):	330
Longitude:	61.836505	Length (m):	22
Use:	Government	Width (m):	15
Risk Category:	II	No. of storeys:	1
Occupancy Group:	Group D	Storey height (m):	3
No. of occupants:	50	Total height (m):	5
Roof shape:	Hip and Valley	Walls	Concrete Blocks
Roofing:	Metal Sheeting	Structural system	Concrete Frame
Overall Condition	High		
Comments	The Risk Category and the overall condition suggest works could be considered in the short term		

Task No.	Interventions/Improvements	Unit	Quantity	Unit Rate (USD)	Total (USD)
DOE-01	**Windows and shutters**				
	Replace existing windows with standard operable or fixed windows and install shutters with Miami Dade NOA	m^2	20	750	15,000
DOE-02	**Condition and safety of floor coverings**				
	Allow for repairs to defective areas of the floor finish - allow for 20% of floor area	m^2	132	88	11,616
DOE-03	**Water Reserves**				
	Install potable water storage tanks to accommodate a 5-day supply	Litres	22,500	0.75	16,875
	Installation of pump or upgrade of existing	nr	1	5,000	5,000
DOE-04	**Alternate water supply to regular water supply**				
	Install rainwater tanks with capacity equivalent to 30% of building consumption - include potable water backup connection	Litres	6,750	0.75	5,063
	Re-plumbing of building to facilitate dual water use - potable and non-potable	sum	1	5,000	5,000
DOE-05	**Water Distribution System**				
	Supply and install 80 Gall solar water heaters on roof	nr	2	2,500	5,000
	Source, repair chronic pipe leaks and retrofit plumbing	sum	1	5,000	5,000
	Install low volume water fixtures	nr	6	800	4,800
DOE-06	**Storm Drainage System - site**				
	Improve stormwater drainage on the compound	lm	150	110	16,500
DOE-07	**Storm Drainage System - roof and gutters**				
	Install guttering to new roof structure inclusive of down pipes	lm	74	50	3,700
DOE-08	**Alternate Sources of Electricity**				
	200 KVA generator plus automatic transfer switch	sum	1	70,000	70,000
	Allow for 500-litre fuel tank and accessories	sum	1	6,000	6,000
	Install roof mounted solar photovoltaic system as per legal statutes - 25 KW tied to the national grid	KW	25	3,500	87,500
DOE-09	**Safety of Electrical Equipment**				
	Undertake up to 50% rewiring of the building as required	m^2	330	120	39,600
	Re-inspection and certification of building as required	sum	1	2,500	2,500
DOE-10	**Lighting System**				
	Improve lighting using LED tubes and light fixtures	m^2	330	40	13,200
	Total Collection				**312,354**

Task No.	Interventions/Improvements	Unit	Quantity	Unit Rate (USD)	Total (USD)
	Collection				
		Page 1			312,354
	Base Cost				**312,354**
	Allowance for Demolition of works to be repaired - 3% of Base Cost	Sum			9,371
	Allowance for preliminaries - 7.5% of Base Cost	Sum			23,427
	Sub-total				**345,151**
	Allow 20% contingencies due to the nature of repairs and retrofit works	Sum			69,030
	Total				**414,181**
	Value Added Tax - 15% of Total				62,127
	Total Construction cost of repairs and retrofit works - DOE 1				**476,308**

Department of the Environment 2

Building and Construction Data

Facility Name:	Department of Environment 2	Year built:	1981
Building Name:	DOE Conference Room	Year(s) remodeled:	2018
Building Address:	Factory Road	Original Design Code:	
Latitude:	17.120325	Area (m2):	240
Longitude:	61.836387	Length (m): 24	24
Use:	Government	Width (m): 10	10
Risk Category:	II	No. of storeys:	1
Occupancy Group:	Group D	Storey height (m):	3
No. of occupants:	(1-80)	Total height (m):	5
Roof shape:	Gable	Walls	Concrete Block
Roofing:	Metal Sheeting	Structural system	Concrete Frame
Overall Condition	High		
Comments	The Risk Category and the overall condition suggest works could be considered in the short term		

Task No.	Interventions/Improvements	Unit	Quantity	Unit Rate (USD)	Total (USD)
DOE2-01	**Windows and shutters**				
	Replace existing windows with standard operable or fixed windows and install shutters with Miami Dade NOA	m^2	15	750	11,250
DOE2-02	**Safety of roofing**				
	Replace entire roof with trusses and roof angle of 25 degrees	m^2	240	125	30,000
DOE2-03	**Internal walls - concrete masonry units finishd with mortar plastering**				
	Replace entire wall with new ring beam on both floors	m^2	24	203	4,865
DOE2-04	**False or Suspended Ceilings**				
	Replace and retrofit entire ceiling	m^2	240	31	7,440
DOE2-05	**Condition and safety of floor coverings**				
	Allow for repairs to defective areas of the floor finish - allow for 20% of floor area	m^2	96	88	8,448
DOE2-06	**Water Reserves**				
	Install potable water storage tanks to accommodate a 5-day supply	Litres	36,000	0.75	27,000
	Installation of pump or upgrade of existing	nr	1	5,000	5,000
DOE2-07	**Alternate water supply to regular water supply**				
	Install rainwater tanks with capacity equivalent to 30% of building consumption - include potable water backup connection	Litres	10,800	0.75	8,100
	Re-plumbing of building to facilitate dual water use - potable and non-potable	sum	1	5,000	5,000
DOE2-08	**Water Distribution System**				
	Supply and install 80 Gall solar water heaters on roof	nr	2	2,500	5,000
	Source, repair chronic pipe leaks and retrofit plumbing	sum	1	2,500	2,500
	Install low volume water fixtures	nr	6	800	4,800
DOE2-09	**Storm Drainage System - site**				
	Improve stormwater drainage on the compound	lm	102	110	11,220
DOE2-10	**Storm Drainage System - roof and gutters**				
	Install guttering to new roof structure inclusive of down pipes	lm	68	50	3,400
DOE2-11	**Alternate Sources of Electricity**				
	200 KVA generator plus automatic transfer switch	sum	1	70,000	70,000
	Allow for 500-litre fuel tank and accessories	sum	1	6,000	6,000
	Install roof mounted solar photovoltaic system as per legal statutes - 15 KW tied to the national grid	KW	15	3,500	52,500
DOE2-12	**Safety of Electrical Equipment**				
	Undertake up to 50% rewiring of the building as required	m^2	120	120	14,400
	Re-inspection and certification of building as required	sum	1	2,500	2,500
	Total Collection				**279,423**

Task No.	Interventions/Improvements	Unit	Quantity	Unit Rate (USD)	Total (USD)
DOE2-13	**Lighting System**				
	Improve lighting using LED tubes and light fixtures	m^2	240	40	9,600
	Total Collection				**9,600**
	Collection				
		Page 1			279,423
		Page 2			9,600
	Base Cost				**289,023**
	Allowance for Demolition of works to be repaired - 3% of Base Cost	Sum			8,671
	Allowance for preliminaries - 7.5% of Base Cost	Sum			21,677
	Sub-total				**319,370**
	Allow 20% contingencies due to the nature of repairs and retrofit works	Sum			63,874
	Total				**383,244**
	Value Added Tax - 15% of Total				57,487
	Total Construction cost of repairs and retrofit works - DOE 2				**440,731**

Fines Building 1

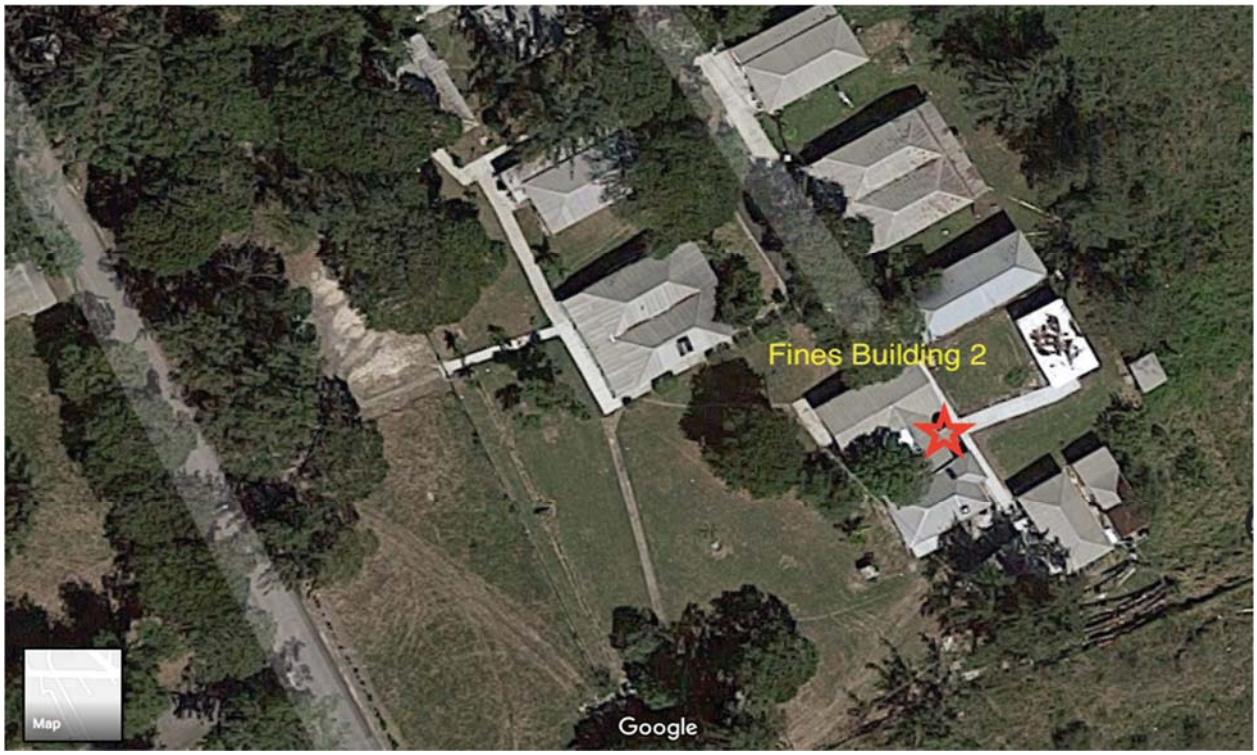
Building and Construction Data

Facility Name:	Fines Building 1	Year built:	
Building Name:	Governor Building	Year(s) remodeled:	
Building Address:	Queen Elizabeth Highway	Original Design Code:	
Latitude:	17.1172478	Area (m2): 126	126
Longitude:	61.8314605	Length (m): 18	18
Use:	Government	Width (m): 7	7
Risk Category:	5	No. of storeys:	1
Occupancy Group:	Group B	Storey height (m):	4
No. of occupants:	30	Total height (m):	4
Roof shape:	Hip	Walls	Concrete Block
Roofing:	Metal Sheeting	Structural system	Concrete Frame
Overall Condition	Average		
Comments	Works likely necessary in the short term		

Task No.	Interventions/Improvements	Unit	Quantity	Unit Rate (USD)	Total (USD)
F-01	**Structural Integrity of Roofs**				
	Replace entire roof with trusses and roof angle of 25 degrees	m^2	126	200	25,200
F-02	**Exterior Doors, Exits and Entrances**				
	Protecting existing door with an impact-resistant covering	nr	3	1,000	3,000
	Install threshold to prevent ingress of water	nr	3	100	300
F-03	**Windows and shutters**				
	Replace existing windows with standard operable or fixed windows and install shutters with Miami Dade NOA	m^2	13	1,270	16,510
F-04	**Other Elements of the Building Envelope**				
	Repair small cracks with epoxy grout	sum	1	2,500	2,500
	Repair cracks > 6 mm using a welded mesh	sum	1	3,500	3,500
F-05	**False or Suspended Ceilings**				
	Replace and retrofit up to 50% of the ceilings	m^2	63	31	1,953
F-06	**Condition and safety of floor coverings**				
	Allow for repairs to defective areas of the floor finish - allow for 20% of floor area	m^2	25	88	2,218
F-07	**Water Reserves**				
	Install potable water storage tanks to accommodate a 5-day supply	Litres	13,500	0.75	10,125
	Supply and install 80 Gall solar water heaters on roof	nr	1	2,500	2,500
	Installation of pump or upgrade of existing	nr	1	2,500	2,500
F-08	**Alternate water supply to regular water supply**				
	Install rainwater tanks with capacity equivalent to 30% of building consumption - include potable water backup connection	Litres	4,050	0.75	3,038
	Re-plumbing of building to facilitate dual water use - potable and non-potable	sum	1	5,000	5,000
F-09	**Water Distribution System**				
	Source, repair chronic pipe leaks and retrofit plumbing	sum	1	5,000	5,000
	Install low volume water fixtures	nr	6	800	4,800
F-10	**Wastewater System**				
	Construct new septic tank system to maximum size of 15 m^3	m^3	15	250	3,750
F-11	**Storm Drainage System - site**				
	Improve stormwater drainage on the compound	lm	75	110	8,250
F-12	**Storm Drainage System - roof and gutters**				
	Install guttering to roof structure inclusive of down pipes	lm	50	60	3,000
	Total Collection				**103,143**

Task No.	Interventions/Improvements	Unit	Quantity	Unit Rate (USD)	Total (USD)
F-13	**Alternate Sources of Electricity**				
	Install roof mounted solar photovoltaic system as per legal statutes - 25 KW tied to the national grid	KW	15	3,500	52,500
	16.5 KVA generator plus automatic transfer switch	sum	1	25,000	25,000
	Allow for 500-litre fuel tank and accessories	sum	1	6,000	6,000
F-14	**Safety of Electrical Equipment**				
	Re-inspection and certification of building as required	sum	1	1,500	1,500
	Undertake 50% rewiring of the building as required	m^2	63	120	7,560
F-15	**Lighting System**				
	Improve lighting using LED tubes and light fixtures	m^2	580	40	23,200
F-16	**Safety of HVAC Components**				
	Install central AC system	m^2	580	175	101,500
	Total Collection				**217,260**
	Collection				
		Page 1			103,143
		Page 2			217,260
	Base Cost				**320,403**
	Allowance for Demolition of works to be repaired - 3% of Base Cost	Sum			9,612
	Allowance for preliminaries - 7.5% of Base Cost	Sum			24,030
	Sub-total				**354,045**
	Allow 20% contingencies due to the nature of repairs and retrofit works	Sum			70,809
	Total				**424,855**
	Value Added Tax - 15% of Total				63,728
	Total Construction cost of repairs and retrofit works - Fines				**488,583**

Fines Building 2



Building and Construction Data

Facility Name:	'Fines Institute	Year built:	
Building Name:	Kitchen – Fines Building	Year(s) remodeled:	
Building Address:	Queen Elizabeth Highway	Original Design Code:	
Latitude:	17.117248	Area (m2): 294	294
Longitude:	61.8314529	Length (m): 21	21
Use:	Government	Width (m): 14	14
Risk Category:	5	No. of storeys:	1
Occupancy Group:	Group B	Storey height (m):	4
No. of occupants:	30	Total height (m):	4
Roof shape:	Hip	Walls	Concrete Blocks
Roofing:	Metal Sheeting	Structural system	Concrete Frame
Overall Condition	Average		
Comments	Condition is a high average rating of 64%. Retrofit works likely required in the short term		

Task No.	Interventions/Improvements	Unit	Quantity	Unit Rate (USD)	Total (USD)
F2-01	**Structural Integrity of Roofs**				
	Replace entire roof with trusses and roof angle of 25 degrees	m^2	294	200	58,800
F2-02	**Exterior Doors, Exits and Entrances**				
	Protecting existing door with an impact-resistant covering	nr	6	1,000	6,000
	Install threshold to prevent ingress of water	nr	6	100	600
F2-03	**Windows and shutters**				
	Replace existing windows with standard operable or fixed windows and install shutters with Miami Dade NOA	m^2	20	1,270	25,400
F2-04	**Condition and safety of floor coverings**				
	Allow for repairs to defective areas of the floor finish - allow for 20% of floor area	m^2	25	88	2,218
F2-05	**Water Reserves**				
	Install potable water storage tanks to accommodate a 5-day supply	Litres	13,500	0.75	10,125
	Supply and install 80 Gall solar water heaters on roof	nr	1	2,500	2,500
	Installation of pump or upgrade of existing	nr	1	2,500	2,500
F2-06	**Alternate water supply to regular water supply**				
	Install rainwater tanks with capacity equivalent to 30% of building consumption - include potable water backup connection	Litres	4,050	0.75	3,038
	Re-plumbing of building to facilitate dual water use - potable and non-potable	sum	1	5,000	5,000
F2-07	**Water Distribution System**				
	Source, repair chronic pipe leaks and retrofit plumbing	sum	1	5,000	5,000
	Install low volume water fixtures	nr	6	800	4,800
F2-08	**Wastewater System**				
	Construct new septic tank system to maximum size of 15 m^3	m^3	15	250	3,750
F2-09	**Storm Drainage System - site**				
	Improve stormwater drainage on the compound	lm	75	110	8,250
F2-10	**Storm Drainage System - roof and gutters**				
	Replace roof guttering	lm	50	60	3,000
F2-11	**Alternate Sources of Electricity**				
	Install roof mounted solar photovoltaic system as per legal statutes - 25 KW tied to the national grid	KW	15	3,500	52,500
	16.5 KVA generator plus automatic transfer switch	sum	1	25,000	25,000
	Allow for 500-litre fuel tank and accessories	sum	1	6,000	6,000
F2-12	**Safety of Electrical Equipment**				
	Re-inspection and certification of building as required	sum	1	1,500	1,500
	Undertake 50% rewiring of the building as required	m^2	63	120	7,560
	Total Collection				**233,540**

Task No.	Interventions/Improvements	Unit	Quantity	Unit Rate (USD)	Total (USD)
F2-13	**Lighting System**				
	Improve lighting using LED tubes and light fixtures	m^2	580	40	23,200
F2-14	**Safety of HVAC Components**				
	Install central AC system	m^2	580	175	101,500
	Total Collection				**124,700**
	Collection				
		Page 1			233,540
		Page 2			124,700
	Base Cost				**358,240**
	Allowance for Demolition of works to be repaired - 3% of Base Cost	Sum			10,747
	Allowance for preliminaries - 7.5% of Base Cost	Sum			26,868
	Sub-total				**395,855**
	Allow 20% contingencies due to the nature of repairs and retrofit works	Sum			79,171
	Total				**475,026**
	Value Added Tax - 15% of Total				71,254
	Total Construction cost of repairs and retrofit works - Fines 2				**546,280**

Good Shepherd Home

Building and Construction Data

Facility Name:	Good Shepherd Home	Year built:	
Building Name:	Good Shepherd Home	Year(s) remodeled:	
Building Address:	Gordon St, Villa Area	Original Design Code:	
Latitude:	17.1323759	Area (m2):	283
Longitude:	61.84654	Length (m):	41.7
Use:	Medical	Width (m):	15.8
Risk Category:	IV	No. of storeys:	1
Occupancy Group:	Group B	Storey height (m):	3.06
No. of occupants:	10-20	Total height (m):	4.6
Roof shape:	Hip	Walls	Hard Plastic
Roofing:	Plastic Shingles	Structural system	Hard Plastic
Overall Condition	Average		
Comments	The high Risk Category and the Average rating suggest that work should be undertaken in the immediate to short term		

Task No.	Interventions/Improvements	Unit	Quantity	Unit Rate (USD)	Total (USD)
GS-01	**Exterior Doors, Exits and Entrances**				
	Protecting existing door with an impact-resistant covering	nr	3	1,000	3,000
	Install threshold to prevent ingress of water	nr	3	100	300
GS-02	**Windows and shutters**				
	Replace existing windows with standard operable or fixed windows and install shutters with Miami Dade NOA	m^2	62	750	46,701
GS-03	**Safety of roofing**				
	Replace entire roof with trusses and roof angle of 25 degrees	m^2	283	200	56,600
GS-04	**Condition and safety of floor coverings**				
	Allow for repairs to defective areas of the floor finish - allow for 20% of floor area	m^2	57	88	4,981
GS-05	**Water Reserves**				
	Installation of pump or upgrade of existing	nr	1	2,000	2,000
	Install potable water storage tanks to accommodate a 5-day supply	Litres	9,000	0.75	6,750
GS-06	**Alternate water supply to regular water supply**				
	Install rainwater tanks with capacity equivalent to 30% of building consumption - include potable water backup connection	Litres	3,000	0.75	2,250
	Re-plumbing of building to facilitate dual water use - potable and non-potable	sum	1	5,000	5,000
GS-07	**Water Distribution System**				
	Source, repair chronic pipe leaks and retrofit plumbing	sum	1	3,500	3,500
	Supply and install 80 Gall solar water heaters on roof	nr	1	2,500	2,500
	Install low volume water fixtures	nr	4	800	3,200
GS-08	**Wastewater System**				
	Empty and improve site septic units and filtration systems	sum	1	2,500	2,500
GS-09	**Storm Drainage System - site**				
	Improve stormwater drainage on the compound	lm	174	55	9,570
GS-10	**Storm Drainage System - roof and gutters**				
	Install guttering to roof structure inclusive of down pipes	lm	116	50	5,800
GS-11	**Alternate Sources of Electricity**				
	16.5 KVA generator plus automatic transfer switch	sum	1	25,000	25,000
	Allow for 500-litre fuel tank and accessories	sum	1	6,000	6,000
	Install roof mounted solar photovoltaic system as per legal statutes - 15 KW tied to the national grid	KW	15	3,500	52,500
GS-12	**Safety of Electrical Equipment**				
	Re-inspection and certification of building as required	sum	1	3,500	3,500
	Undertake complete rewiring of the building as required	m^2	283	120	33,960
	Improve electrical panels with the change to residual-current devices	sum	1	1,000	1,000
	To Collection				**276,612**

Task No.	Interventions/Improvements	Unit	Quantity	Unit Rate (USD)	Total (USD)
GS-13	**Lighting System**				
	Improve lighting using LED tubes and light fixtures	sum	283	40	11,320
GS-14	**Safety of HVAC Components**				
	Allow for AC split units in specific rooms and offices	nr	10	3,500	35,000
	To Collection				**46,320**
	Collection				
		Page 1			276,612
		Page 2			46,320
	Base Cost				**322,932**
	Allowance for Demolition of works to be repaired - 3% of Base Cost	Sum			9,688
	Allowance for preliminaries - 7.5% of Base Cost	Sum			24,220
	Sub-total				**356,839**
	Allow 20% contingencies due to the nature of repairs and retrofit works	Sum			71,368
	Total				**428,207**
	Value Added Tax - 15% of Total				64,231
	Total Construction cost of repairs and retrofit works - Good Shepard 2.0				**428,207**

MET Office

Building and Construction Data

Facility Name:	Antigua MET Services	Year built:	
Building Name:	Airport Terminal	Year(s) remodeled:	
Building Address:	VC Bird International Airport	Original Design Code:	
Latitude:	17.13997	Area (m2):	234
Longitude:	61.792704	Length (m):	30.8
Use:	Government	Width (m):	7.6
Risk Category:	IV	No. of storeys:	1
Occupancy Group:	Group D	Storey height (m):	3.05
No. of occupants:	20	Total height (m):	6.1
Roof shape:	Flat	Walls	Concrete Bricks
Roofing:	Concrete	Structural system	Concrete Frame
Overall Condition	Average		
Comments	Although structural retrofit is not required, the Average condition rating and the Risk Category of IV, suggest that works need to be in the immediate term		

Task No.	Interventions/Improvements	Unit	Quantity	Unit Rate (USD)	Total (USD)
MO-01	**Structural Redundancy - as per typical detail and specifications**				
	Introduce new columns so as to improve redundancy of structure - location and design to be provided by Engineer	sum	1	5,000	5,000
MO-02	**Safety of Foundations - as per Engineer's details and specifications**				
	Allowance for foundation retrofit	sum	1	5,000	5,000
MO-03	**Structural Integrity of Roofs**				
	Complete Sealing of the concrete roof. The roof has major leaks.	m^2	234	135	31,590
	Replace and retrofit up to 50% of the ceilings	m^2	117	50	5,850
MO-04	**Exterior Doors, Exits and Entrances**				
	Protecting existing door with an impact-resistant covering	nr	4	593	2,370
	Install threshold to prevent ingress of water	nr	4	93	370
	Fasten door frames into concrete surrounds with bolts or screws	nr	4	50	200
MO-05	**Windows and shutters**				
	Replace existing windows with standard operable or fixed windows and install shutters with Miami Dade NOA	m^2	50	99	4,944
MO-06	**Safety of roofing**				
	Undertake repairs to roof protection - built-up roofing felt	m^2	234	60	14,040
MO-07	**Internal walls - concrete masonry units finishd with mortar plastering**				
	Undertake retrofit of walls	sum	1	1,500	1,500
MO-08	**False or Suspended Ceilings**				
	Replace and retrofit entire ceiling	m^2	234	31	7,254
MO-09	**Water Reserves**				
	Install solar hot water units	sum	1	2,222	2,222
	Source, repair chronic pipe leaks and retrofit plumbing	m^2	234	20	4,616
	Install low volume water fixtures	nr	6	741	4,444
	Re-plumbing of building to facilitate dual water use - potable and non-potable	m^2	234	60	13,988
MO-10	**Location of water storage tanks**				
	Improve stormwater drainage on the compound	lm	117	75	8,775
	Installation of pump or upgrade of existing	sum	1	1,500	1,500
MO-11	**Alternate water supply to regular water supply**				
	Install rainwater tanks with capacity equivalent to 30% of building consumption - include potable water backup connection	litres	4,500	0.75	3,375
	To Collection				**117,040**

Task No.	Interventions/Improvements	Unit	Quantity	Unit Rate (USD)	Total (USD)
MO-12	**Wastewater System**				
	Construct new septic tank system to maximum size of 15 m^3	m^3	15	250	3,750
MO-13	**Alternate Sources of Electricity**				
	16.5 KVA generator plus automatic transfer switch	sum	1	25,000	25,000
	Allow for 500-litre fuel tank and accessories	sum	1	6,000	6,000
	Install roof mounted solar photovoltaic system as per legal statutes - 25 KW tied to the national grid	KW	15	3,500	52,500
MO-14	**Lighting system**				
	Re-inspection and certification of building as required	m^2	234	15	3,510
	Complete complete rewiring of the building as required - Improve lighting using LED tubes and light fixtures	m^2	234	100	23,400
MO-15	**Safety of HVAC Components**				
	Repair pipes and insulation	sum	1	5,000	5,000
	Replace HVAC system	m^2	234	175	40,950
	To Collection				**160,110**
	Collection				
		Page 1			117,040
		Page 2			160,110
	Base Cost				**277,150**
	Allowance for Demolition of works to be repaired - 3% of Base Cost	Sum			8,314
	Allowance for preliminaries - 7.5% of Base Cost	Sum			20,786
	Sub-total				**306,250**
	Allow 20% contingencies due to the nature of repairs and retrofit works	Sum			61,250
	Total				**367,500**
	Value Added Tax - 15% of Total				55,125
	Total Construction cost of repairs and retrofit works- Met Office				**422,626**

Ministry of Finance

Building and Construction Data

Facility Name:	Government Complex	Year built:	1995
Building Name:	Ministry of Finance	Year(s) remodeled:	
Building Address:	Parliament Drive	Original Design Code:	OECS Building Code
Latitude:	17.1194999	Area (m2):	2558
Longitude:	61.8357685	Length (m):	67
Use:	Government	Width (m):	22
Risk Category:	II	No. of storeys:	2
Occupancy Group:	Group D	Storey height (m):	10'
No. of occupants:	300	Total height (m):	28'
Roof shape:	Hip and Valley	Walls	Concrete Block
Roofing:	Metal Sheeting	Structural system	Concrete frame
Overall Condition	Average		
Comments	Risk Category II and high Average condition suggest that a short term repair horizon would be adequate		

Task No.	Interventions/Improvements	Unit	Quantity	Unit Rate (USD)	Total (USD)
MoF-01	**Condition of construction materials - repair as detailed in drawings**				
	Repair small cracks with a high strength epoxy grout	sum	1	5,000	5,000
	Repair cracks > 6 mm using a welded mesh	sum	1	3,500	3,500
MoF-02	**Structural Integrity of Roofs**				
	Install horizontal bracing to existing trusses	sum	1	5,000	5,000
	Decreasing spacing of fasteners, particularly at eaves, hips, ridge & edges of gable roofs	sum	1	2,500	2,500
	Fixing roof sheathing with minimum 75 mm screws into rafters and ridges	sum	1	5,000	5,000
	Replace all fasteners and comply with OECS-BC 7th Edition	sum	1	5,000	5,000
MoF-03	**Windows and shutters**				
	Replace existing windows with standard operable or fixed windows and install shutters with Miami Dade NOA	m^2	390	750	292,500
MoF-04	**False or Suspended Ceilings**				
	Replace and retrofit up to 50% of the ceilings	m^2	1,279	31	39,649
MoF-05	**Water Reserves**				
	Supply and install 80 Gall solar water heaters on roof	nr	1	2,500	5,000
	Source, repair chronic pipe leaks and retrofit plumbing	sum	1	5,000	16,000
	Install low volume water fixtures	nr	20	800	16,000
	Installation of pump or upgrade of existing	nr	1	2,500	2,500
MoF-06	**Alternate water supply to regular water supply**				
	Install potable water storage tanks to accommodate a 5-day supply	Litres	135,000	0.75	101,250
	Install rainwater tanks with capacity equivalent to 30% of building consumption - include potable water backup connection	Litres	40,500	0.75	30,375
	Re-plumbing of building to facilitate dual water use - potable and non-potable	sum	1	10,000	10,000
MoF-07	**Water Distribution System**				
	Supply and install 80 Gall solar water heaters on roof	nr	1	2,500	2,500
	Source, repair chronic pipe leaks and retrofit plumbing	sum	1	2,000	2,000
	Install low volume water fixtures	nr	20	800	16,000
MoF-08	**Wastewater System**				
	Empty and improve site septic units and filtration systems	sum	1	2,500	2,500
MoF-09	**Storm Drainage System - site**				
	Improve stormwater drainage on the compound	lm	267	110	29,370
MoF-10	**Alternate Sources of Electricity**				
	200 KVA generator plus automatic transfer switch	sum	1	70,000	70,000
	Allow for 500-litre fuel tank and accessories	sum	1	6,000	6,000
	Install roof mounted solar photovoltaic system as per legal statutes - 25 KW tied to the national grid	KW	25	3,500	87,500
	To Collection				**755,144**

Task No.	Interventions/Improvements	Unit	Quantity	Unit Rate (USD)	Total (USD)
MoF-11	**Safety of Electrical Equipment**				
	Re-inspection and certification of building as required	sum	1	5,000	5,000
	Undertake up to 25% rewiring of the building as required	m^2	640	120	76,740
MoF-12	**Lighting system**				
	Improve lighting using LED tubes and light fixtures	m^2	2,558	40	102,320
MoF-13	**Condition and safety of HVAC components**				
	Perform major repairs and maintenance	sum	1	30,000	30,000
	To Collection				**214,060**
	Collection				
		Page 1			755,144
		Page 2			214,060
	Base Cost				**969,204**
	Allowance for Demolition of works to be repaired - 3% of Base Cost	Sum			29,076
	Allowance for preliminaries - 7.5% of Base Cost	Sum			72,690
	Sub-total				**1,070,970**
	Allow 20% contingencies due to the nature of repairs and retrofit works	Sum			214,194
	Total				**1,285,165**
	Value Added Tax - 15% of Total				192,775
	Total Construction cost of repairs and retrofit works- Ministry of Finance				**1,477,939**

Ministry of Tourism

Building and Construction Data

Facility Name:	Government Complex	Year built:	1995
Building Name:	Ministry of Tourism	Year(s) remodeled:	
Building Address:	Queen Elizabeth Highway	Original Design Code:	OECS Building Code
Latitude:	17.11864	Area (m2):	2060
Longitude:	61.835004	Length (m):	48
Use:	Government	Width (m):	25
Risk Category:	II	No. of storeys:	2
Occupancy Group:	Group D	Storey height (m):	10'
No. of occupants:	338	Total height (m):	28'
Roof shape:	Pitched	Walls	Concrete Blocks
Roofing:	Metal Sheeting	Structural system	Concrete Frame
Overall Condition	High		
Comments	Risk Category II and High condition suggest that a short term repair horizon would be adequate		

Task No.	Interventions/Improvements	Unit	Quantity	Unit Rate (USD)	Total (USD)
MoT-01	**Condition of the building - as per Engineer's drawings and specifications**				
	Repair small cracks with epoxy grout	sum	1	5,000	5,000
	Repair cracks > 6 mm using a welded mesh	sum	1	3,500	3,500
MoT-02	**Structural Integrity of Roofs**				
	Install horizontal bracing to existing trusses	sum	1	2,500	2,500
	Decreasing spacing of fasteners, particularly at eaves, hips, ridge & edges of gable roofs	sum	1	2,500	2,500
MoT-03	**Windows and shutters**				
	Replace existing windows with standard operable or fixed windows and install shutters with Miami Dade NOA	m^2	245	750	183,750
MoT-04	**Other Elements of the Building Envelope**				
	Repair cracks > 6 mm using a welded mesh	sum	1	2,500	2,500
	Replace entire existing masonry wall with the inclusion of a ring beam	m^2	40	202	8,080
MoT-05	**Safety of roofing**				
	Inspect roof and then Install hurricane straps at the eaves/ring beams and ridge to rafter connections	nr	210	5	1,050
	Fixing roof sheathing with minimum 75 mm screws into rafters and ridges	nr	600	1	600
	Decreasing spacing of fasteners, particularly at eaves, hips, ridge & edges of gable roofs	nr	420	1	420
MoT-06	**False or Suspended Ceilings**				
	Replace and retrofit 50% of ceiling	m^2	1,030	31	31,930
MoT-07	**Condition and safety of floor coverings**				
	Allow for repairs to defective areas of the floor finish - allow for 20% of floor area	m^2	412	88	36,256
MoT-08	**Water Reserves**				
	Install potable water storage tanks to accommodate a 5-day supply	Litres	152,100	0.75	114,075
	Installation of pump or upgrade of existing	nr	1	2,500	2,500
MoT-09	**Alternate water supply to regular water supply**				
	Install rainwater tanks with capacity equivalent to 30% of building consumption - include potable water backup connection	Litres	45,630	0.75	34,223
	Re-plumbing of building to facilitate dual water use - potable and non-potable	sum	1	10,000	10,000
MoT-10	**Water Distribution System**				
	Supply and install 80 Gall solar water heaters on roof	nr	1	2,500	2,500
	Source, repair chronic pipe leaks and retrofit plumbing	sum	1	5,000	5,000
	Install low volume water fixtures	nr	20	800	16,000
MoT-11	**Wastewater System**				
	Empty and improve site septic units and filtration systems	sum	1	2,500	2,500
	To Collection				**464,884**

Task No.	Interventions/Improvements	Unit	Quantity	Unit Rate (USD)	Total (USD)
MoT-12	**Storm Drainage System - site**				
	Improve stormwater drainage on the compound	lm	219	110	24,090
MoT-13	**Storm Drainage system - roof and gutters**				
	Install guttering to 50% roof structure inclusive of down pipes	lm	73	50	3,650
MoT-14	**Alternate Sources of Electricity**				
	200 KVA generator plus automatic transfer switch	sum	1	70,000	70,000
	Allow for 500-litre fuel tank and accessories	sum	1	6,000	6,000
MoT-15	**Safety of Electrical Equipment**				
	Re-inspection and certification of building as required	sum	1	3,500	3,500
	Undertakeup to 50% rewiring of the building as required	m^2	1,030	120	123,600
	Improve electrical panels with the change to residual-current devices	sum	1	5,000	5,000
MoT-16	**Lighting system**				
	Improve lighting using LED tubes and light fixtures	m^2	2,060	40	82,400
MoT-17	**Condition and safety of HVAC components**				
	Perform major repairs and maintenance	sum	1	30,000	30,000
	To Collection				**348,240**
	Collection				
		Page 1			464,884
		Page 2			348,240
	Base Cost				**813,124**
	Allowance for Demolition of works to be repaired - 3% of Base Cost	Sum			24,394
	Allowance for preliminaries - 7.5% of Base Cost	Sum			60,984
	Sub-total				**898,501**
	Allow 20% contingencies due to the nature of repairs and retrofit works	Sum			179,700
	Total				**1,078,202**
	Value Added Tax - 15% of Total				161,730
	Total Construction cost of repairs and retrofit works - Ministry of Tourism				**1,239,932**

National Archives

Building and Construction Data

Facility Name:	National Archives	Year built:	1981
Building Name:	National Archives	Year(s) remodeled:	
Building Address:	Factory Road	Original Design Code:	
Latitude:	17.1214369	Area (m2):	855
Longitude:	61.8386363	Length (m):	26
Use:	Government	Width (m):	15
Risk Category:	II	No. of storeys:	2
Occupancy Group:	Group C	Storey height (m):	2.4
No. of occupants:	28	Total height (m):	7.3
Roof shape:	Hip	Walls	Concrete Blocks
Roofing:	Metal Sheeting	Structural system	Concrete Frame
Overall Condition	Average		
Comments	Risk Category II and Average condition suggest that a short term repair horizon would be adequate		

Task No.	Interventions/Improvements	Unit	Quantity	Unit Rate (USD)	Total (USD)
NA-01	**False or Suspended Ceilings**				
	Replace and retrofit up the entire ceiling	m^2	800	60	48,000
NA-02	**Water Reserves**				
	Supply and install 80 Gall solar water heaters on roof	nr	1	2,500	2,500
	Source, repair chronic pipe leaks and retrofit plumbing	sum	1	5,000	5,000
	Install low volume water fixtures	nr	6	800	4,800
	Installation of pump or upgrade of existing	nr	1	2,500	2,500
NA-03	**Alternate water supply to regular water supply**				
	Install potable water storage tanks to accommodate a 5-day supply	Litres	12,600	0.75	9,450
	Install rainwater tanks with capacity equivalent to 30% of building consumption - include potable water backup connection	Litres	3,780	0.75	2,835
	Re-plumbing of building to facilitate dual water use - potable and non-potable	sum	1	3,000	3,000
NA-04	**Storm Drainage System - site**				
	Improve stormwater drainage on the compound	lm	276	110	30,360
NA-05	**Storm Drainage System - roof and gutters**				
	Install new guttering with downpipes	lm	185	60	11,100
NA-06	**Capacity of alternate sources of electricity (e.g. generators)**				
	16.5 KVA generator plus automatic transfer switch	sum	1	25,000	25,000
	Allow for 500-litre fuel tank and accessories	sum	1	6,000	6,000
	Install roof mounted solar photovoltaic system as per legal statutes - 25 KW tied to the national grid	KW	25	3,500	87,500
NA-07	**Safety of Electrical Equipment**				
	Re-inspection and certification of building as required	sum	1	2,500	2,500
	Undertake complete rewiring of the building as required	m^2	800	120	96,000
	Improve electrical panels with the change to residual-current devices	sum	1	1,000	1,000
NA-08	**Lighting System**				
	Improve lighting using LED tubes and light fixtures	m^2	800	40	32,000
NA-09	**Safety of HVAC Components**				
	Allow for AC split units in specific rooms and offices	nr	10	3,500	35,000
	To Collection				**404,545**
	Collection				
		Page 1			404,545
	Base Cost				**404,545**
	Allowance for Demolition of works to be repaired - 3% of Base Cost	Sum			12,136
	Allowance for preliminaries - 7.5% of Base Cost	Sum			30,341
	Sub-total				**447,022**
	Allow 20% contingencies due to the nature of repairs and retrofit works	Sum			89,404
	Total				**536,427**
	Value Added Tax - 15% of Total				80,464
	Total Construction cost of repairs and retrofit works- National Archives				**616,891**

National Office of Disaster Services

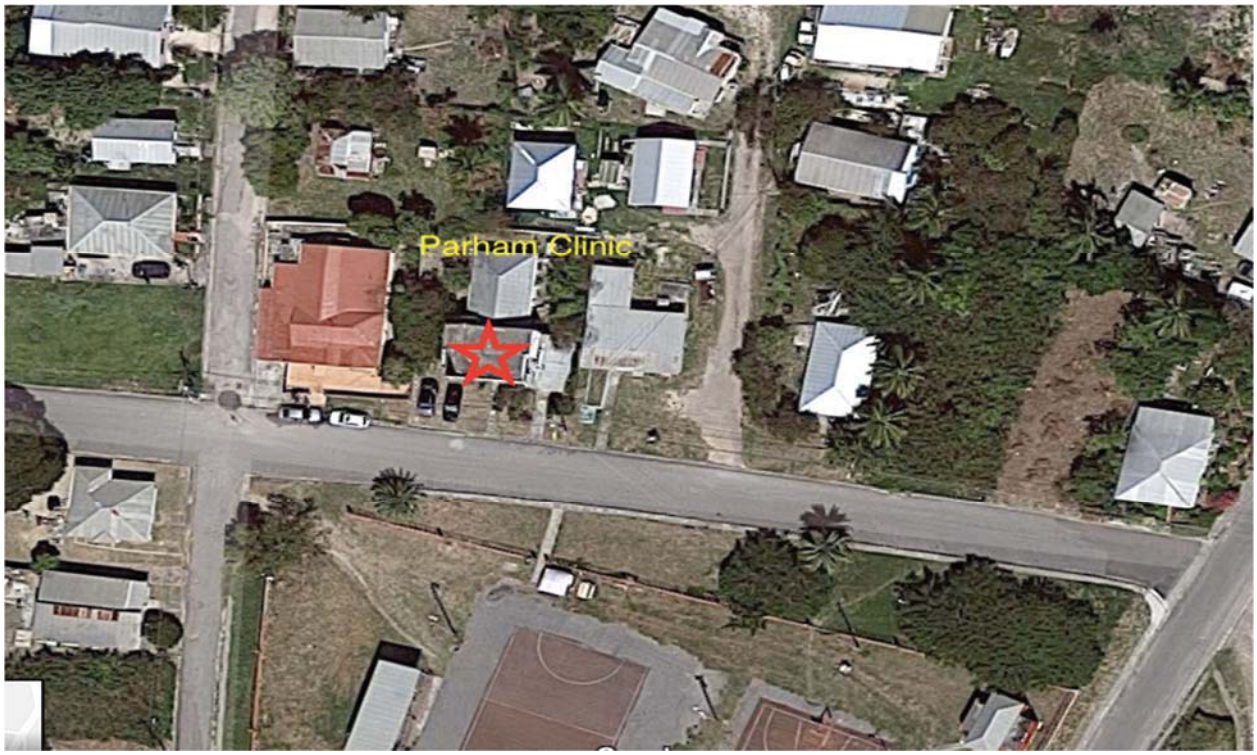
Building and Construction Data

Facility Name:	National Office of Disaster Services	Year built:	
Building Name:	National Office of Disaster Services	Year(s) remodeled:	2018
Building Address:	St John's, American road	Original Design Code:	OECS Building Code
Latitude:	17.1118254	Area (m2):	294
Longitude:	61.8318272	Length (m):	20.2
Use:	Government	Width (m):	14.6
Risk Category:	IV	No. of storeys:	1
Occupancy Group:	Group D	Storey height (m):	4.5
No. of occupants:	15	Total height (m):	4.6
Roof shape:	Gable	Walls	Concrete Blocks
Roofing:	Metal Sheeting	Structural system	Steel Frame
Overall Condition	High		
Comments	Despite the Risk Category IV, the High condition rating suggest that a short term repair horizon would be adequate		

Task No.	Interventions/Improvements	Unit	Quantity	Unit Rate (USD)	Total (USD)
N2-01	**Condition of construction materials - repair as detailed in drawings**				
	Repair small cracks with a high strength epoxy grout	sum	1	2,000	2,000
N2-02	**False or Suspended Ceilings**				
	Replace and retrofit up to 50% of ceiling	m^2	305	50	15,225
N2-03	**Safety of stairways and Ramps**				
	Reconstruct/Rehabilitate up to 50% of the staircase	sum	1	2,000	2,000
N2-04	**Water Reserves**				
	Install potable water storage tanks to accommodate a 5-day supply	Litres	6,825	0.75	5,119
N2-05	**Location of water storage tanks**				
	Retrofit support for tank supports	sum	1	1,500	1,500
N2-06	**Alternate water supply to regular water supply**				
	Install rainwater tanks with capacity equivalent to 30% of building consumption - include potable water backup connection	Litres	2,252	0.75	1,689
N2-07	**Water Distribution System**				
	Source, repair chronic pipe leaks and retrofit plumbing	sum	1	2,000	2,000
	Re-plumbing of building to facilitate dual water use - potable and non-potable	sum	1	7,500	7,500
	Supply and install 80 Gall solar water heaters on roof	nr	1	2,500	2,500
	Source, repair chronic pipe leaks and retrofit plumbing	sum	1	1,000	1,000
	Install low volume water fixtures	nr	8	800	6,400
N2-08	**Wastewater System**				
	Construct new septic tank system to maximum size of 15 m3	m^3	15	250	3,750
N2-09	**Storm Drainage System - site**				
	Improve stormwater drainage on the compound	Lm	153	110	16,830
N2-10	**Storm Drainage System - roof and gutters**				
	Install guttering to 50% of roof structure inclusive of down pipes	Lm	51	40	2,040
	To Collection				**69,553**

Task No.	Interventions/Improvements	Unit	Quantity	Unit Rate (USD)	Total (USD)
N2-11	**Alternate Sources of Electricity**				
	16.5 KVA generator plus automatic transfer switch	sum	1	25,000	25,000
	Allow for 500-litre fuel tank and accessories	sum	1	6,000	6,000
	Install roof mounted solar photovoltaic system as per legal statutes - 15 KW tied to the national grid	KW	15	3,500	52,500
N2-12	**Safety of Electrical Equipment**				
	Re-inspection and certification of building as required	m^2	609	15	9,135
	Undertake complete rewiring of the building as required	m^2	609	120	73,080
N2-13	**Lighting System**				
	Improve 50% of lighting using LED tubes and light fixtures	m^2	305	40	12,180
N2-14	**Safety of HVAC Components**				
	Perform routine repairs and maintenance	sum	1	3,500	3,500
	To Collection				**181,395**
	Collection				
		Page 1			69,553
		Page 2			181,395
	Base Cost				**250,948**
	Allowance for Demolition of works to be repaired - 3% of Base Cost	Sum			7,528
	Allowance for preliminaries - 7.5% of Base Cost	Sum			18,821
	Sub-total				**277,297**
	Allow 20% contingencies due to the nature of repairs and retrofit works	Sum			55,459
	Total				**332,757**
	Value Added Tax - 15% of Total				49,914
	Total Construction cost of repairs and retrofit works - NODS 2.0				**382,671**

Parahm Clinic



Building and Construction Data

Facility Name:	Parahm Clinic	Year built:	
Building Name:	Parahm Clinic	Year(s) remodeled:	
Building Address:	Parahm Village	Original Design Code:	OECSBuilding Code
Latitude:	17.107832	Area (m^2):	107.8
Longitude:	61.7667422	Length (m):	13.65
Use:	Clinic	Width (m):	11.3
Risk Category:	IV	No. of storeys:	Single
Occupancy Group:	1	Storey height (m):	3.35
No. of occupants:	30	Total height (m):	4
Roof shape:	Flat	Walls	Concrete Blocks
Roofing:	Metal sheeting	Structural system	Concrete Frame
Overall Condition	Average		
Comments	Risk Category II and Average condition suggest that an immediate to short term repair horizon would be adequate		

Task No.	Interventions/Improvements	Unit	Quantity	Unit Rate (USD)	Total (USD)
PC-01	**Exterior Doors, Exits and Entrances**				
	Protecting existing door with an impact-resistant covering	nr	3	1,000	3,000
	Install threshold to prevent ingress of water	nr	3	100	300
PC-02	**Windows and shutters**				
	Replace existing windows with standard operable or fixed windows and install shutters with Miami Dade NOA	m^2	13	1,270	16,510
PC-03	**Other Elements of the Building Envelope**				
	Repair cracks > 6 mm using a welded mesh	sum	1	2,500	2,500
PC-04	**Safety of roofing**				
	Installing and improving secondary underlayments - remove existing metal sheeting use a built protective roofing system on concrete	m^2	108	80	8,640
PC-05	**Internal walls - concrete masonry units finishd with mortar plastering**				
	Repair cracks > 6 mm using a welded mesh	sum	1	1,500	1,500
PC-07	**False or Suspended Ceilings**				
	Replace and retrofit up to 50% of the ceilings	m^2	54	60	3,240
PC-08	**Condition and safety of floor coverings**				
	Repair and improve condition of floor finish	sum	1	2,500	2,500
PC-09	**Water Reserves**				
	Install potable water storage tanks to accommodate a 5-day supply - augment existing supply	litres	9,100	0.75	6,825
PC-10	**Alternate water supply to regular water supply**				
	Install rainwater tanks with capacity equivalent to 30% of building consumption - include potable water backup connection	Litres	2,730	0.75	2,048
	Re-plumbing of building to facilitate dual water use - potable and non-potable	sum	1	10,000	10,000
PC-11	**Water Distribution System**				
	Source, repair chronic pipe leaks and retrofit plumbing	sum	1	1,500	1,500
	Supply and install 80 Gall solar water heaters on roof	nr	1	2,500	2,500
	Install low volume water fixtures	nr	6	800	4,800
	Installation of pump or upgrade of existing	nr	1	2,500	2,500
PC-12	**Wastewater System**				
	Construct new septic tank system to maximum size of 15 m^3	m^3	15	250	3,750
PC-13	**Storm Drainage System - site**				
	Improve stormwater drainage on the compound	lm	75	110	8,234
PC-14	**Storm Drainage System - roof and gutters**				
	Install guttering to roof structure inclusive of down pipes	lm	50	80	3,992
PC-15	**Alternate Sources of Electricity**				
	16.5 KVA generator plus automatic transfer switch	sum	1	25,000	25,000
	Allow for 500-litre fuel tank and accessories	sum	1	6,000	6,000
	Install roof mounted solar photovoltaic system as per legal statutes	KW	25	3,500	87,500
	Total Collection				**202,838**

Task No.	Interventions/Improvements	Unit	Quantity	Unit Rate (USD)	Total (USD)
PC-16	**Safety of Electrical Equipment**				
	Re-inspection and certification of building as required	sum	1	1,500	1,500
	Undertake 50% rewiring of the building as required	m^2	108	120	12,960
PC-17	**Lighting System**				
	Improve lighting using LED tubes and light fixtures	m^2	108	40	4,320
PC-18	**Safety of HVAC Components**				
	Install AC system	m^2	108	175	18,900
	Total Collection				**37,680**
	Collection				
		Page 1			202,838
		Page 2			37,680
	Base Cost				**240,518**
	Allowance for Demolition of works to be repaired - 3% of Base Cost	Sum			7,216
	Allowance for preliminaries - 7.5% of Base Cost	Sum			18,039
	Sub-total				**265,772**
	Allow 20% contingencies due to the nature of repairs and retrofit works	Sum			53,154
	Total				**318,927**
	Value Added Tax - 15% of Total				47,839
	Total Construction cost of repairs and retrofit works - Parahm Clinic				**366,766**

Police Headquarters

Building and Construction Data

Facility Name:	Royal Police Force of Antigua and Barbuda Headquarters	Year built:	
Building Name:	Constable Quarters	Year(s) remodelled:	
Building Address:	St John's, American road	Original Design Code:	
Latitude:	17.1148965	Area (m2):	668
Longitude:	61.8314998	Length (m):	27.4
Use:	Military	Width (m):	12.2
Risk Category:	IV	No. of storeys:	2
Occupancy Group:	Group B	Storey height (m):	3.06
No. of occupants:	80	Total height (m):	4.6
Roof shape:	Gable	Walls	Concrete Blocks
Roofing:	Metal Sheeting	Structural system	Concrete Frame
Overall Condition	Low		
Comments	Risk Category IV and Low condition rating suggest that an immediate term repair horizon would be required.		

Task No.	Interventions/Improvements	Unit	Quantity	Unit Rate (USD)	Total (USD)
PH2-01	**Condition of the building - as per Engineer's drawings and specifications**				
	Introduce new columns so as to improve redundancy of structure	lm	20	495	9,900
	Stiffening of an existing floor and tying it into the walls	sum	1	5,000	5,000
	Increase capacity of columns	nr	10	300	3,000
	Increase capacity of beams	lm	20	300	6,000
	Introduce new collector beams to improve capacity of floor	lm	20	495	9,900
	Increasing flexural and shear strength by adding reinforcing bars and stirrups	sum	1	2,500	2,500
	Repair beams spalling and honeycombing as detailed	lm	20	150	3,000
	Repair slab soffits for spalling and honeycombing	m^2	75	320	24,000
PH2-02	**Structural Integrity of Roofs**				
	Replace entire roof with trusses and roof angle of 25 degrees	m^2	334	200	66,800
PH2-03	**Exterior Doors, Exits and Entrances**				
	Protecting existing door with an impact-resistant covering	nr	13	1,000	13,000
	Install threshold to prevent ingress of water	nr	13	100	1,300
	Fasten door frames into concrete surrounds with bolts or screws	nr	13	30	390
PH2-04	**Windows and shutters**				
	Replace existing windows with standard operable or fixed windows and install shutters with Miami Dade NOA	m^2	184	1,270	233,699
	Remove decorative blocks and replace with large missile impact resisting windows	m^2	50	750	37,500
PH2-05	**Parapets and other outside Elements (railings, ornaments)**				
	Repair and retrofit all parapet walls	sum	1	5,000	5,000
PH2-06	**Internal walls - concrete masonry units finishd with mortar plastering**				
	Replace entire wall with new ring beam	m^2	144	475	68,400
PH2-07	**False or Suspended Ceilings**				
	Replace and retrofit entire ceiling	m^2	668	31	20,708
PH2-08	**Safety of stairways and Ramps**				
	Reconstruct entire staircase	Flights	2	5,000	10,000
	Reinstate balustrade bolted to stair treads	lm	18	500	9,180
PH2-09	**Condition and safety of floor coverings**				
	Allow for repairs to defective areas of the floor finish - allow for 100% of floor area	m^2	668	88	58,784
	To Collection				**588,061**

Task No.	Interventions/Improvements	Unit	Quantity	Unit Rate (USD)	Total (USD)
PH2-10	**Water Reserves**				
	Supply and install 80 Gall solar water heaters on roof	nr	1	2,500	2,500
	Source, repair chronic pipe leaks and retrofit plumbing	sum	1	5,000	5,000
	Install low volume water fixtures	nr	10	800	8,000
	Install potable water storage tanks to accommodate a 5-day supply	Litres	30,000	0.75	22,500
	Install rainwater tanks with capacity equivalent to 30% of building consumption - include potable water backup connection	Litres	9,000	0.75	6,750
PH2-11	**3.2 Location of water storage tanks**				
	New or replacement electric water heater - small buildings only	sum	1	1,000	1,000
	Installation of pump or upgrade of existing	sum	1	2,500	2,500
PH2-12	**Alternate water supply to regular water supply**				
	Re-plumbing of building to facilitate dual water use - potable and non-potable	sum	1	7,500	7,500
PH2-13	**Water Distribution System**				
	Source, repair chronic pipe leaks and retrofit plumbing	sum	1	2,500	2,500
PH2-14	**Wastewater System**				
	Construct new septic tank system to maximum size of 15 m3	m^3	15	250	3,750
PH2-15	**Storm drainage System - site**				
	Improve stormwater drainage on the compound	lm	117	110	12,870
PH2-16	**Storm Drainage System - roof and gutters**				
	Install guttering to roof structure inclusive of down pipes	lm	78	60	4,680
PH2-17	**Alternate Sources of Electricity**				
	Install roof mounted solar photovoltaic system as per legal statutes - 25 KW tied to the national grid	KW	25	3,500	87,500
	26 KVA generator plus automatic transfer switch	sum	1	35,000	35,000
	Allow for 500-litre fuel tank and accessories	sum	1	6,000	6,000
PH2-18	**Safety of Electrical Equipment**				
	Undertake complete rewiring of the building as required	m^2	668	120	80,160
	Re-inspection and certification of building as required	sum	1	2,500	2,500
PH2-19	**Lighting System**				
	Improve lighting using LED tubes and light fixtures	m^2	668	40	26,720
PH2-20	**Safety of HVAC Components**				
	Replace HVAC System	m^2	668	175	116,900
	To Collection				**434,330**

Task No.	Interventions/Improvements	Unit	Quantity	Unit Rate (USD)	Total (USD)
	Collection				
		Page 1			588,061
		Page 2			434,330
	Base Cost				**1,022,391**
	Allowance for Demolition of works to be repaired - 3% of Base Cost	Sum			30,672
	Allowance for preliminaries - 7.5% of Base Cost	Sum			76,679
	Sub-total				**1,129,742**
	Allow 20% contingencies due to the nature of repairs and retrofit works	Sum			112,974
	Total				**1,242,716**
	Value Added Tax - 15% of Total				186,407
	Total Construction cost of repairs and retrofit works - Police Headquarters 2.0				**1,429,124**

Potters Clinic

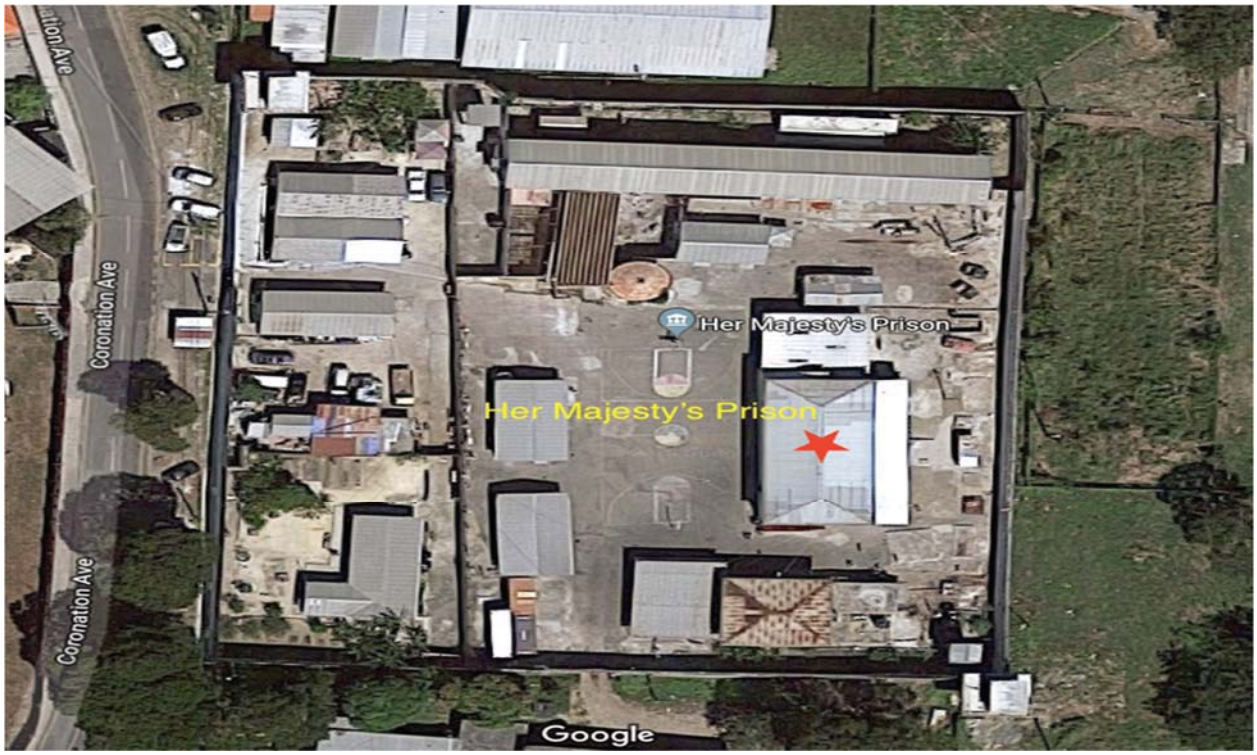
Building and Construction Data

Facility Name:	Potters Clinic	Year built:	
Building Name:	Potters Clinic	Year(s) remodeled:	
Building Address:	Potters Main Road	Original Design Code:	OECS Building Code
Latitude:	17.1118307	Area (m2):	220
Longitude:	61.8190544	Length (m):	16.6
Use:	Medical	Width (m):	13.4
Risk Category:	IV	No. of storeys:	1
Occupancy Group:	Group B	Storey height (m):	3
No. of occupants:	35	Total height (m):	4.5
Roof shape:	Gable	Walls	Concrete Blocks
Roofing:	Metal Sheeting	Structural system	Concrete Frame
Overall Condition	Average		
Comments	Risk Category IV and Average condition suggest that a short term repair horizon would be adequate.		

Task No.	Interventions/Improvements	Unit	Quantity	Unit Rate (USD)	Total (USD)
P-01	**Condition of construction materials - repair as detailed in drawings**				
	Repair small cracks with a high strength epoxy grout	sum	1	2,500	2,500
	Repair cracks > 6 mm using a welded mesh	sum	1	5,000	5,000
P-02	**Structural Integrity of Roofs**				
	Replace entire roof with trusses and roof angle of 25 degrees	m^2	220	200	44,000
P-03	**Exterior Doors, Exits and Entrances**				
	Protecting existing door with an impact-resistant covering	nr	5	1,000	5,000
	Fasten door frames into concrete surrounds with bolts or screws	nr	5	60	300
	Install threshold to prevent ingress of water	nr	5	100	500
P-04	**Windows and shutters**				
	Replace existing windows with standard operable or fixed windows and install shutters with Miami Dade NOA	m^2	40	1,270	50,800
P-05	**Other Elements of the Building Envelope**				
	Repair cracks > 6 mm using a welded mesh	sum	1	2,500	2,500
P-06	**Safety of roofing**				
	Replace and retrofit entire ceiling	m^2	220	80	17,600
P-07	**Parapets and other outside Elements (railings, ornaments)**				
	Repair cracks > 6 mm using a welded mesh	sum	1	1,500	1,500
P-08	**Internal walls - concrete masonry units finished with mortar plastering**				
	Reconstruct wall where cracks are greater than 6 mm	sum	1	2,500	2,500
	Repair small cracks with epoxy grout	sum	1	1,500	1,500
	Replace entire wall with new ring beam	m^2	15	202	3,030
P-09	**Condition and safety of floor coverings**				
	Allow for repairs to defective areas of the floor finish - allow for 20% of floor area	m^2	44	88	3,872
P-10	**Water Reserves**				
	Install solar hot water units	nr	1	2,500	2,500
	Install potable water storage tanks to accommodate a 5-day supply	litres	13,500	0.75	10,125
P-11	**Alternate water supply to regular water supply**				
	Install rainwater tanks with capacity equivalent to 30% of building consumption - include potable water backup connection	litres	4,050	0.75	3,038
P-12	**Water Distribution System**				
	Source, repair chronic pipe leaks and retrofit plumbing	sum	1	1,500	1,500
	Re-plumbing of building to facilitate dual water use - potable and non-potable	sum	1	2,500	2,500
	Supply and install 80 Gall solar water heaters on roof	nr	1	2,500	2,500
	Install low volume water fixtures	nr	4	800	3,200
	To Collection				**165,965**

Task No.	Interventions/Improvements	Unit	Quantity	Unit Rate (USD)	Total (USD)
P-13	**Wastewater System**				
	Empty and improve site septic units and filtration systems	sum	1	2,000	2,000
P-14	**Storm Drainage System - site**				
	Improve stormwater drainage on the compound	lm	90	110	9,900
P-14	**Storm Drainage System - roof and gutters**				
	Install guttering to roof structure inclusive of down pipes	lm	60	50	3,000
P-16	**Alternate Sources of Electricity**				
	16.5 KVA generator plus automatic transfer switch	sum	1	25,000	25,000
	Allow for 500-litre fuel tank and accessories	sum	1	6,000	6,000
	Install roof mounted solar photovoltaic system as per legal statutes - 15 KW tied to the national grid	KW	15	3,500	52,500
P-17	**Safety of Electrical Equipment**				
	Re-inspection and certification of building as required	sum	1	1,500	1,500
	Undertake complete rewiring of the building as required	m^2	220	120	26,400
	Improve electrical panels with the change to residual-current devices	sum	1	1,000	1,000
P-18	**Lighting System**				
	Improve lighting using LED tubes and light fixtures	m^2	220	40	8,800
P-19	**Safety of HVAC Components**				
	Allow for AC split units in specific rooms and offices	nr	6	3,500	21,000
	To Collection				**157,100**
	Collection				
		Page 1			165,965
		Page 2			157,100
	Base Cost				**323,065**
	Allowance for Demolition of works to be repaired - 3% of Base Cost	Sum			9,692
	Allowance for preliminaries - 7.5% of Base Cost	Sum			24,230
	Sub-total				**356,986**
	Allow 20% contingencies due to the nature of repairs and retrofit works	Sum			71,397
	Total				**428,384**
	Value Added Tax - 15% of Total				64,258
	Total Construction cost of repairs and retrofit works - Potters				**492,641**

Prison Block



Building and Construction Data

Facility Name:	Her Majesty's Prison	Year built:	1735
Building Name:	B block	Year(s) remodeled:	
Building Address:	Coronation Ave, St John's	Original Design Code:	Built by British
Latitude:	17.1225398	Area (m2):	800
Longitude:	61.840002	Length (m):	40
Use:	Government	Width (m):	20
Risk Category:	IV	No. of storeys:	2
Occupancy Group:	Group B	Storey height (m):	7
No. of occupants:	303	Total height (m):	6
Roof shape:	Gable	Walls	Concrete Blocks and Bricks
Roofing:	Metal Sheeting	Structural system	Concrete Frame
Overall Condition	Low		
Comments	Risk Category IV and Low condition rating suggest that an immediate term repair and retrofit horizon would be required		

Task No.	Interventions/Improvements	Unit	Quantity	Unit Rate (USD)	Total (USD)
PGB-01	**Condition of the building - as per Engineer's drawings and specifications**				
	Undertake general structural retrofit of structure	m^2	800	125	100,000
PGB-02	**Condition of construction materials- repair as detailed in drawings**				
	Repair small cracks with a high strength epoxy grout	sum	1	3,500	3,500
	Repair cracks > 6 mm using a welded mesh	sum	1	5,000	5,000
PGB-03	**Structural Redundancy - as per typical detail and specifications**				
	Introduce new columns so as to improve redundancy of structure - location and design to be provided by Engineer	lm	20	495	9,900
PGB-04	**Structural Integrity of Roofs**				
	Replace entire roof with trusses and roof angle of 25 degrees	m^2	400	200	80,000
PGB-05	**Exterior Doors, Exits and Entrances**				
	Protecting existing door with an impact-resistant covering	nr	3	1,000	3,000
	Install threshold to prevent ingress of water	nr	3	100	300
PGB-06	**Windows and shutters**				
	Replace existing windows with standard operable or fixed windows and install shutters with Miami Dade NOA	m^2	30	1,270	38,100
PGB-07	**Other Elements of the Building Envelope**				
	Repair cracks > 6 mm using a welded mesh	sum	1	5,000	5,000
PGB-08	**Parapets and other outside Elements (railings, ornaments)**				
	Repair cracks > 6 mm using a welded mesh	sum	1	1,500	1,500
	Reconstruct wall where cracks are greater than 6 mm	m^2	40	202	8,080
PGB-09	**Internal walls - concrete masonry units finished with mortar plastering**				
	Reconstruct wall where cracks are greater than 6 mm	sum	1	2,500	2,500
	Repair small cracks with epoxy grout	sum	1	2,500	2,500
	Replace entire wall with new ring beam	m^2	100	202	20,200
PGB-10	**False or Suspended Ceilings**				
	Replace and retrofit entire ceiling	m^2	300	102	30,742
	Retrofit major sections of suspended floor slab	m^2	100	502	50,244
PGB-11	**Safety of stairways and Ramps**				
	Reconstruct entire staircase	nr	1	10,000	10,000
PGB-12	**Water Reserves**				
	Construct new septic tank system to maximum size of 15 m^3	m^3	15	250	3,750
	Install potable water storage tanks to accommodate a 5-day supply - based on user population of 200 persons	Litres	72,800	0.75	54,600
	Re-plumbing of building to facilitate dual water use - potable and non-potable	sum	1	5,000	5,000
	Construct stormwater drainage throughout the building grounds	lm	180	110	19,800
	Installation of pump or upgrade of existing	sum	1	2,000	2,000
	To Collection				**455,716**

Task No.	Interventions/Improvements	Unit	Quantity	Unit Rate (USD)	Total (USD)
PGB-13	**Alternate water supply to regular water supply**				
	Install rainwater tanks with capacity equivalent to 30% of building consumption - include potable water backup connection	Litres	7,500	0.75	5,625
PGB-14	**Water Distribution System**				
	Source, repair chronic pipe leaks and retrofit plumbing	sum	1	1,000	1,000
PGB-15	**Wastewater System**				
	Construct new septic tank system to maximum size of 30 m^3	m^3	30	250	7,500
PGB-16	**Storm Drainage System - site**				
	Improve stormwater drainage on the compound	sum	1	5,000	5,000
PGB-17	**Storm Drainage System - roof and gutters**				
	Install guttering to roof structure inclusive of down pipes	lm	120	60	7,200
PGB-18	**Alternate Sources of Electricity**				
	200 KVA generator plus automatic transfer switch	sum	1	70,000	70,000
	Allow for 500-litre fuel tank and accessories	sum	1	6,000	6,000
PGB-19	**Safety of Electrical Equipment**				
	Re-inspection and certification of building as required	m^2	800	15	12,000
	Undertake complete rewiring of the building as required	m^2	800	120	96,000
	Install roof mounted solar photovoltaic system as per legal statutes - 25 KW tied to the national grid	KW	25	3,500	87,500
	To Collection				**297,825**
	Collection				
		Page 1			455,716
		Page 2			297,825
	Base Cost				**753,541**
	Allowance for Demolition of works to be repaired - 3% of Base Cost	Sum			22,606
	Allowance for preliminaries - 7.5% of Base Cost	Sum			56,516
	Sub-total				**832,663**
	Allow 20% contingencies due to the nature of repairs and retrofit works	Sum			166,533
	Total				**999,196**
	Value Added Tax - 15% of Total				149,879
	Total Construction cost of repairs and retrofit works - Prison B Block				**1,149,075**

St. John's Fire Station

Building and Construction Data

Facility Name:	St John's Fire Station	Year built:	1960's
Building Name:	St. John's Fire Station	Year(s) remodeled:	2014
Building Address:	Factory Road	Original Design Code:	
Latitude:	17.1217897	Area (m2):	600
Longitude:	61.8385879	Length (m):	24
Use:	Government	Width (m):	15
Risk Category:	IV	No. of storeys:	2
Occupancy Group:	Group A	Storey height (m):	3.028
No. of occupants:	60	Total height (m):	8.5344
Roof shape:	Hip	Walls	Blocks
Roofing:	Metal Sheeting	Structural system	Concrete Frame
Overall Condition	Low		
Comments	Risk Category IV and Low condition rating suggest that an immediate term repair and retrofit horizon would be required		

Task No.	Interventions/Improvements	Unit	Quantity	Unit Rate (USD)	Total (USD)
SJFS-01	**Condition of the building - as per Engineer's drawings and specifications**				
	Reconstruct slab on grade by cutting out damaged section and replacing with engineered section	m^2	62	135	8,370
	Increase capacity of columns	nr	5	300	1,500
	Increase capacity of beams	lm	15	300	4,500
	Increasing flexural and shear strength by adding reinforcing bars and stirrups	sum	1	2,500	2,500
	Repair beams spalling and honeycombing as detailed	lm	6	150	900
SJFS-02	**Condition of construction materials - repair as detailed in drawings**				
	Repair small cracks with a high strength epoxy grout	sum	1	2,500	2,500
	Repair cracks > 6 mm using a welded mesh and non-shrink grout	sum	1	5,000	5,000
SJFS-03	**Structural Redundancy - as per typical detail and specifications**				
	Introduce new columns so as to improve redundancy of structure - location and design to be provided by Engineer	lm	20	495	9,900
SJFS-04	**Safety of Foundations - as per Engineer's details and specifications**				
	Reconstruct severely damaged foundation walls, strip and spread footings	m^2	10	116	1,160
	Improve the drainage of the area to prevent saturation of foundation soil - alignment identified on site and drainage plans	sum	1	1,000	1,000
	Introducing new load bearing members to the foundations to relieve the already overloaded members.	m^2	10	232	2,320
SJFS-05	**Structural Integrity of Roofs**				
	Replace entire roof with trusses and roof angle of 25 degrees	m^2	206	200	41,200
SJFS-06	**Exterior Doors, Exits and Entrances**				
	Protecting existing door with an impact-resistant covering	nr	4	1,000	4,000
	Fasten door frames into concrete surrounds with bolts or screws	nr	4	60	240
	Install threshold to prevent ingress of water	nr	4	100	400
SJFS-07	**Windows and shutters**				
	Replace existing windows with standard operable or fixed windows and install shutters with Miami Dade NOA	m^2	63	1,270	80,010
SJFS-08	**Other Elements of the Building Envelope**				
	Repair cracks > 6 mm using a welded mesh	sum	1	2,500	2,500
	Replace entire existing masonry wall with the inclusion of a ring beam	m^2	50	202	10,100
SJFS-09	**Parapets and other outside Elements (railings, ornaments)**				
	Repair cracks > 6 mm using a welded mesh	sum	1	1,500	1,500
	Reconstruct wall where cracks are greater than 6 mm	m^2	20	202	4,040
	To Collection				**183,640**

Task No.	Interventions/Improvements	Unit	Quantity	Unit Rate (USD)	Total (USD)
SJFS-10	**Internal walls - concrete masonry units finishd with mortar plastering**				
	Reconstruct wall where cracks are greater than 6 mm	sum	1	2,500	2,500
	Repair small cracks with epoxy grout	sum	1	1,500	1,500
	Replace entire wall with new ring beam	m^2	70	202	14,140
SJFS-11	**Safety of stairways and Ramps**				
	Reconstruct entire staircase	Flights	4	5,000	20,000
	Reinstate balustrade bolted to stair treads	lm	13	500	6,500
SJFS-12	**Condition and safety of floor coverings**				
	Allow for repairs to defective areas of the floor finish - allow for 100% of floor area	m^2	82	88	7,216
SJFS-13	**Water Reserves**				
	Install potable water storage tanks to accommodate a 5-day supply	Litres	27,000	0.75	20,250
SJFS-14	**Alternate water supply to regular water supply**				
	Install rainwater tanks with capacity equivalent to 30% of building consumption - include potable water backup connection	Litres	8,100	0.75	6,075
	Re-plumbing of building to facilitate dual water use - potable and non-potable	sum	1	7,500	7,500
	Installation of pump or upgrade of existing	nr	1	2,500	2,500
SJFS-15	**Water Distribution System**				
	Supply and install 80 Gall solar water heaters on roof	nr	1	2,500	2,500
	Source, repair chronic pipe leaks and retrofit plumbing	sum	1	1,000	1,000
	Install low volume water fixtures	nr	8	800	6,400
SJFS-16	**Wastewater System**				
	Construct new septic tank system to maximum size of 15 m3	m^3	15	250	3,750
SJFS-17	**Storm Drainage System - site**				
	Improve stormwater drainage on the compound	lm	55	110	6,050
SJFS-18	**Storm Drainage System - roof and gutters**				
	Install guttering to roof structure inclusive of down pipes	lm	65	50	3,250
SJFS-19	**Alternate Sources of Electricity**				
	16.5 KVA generator plus automatic transfer switch	sum	1	25,000	25,000
	Allow for 500-litre fuel tank and accessories	sum	1	6,000	6,000
	Install roof mounted solar photovoltaic system as per legal statutes - 25 KW tied to the national grid	KW	25	3,500	87,500
	To Collection				**229,631**

Task No.	Interventions/Improvements	Unit	Quantity	Unit Rate (USD)	Total (USD)
SJFS-20	**Safety of Electrical Equipment**				
	Re-inspection and certification of building as required	sum	1	3,500	3,500
	Undertake complete rewiring of the building as required	m^2	412	120	49,440
	Improve electrical panels with the change to residual-current devices	sum	1	1,000	1,000
SJFS-21	**Lighting System**				
	Improve lighting using LED tubes and light fixtures	m^2	412	40	16,480
SJFS-22	**Safety of HVAC Components**				
	Allow for AC split units in specific rooms and offices	nr	10	3,500	35,000
	To Collection				**105,420**
	Collection				
		Page 1			183,640
		Page 2			229,631
		Page 3			105,420
	Base Cost				**518,691**
	Allowance for Demolition of works to be repaired - 3% of Base Cost	Sum			15,561
	Allowance for preliminaries - 7.5% of Base Cost	Sum			38,902
	Sub-total				**573,154**
	Allow 20% contingencies due to the nature of repairs and retrofit works	Sum			114,631
	Total				**687,784**
	Value Added Tax - 15% of Total				103,168
	Total Construction cost of repairs and retrofit works - St. Johns Fire Station				**790,952**

Swetes Clinic

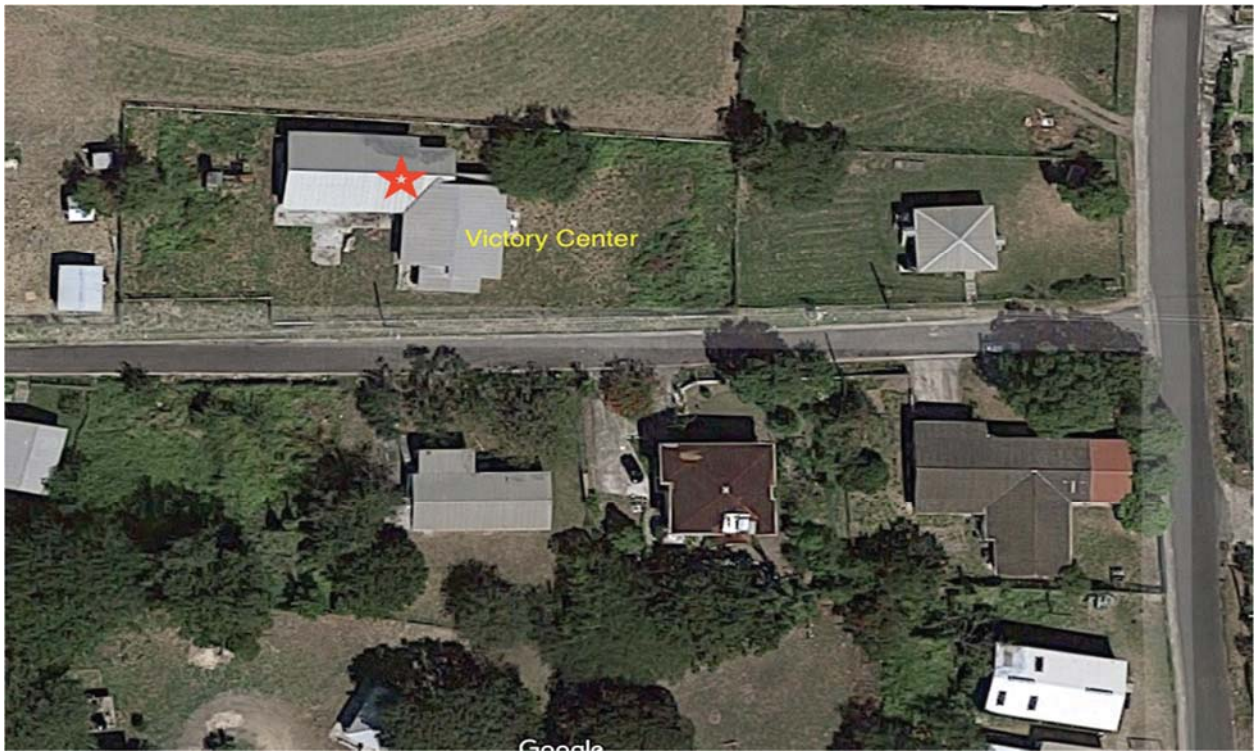
Building and Construction Data

Facility Name:	Swetes Clinic	Year built:	
Building Name:	Swetes Clinic	Year(s) remodeled:	
Building Address:	Swetes Village	Original Design Code:	
Latitude:	17.0518242	Area (m2):	177.32
Longitude:	61.8006131	Length (m):	14.3
Use:	Medical	Width (m):	12.4
Risk Category:	IV	No. of storeys:	1
Occupancy Group:	Group D	Storey height (m):	2.4
No. of occupants:	25	Total height (m):	5,18
Roof shape:	Hip	Walls	Bricks
Roofing:	Metal Sheeting	Structural system	Concrete Frame
Overall Condition	Average		
Comments	Risk Category IV and high Average condition rating of 68% suggest that short term repair and retrofit horizon would be required		

Task No.	Interventions/Improvements	Unit	Quantity	Unit Rate (USD)	Total (USD)
SC -01	**Condition of the building - as per Engineer's drawings and specifications**				
	Undertake general structural retrofit of the building	sum	1	20,000	20,000
SC -02	**Condition of construction materials - repair as detailed in drawings**				
	Repair small cracks with a high strength epoxy grout	sum	1	1,500	1,500
	Repair cracks > 6 mm using a welded mesh	sum	1	2,000	2,000
SC -03	**Safety of Foundations - as per Engineer's details and specifications**				
	Reconstruct severely damaged foundation walls, strip and spread footings Underpin subsided foundation	m^2	10	116	1,160
	Improve the drainage of the area to prevent saturation of foundation soil - alignment identified on site and drainage plans	sum	1	1,000	1,000
	Introducing new load bearing members to the foundations to relieve the already overloaded members.	m^2	10	232	2,320
SC -04	**Windows and shutters**				
	Replace existing windows with standard operable or fixed windows and install shutters with Miami Dade NOA	m^2	40	750	30,000
SC -05	**Other Elements of the Building Envelope**				
	Repair cracks > 6 mm using a welded mesh	sum	1	1,500	1,500
	Replace entire existing masonry wall with the inclusion of a ring beam	m^2	20	202	4,040
SC -06	**Safety of roofing**				
	Inspect roof and then Install hurricane straps at the eaves/ring beams and ridge to rafter connections	nr	210	5	1,050
	Fixing roof sheathing with minimum 75 mm screws into rafters and ridges	nr	600	1	600
	Decreasing spacing of fasteners, particularly at eaves, hips, ridge & edges of gable roofs	nr	420	1	420
	Roof and wall coverings capable of resisting high winds	m^2	286	40	11,440
	Replace all fasteners and comply with OECS-BC 7th Edition	m^2	286	16	4,616
SC -07	**False or Suspended Ceilings**				
	Replace and retrofit up to 50% of the ceilings	m^2	143	80	11,440
SC -08	**Water Reserves**				
	Install potable water storage tanks to accommodate a 5-day supply	Litres	13,500	0.75	10,125
SC -09	**Alternate water supply to regular water supply**				
	Install rainwater tanks with capacity equivalent to 30% of building consumption - include potable water backup connection	Litres	4,050	0.75	3,038
	Re-plumbing of building to facilitate dual water use - potable and non-potable	sum	1	7,500	7,500
	Installation of pump or upgrade of existing	nr	1	2,500	2,500
SC -10	**Water Distribution System**				
	Supply and install 80 Gall solar water heaters on roof	nr	1	2,500	2,500
	Source, repair chronic pipe leaks and retrofit plumbing	sum	1	2,500	2,500
	Install low volume water fixtures	nr	43	800	34,400
	To Collection				**155,649**

Task No.	Interventions/Improvements	Unit	Quantity	Unit Rate (USD)	Total (USD)
SC -11	**Wastewater System**				
	Empty and improve site septic units and filtration systems	sum	1	2,500	2,500
SC -12	**Storm Drainage System - site**				
	Improve stormwater drainage on the compound	lm	98	110	10,780
SC -13	**Storm Drainage System - roof and gutters**				
	Install guttering to new roof structure inclusive of down pipes	lm	70	50	3,500
SC -14	**Alternate Sources of Electricity**				
	16.5 KVA generator plus automatic transfer switch	sum	1	25,000	25,000
	Allow for 500-litre fuel tank and accessories	sum	1	6,000	6,000
	Install roof mounted solar photovoltaic system as per legal statutes - 15 KW tied to the national grid	KW	15	3,500	52,500
					0
SC -15	**Safety of Electrical Equipment**				
	Re-inspection and certification of building as required	sum	1	2,000	2,000
	Undertake up to 50% rewiring of the building as required	m^2	143	120	17,160
	Improve electrical panels with the change to residual-current devices	sum	1	1,000	1,000
					0
SC -16	**Lighting system**				
	Improve lighting using LED tubes and light fixtures	m^2	286	40	11,440
					0
SC -17	**Safety of HVAC Components**				
	Allow for AC split units in specific rooms and offices	nr	6	3,500	21,000
	To Collection				**152,880**
	Collection				
		Page 1			155,649
		Page 2			152,880
	Base Cost				**308,529**
	Allowance for Demolition of works to be repaired - 3% of Base Cost	Sum			9,256
	Allowance for preliminaries - 7.5% of Base Cost	Sum			23,140
	Sub-total				**340,924**
	Allow 20% contingencies due to the nature of repairs and retrofit works	Sum			68,185
	Total				**409,109**
	Value Added Tax - 15% of Total				61,366
	Total Construction cost of repairs and retrofit works - Swetes Clinic				**470,475**

Victory Center



Building and Construction Data

Facility Name:	Victory Center	Year built:	
Building Name:	Victory Center	Year(s) remodelled:	
Building Address:	St. John's	Original Design Code:	
Latitude:	17.1219209	Area (m2):	150
Longitude:	61.834791	Length (m):	15
Use:	Military	Width (m):	10
Risk Category:	IV	No. of storeys:	1
Occupancy Group:	Group A	Storey height (m):	3.5
No. of occupants:	25	Total height (m):	4
Roof shape:	Pyramid Hip	Walls	Concrete Blocks
Roofing:	Metal Sheeting	Structural system	Concrete Frame
Overall Condition	Average		
Comments	Risk Category IV and high Average condition rating of 65% suggest that short term repair and retrofit horizon would be required		

Task No.	Interventions/Improvements	Unit	Quantity	Unit Rate (USD)	Total (USD)
VC-01	**Structural Integrity of Roofs**				
	Retrofit roof with collars at top third of roof height	lm	200	16	3,200
	Strengthening overhangs at gable end walls	m^2	37	31	1,131
VC-02	**Exterior Doors, Exits and Entrances**				
	Protecting existing door with an impact-resistant covering	nr	8	1,000	8,000
	Install threshold to prevent ingress of water - single door	nr	8	100	800
	Protecting existing doors with an impact-resistant covering	nr	1	2,000	2,000
	Install threshold to prevent ingress of water - double door	nr	1	180	180
VC-03	**Windows and shutters**				
	Replace existing windows with standard operable or fixed windows and install shutters with Miami Dade NOA	m^2	50	1,270	63,500
VC-04	**Other Elements of the Building Envelope**				
	Repair cracks > 6 mm using a welded mesh	sum	1	1,500	1,500
	Replace entire existing masonry wall with the inclusion of a ring beam	m^2	10	202	2,020
VC-05	**Safety of roofing**				
	Inspect roof and then Install hurricane straps at the eaves/ring beams and ridge to rafter connections	nr	210	5	1,050
	Fixing roof sheathing with minimum 75 mm screws into rafters and ridges	nr	600	1	600
	Decreasing spacing of fasteners, particularly at eaves, hips, ridge & edges of gable roofs	nr	420	1	420
VC-06	**Parapets and other outside Elements (railings, ornaments)**				
	Repair cracks > 6 mm using a welded mesh	sum	1	2,500	2,500
	Reconstruct wall where cracks are greater than 6 mm	m^2	20	202	4,040
VC-07	**Internal walls - concrete masonry units finishd with mortar plastering**				
	Reconstruct wall where cracks are greater than 6 mm	sum	1	2,500	2,500
	Repair small cracks with epoxy grout	sum	1	1,500	1,500
VC-08	**False or Suspended Ceilings**				
	Replace and retrofit 50% ceiling	m^2	675	20	13,500
VC-09	**Safety of stairways and Ramps**				
	Reconstruct entire staircase	Flights	2	5,000	10,000
	Reinstate balustrade bolted to stair treads	lm	6	500	3,000
VC-10	**Condition and safety of floor coverings**				-
	Allow for repairs to defective areas of the floor finish - allow for 10% of floor area	m^2	135	88	11,880
	Total Collection				**133,321**

Task No.	Interventions/Improvements	Unit	Quantity	Unit Rate (USD)	Total (USD)
VC-11	**Safety of HVAC Components**				
	Allow for AC split units in specific rooms and offices	nr	20	3,500	70,000
	Total Collection				**70,000**
	Collection				
		Page 1			133,321
		Page 2			70,000
	Base Cost				**203,321**
	Allowance for Demolition of works to be repaired - 3% of Base Cost	Sum			6,100
	Allowance for preliminaries - 7.5% of Base Cost	Sum			15,249
	Sub-total				**224,669**
	Allow 20% contingencies due to the nature of repairs and retrofit works	Sum			44,934
	Total				**269,603**
	Value Added Tax - 15% of Total				40,440
	Total Construction cost of repairs and retrofit works -Victory Centre				**310,044**

Nyabinghi School

Facility Name:	Nyabinghi Theocracy School	Year built:	
Building Name:	Living Quarters	Year(s) remodelled:	
Building Address:	Big Creek	Original Design Code:	Unknown
Latitude:	17° 5'38.43"N	Area (m2):	30
Longitude:	61°50'58.66"W	Length (m):	5.5
Use:	Educational	Width (m):	4.88
Risk Category:	II	No. of storeys:	1
Occupancy Group:	Group E	Storey height (m):	2.75
No. of occupants:	20	Total height (m):	4.5
Roof shape:	Flat Gable	Walls	Timber - Plywood
Roofing:	Metal sheets	Structural system	Timber studs
Overall Condition	Low		
Comments	Needs to be demolished and reconstructed		

CLIMATE TECHNOLOGY CENTRE AND NETWORK

STANDARD STRUCTURAL REPAIR AND RETROFIT DRAWINGS

SHEET #	SHEET TITLE
18106-G-001	COVER SHEET & DRAWING LIST
	FOUNDATION REPAIRS AND RETROFIT MEASURES
18106-S-501	CONTINUOUS FOUNDATION AND UNDERPINNING DETAILS
18106-S-502	UNDERPINNING DETAILS
	SLAB REPAIR AND RETROFIT MEASURES
18106-S-506	CRACKS METHODOLOGIES AND EXPANSION JOINT DETAIL
18106-S-507	SLAB PATCH, CONSTRUCTION AND EXPANSION JOINTS DETAILS
18106-S-508	CONSTRUCTION, PREFAB, FIBERBPOARD FILLER & SAWED JOINTS DETAILS
18106-S-509	SLAB REPAIR DETAIL AND METHODOLOGIES
18106-S-510	SPALLING AND DETERIORATED SLAB REPIAR METHODOLOGIES & DETAILS
	WALL REPAIR AND RETROFIT MEASURES
18106-S-511	REPAIR METHODOLOGIES FOR CRACKS IN BLOCK WORK WALL
18106-S-512	REPAIR METHODOLOGIES FOR CRACKS IN BLOCK WORK WALL
18106-S-513	NEW WALL TO EXISTING WALL OR COLUMN CONNECTION DETAILS
18106-S-514	BLOCKWORK & RETAINING WALLS REPAIR AND MASONRY UNIT DETAILS
18106-S-515	DETAILS SHOWING HOW TO STRENGTHENING EXISTING WALL
18106-S-516	NEW WALL TO EXISTING WALL CONNECTION DETAILS
18106-S-517	STRENGTHENING OF BLOCKWORK WALL BY BUTTRESSES
	COLUMN REPAIR AND RETROFIT MEASURES
18106-S-521	CONCRETE JACKET ESCTION AND DETAILS
18106-S-522	CONCRETE JACKET ESCTION AND DETAILS
18106-S-523	COLUMN REPAIR METHODOLOGIES AND DETAILS
18106-S-524	COLUMN REPAIR METHODOLOGIES & COULMN TO MASORY CONNECTION DETAIL
18106-S-525	COLUMN RETROFTTING DETAILS

SHEET #	SHEET TITLE
18106-S-526	STRENGTHENING OF DAMAGED COLUMN DETAILS
	BEAM REPAIR AND RETROFIT MEASURES
18106-S-531	BEAM REPAIR METHODOLOGIES AND DETAILS
18106-S-532	INCREASING SHEAR STRENGTH IN EXISTING BEAM DETAILS
	WINDOW REPAIR AND RETROFIT MEASURES
18106-S-536	RETROFITTING EXISTING OPENING AND NEW WINDOW OPENING DETAILS
	DOORS REPAIR AND RETROFIT MEASURES
18106-S-541	EXTERNAL DOOR EXTENSION AND NEW LINTEL DETAILS
	ROOF REPAIR AND RETROFIT MEASURES
18106-S-546	TYPICAL TRUSS DETAILS
18106-S-547	HURRICANE TIES DETAILS
18106-S-548	ROOF COLLAR TIE AND ROOF SHEETING DETAILS
18106-S-549	HIP ROOF FASTENERS ARRANGEMENT AND GABLE ROOF FRAMING DETAILS
18106-S-550	ROOF REPAIR AND RETROFIT MEASURES
	SEPTIC TANK REPAIR AND RETROFIT MEASURES
18106-S-556	TYPICAL SEPTIC TANK PLAN AND SECTION
18106-S-557	FIELD DRAINS
	EXTERNAL - DRAINS REPAIR AND RETROFIT MEASURES
18106-S-561	TYPICAL DRAINS DETAILS
18106-S-562	STEPPED AND DOG BONE COVER DETAILS
18106-S-563	UTILITY AND POT HOLES REPAIR DETAILS
	FINISHES REPAIR AND RETROFIT MEASURES
18106-S-571	DAMAGED TILE REPLACEMENT AND STAIRCASE FINISH DETAILS

ENGINEER'S CERTIFICATION/ PROFESSIONAL SEAL

#	DATE	REVISION	BY	CHK

ECMC Ltd
1st flr. Marie-Colette Bldg.; #9Lawjanv Crescent, Rodney Bay Commercial Blvd;
P.O. Box RB2446; Gros Islet, Saint Lucia;
t: 1-758-453-2093; e: ecmc@candw.lc; w: www.ecmcstlucia.com

CLIENT: **CLIMATE TECHNOLOGY CENTRE AND NETWORK**

PROJECT: **TECHNICAL ASSISTANCE FOR RESILIENCE TO CLIMATE VARIABILITY IN THE BUILDING SECTOR OF ANTIGUA AND BARBUDA**

TITLE: **COVER SHEET & DRAWING LIST**

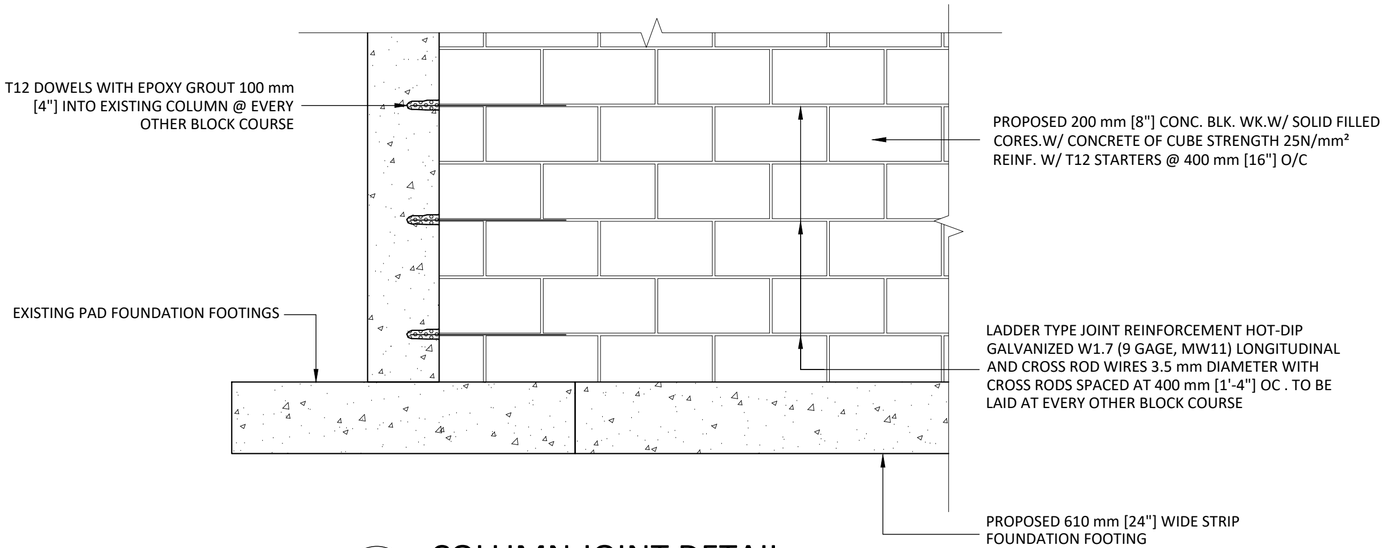
SCALE: **AS SHOWN** | DRAWN: **H.A.**

DATE: **SEPTEMBER, 2018** | CHECKED: **E. LOUIS** (REG. ENGINEER)

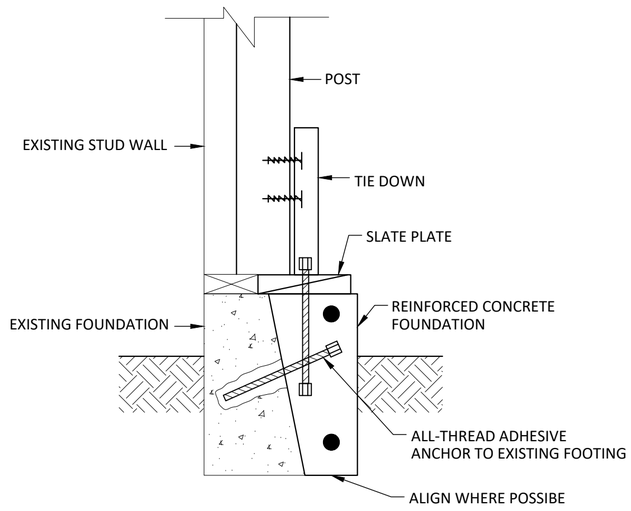
DRAWING #: **18106-G-001** | REV #:

FOUNDATION REPAIRS & RETROFIT MEASURES

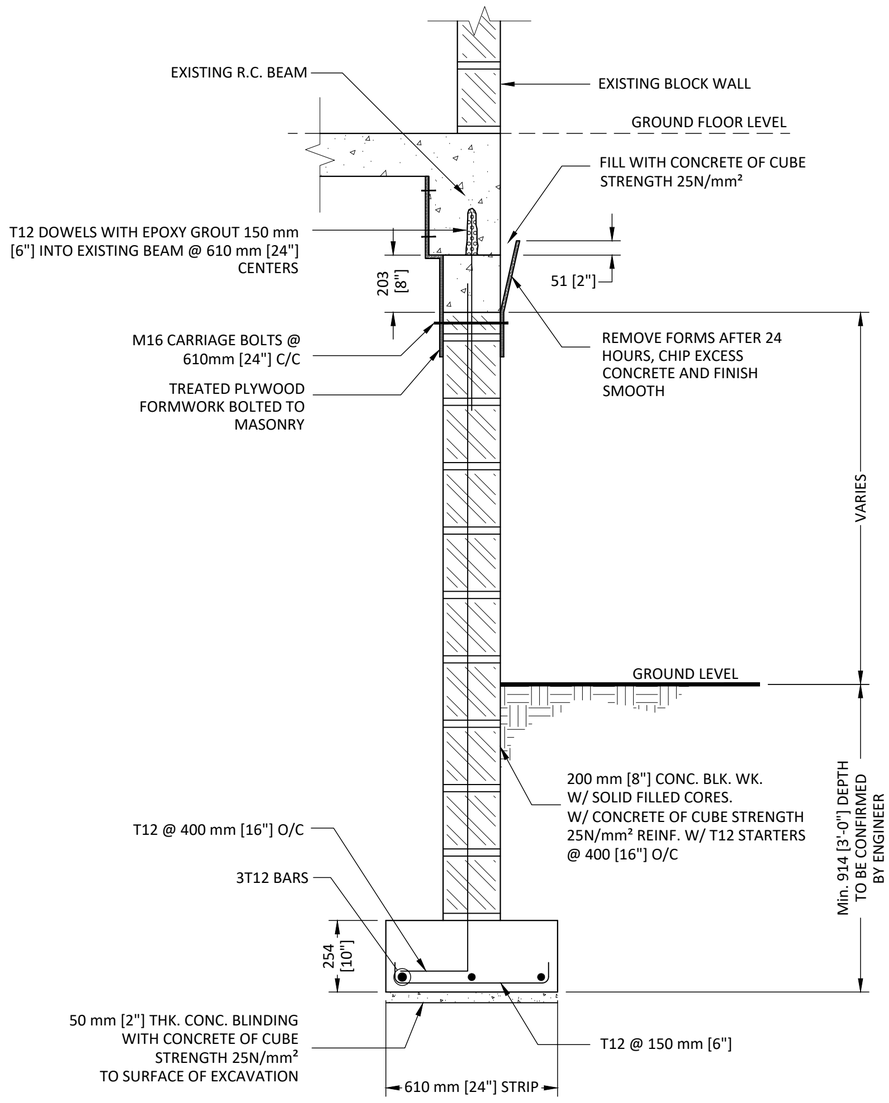
NOTES:
1. ALL REINFORCING BARS USED SHOULD BE ASTM A615 GRADE 60 [420 MPa].



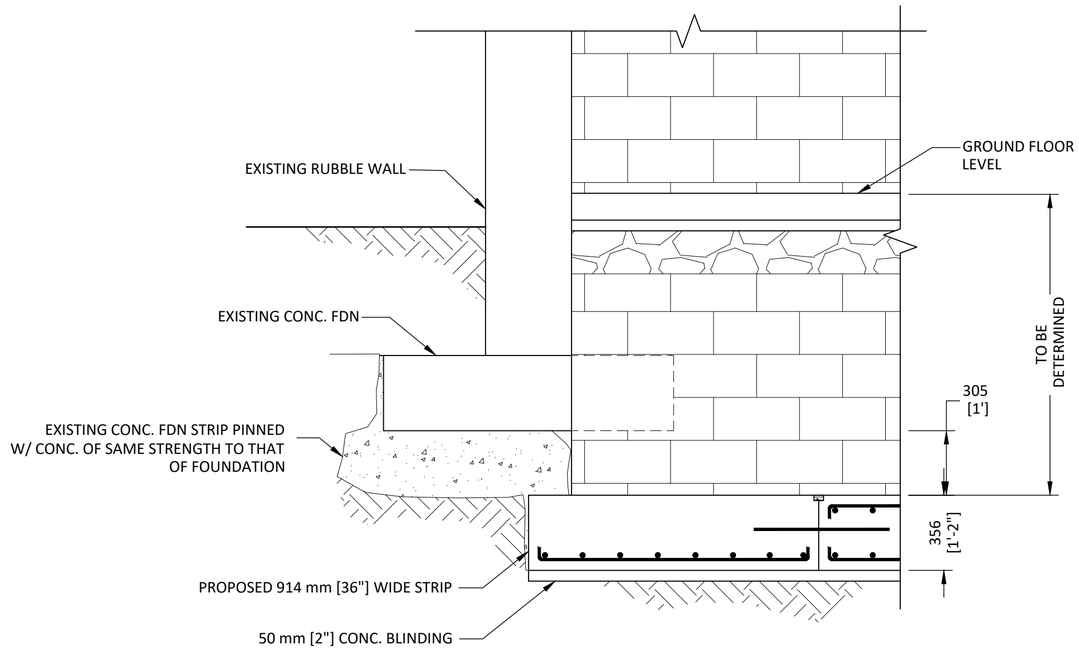
A COLUMN JOINT DETAIL
SCALE: 1:15



C NEW CONTINUOUS FOUNDATION CAST ALONG SIDE EXISTING TO PROVIDE CAPACITY FOR TIE-DOWN ANCHOR
SCALE: NTS



B STRIP FOUNDATION DETAIL
SCALE: 1:15



D UNDERPINNING DETAIL 1
SCALE: 1:20

ENGINEER'S CERTIFICATION/ PROFESSIONAL SEAL

#	DATE	REVISION	BY	CHK

ECMC Ltd
1st flr. Marie-Colette Bldg.; #9Lawjanv Crescent, Rodney Bay Commercial Blvd;
P.O. Box RB2446; Gros Islet, Saint Lucia;
t: 1-758-453-2093; e: ecmc@candw.lc; w: www.ecmcstlucia.com

CLIENT: **CLIMATE TECHNOLOGY CENTRE AND NETWORK**

PROJECT: **TECHNICAL ASSISTANCE FOR RESILIENCE TO CLIMATE VARIABILITY IN THE BUILDING SECTOR OF ANTIGUA AND BARBUDA**

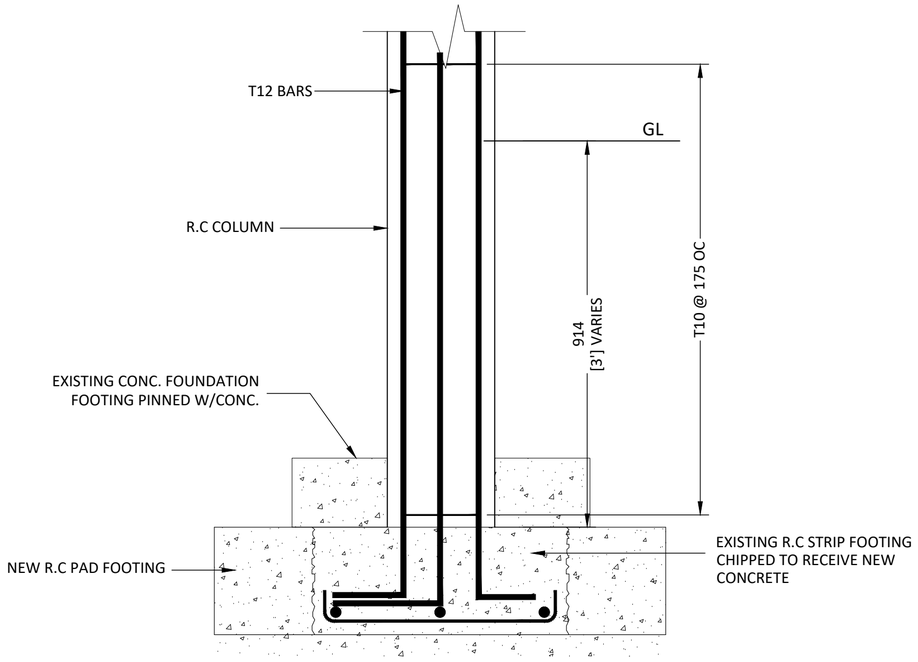
TITLE: **CONTINUOUS FOUNDATION AND UNDERPINNING DETAILS**

SCALE: **AS SHOWN** | DRAWN: **H.A.**

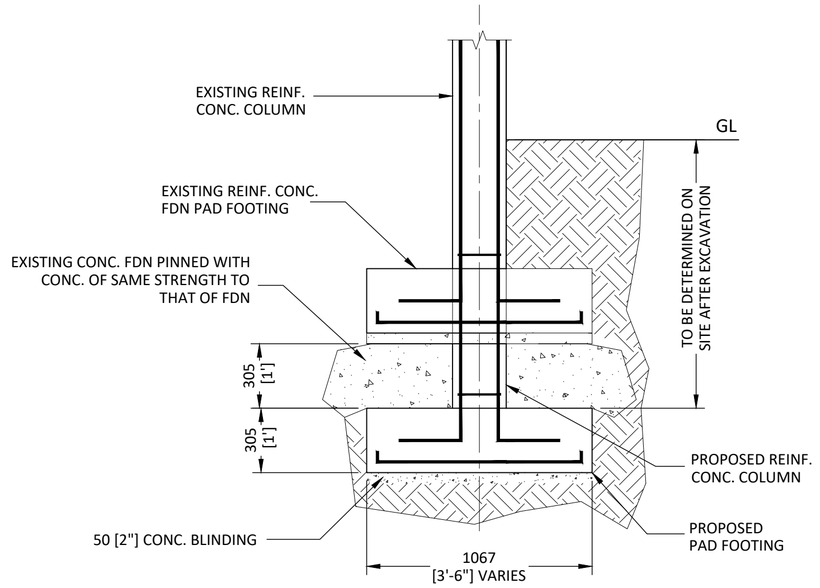
DATE: **SEPTEMBER, 2018** | CHECKED: **E. LOUIS** (REG. ENGINEER)

DRAWING #: **18106-S-501** | REV #:

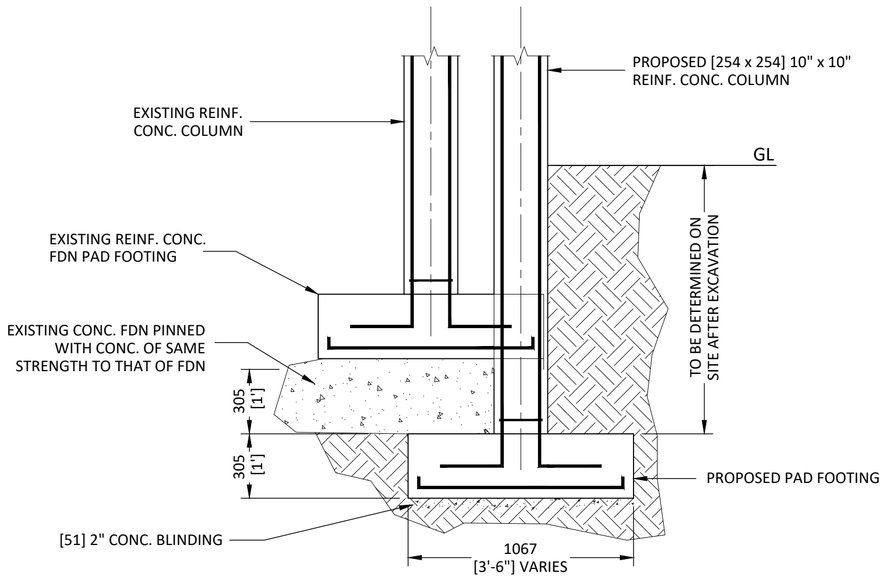
NOTES:
1. ALL REINFORCING BARS USED SHOULD BE ASTM A615 GRADE 60 [420 MPa].



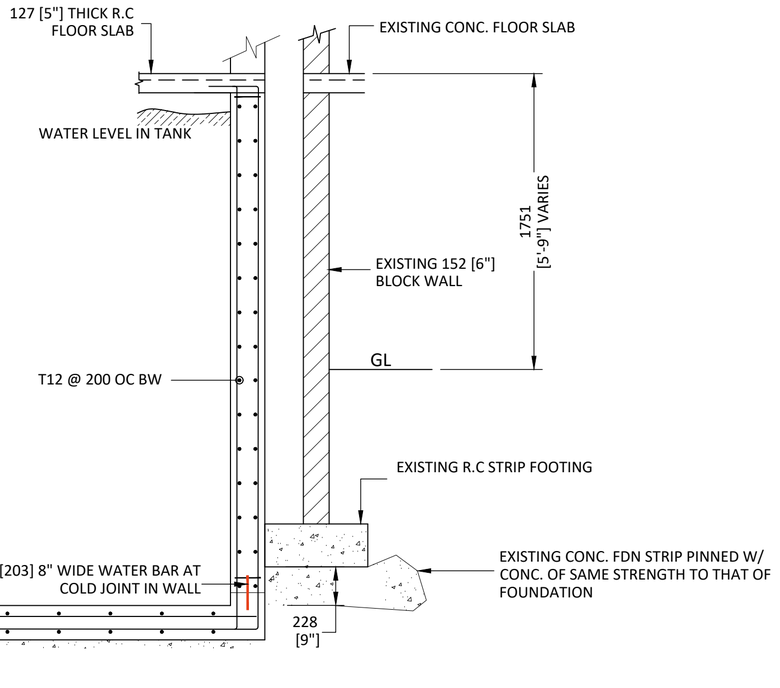
1 UNDERPINNING DETAIL 2
SCALE: 1:15



2 UNDER PINNING DETAIL 3
SCALE: 1:20



3 UNDERPINNING DETAIL 3
SCALE: 1:20



4 UNDERPINNING DETAIL 4
SCALE: 1:25

ENGINEER'S CERTIFICATION/ PROFESSIONAL SEAL

#	DATE	REVISION	BY	CHK

ECMC Ltd
1st flr. Marie-Colette Bldg.; #9Lawjanv Crescent, Rodney Bay Commercial Blvd;
P.O. Box RB2446; Gros Islet, Saint Lucia;
t: 1-758-453-2093; e: ecmc@candw.lc; w: www.ecmcstlucia.com

CLIENT: **CLIMATE TECHNOLOGY CENTRE AND NETWORK**

PROJECT: **TECHNICAL ASSISTANCE FOR RESILIENCE TO CLIMATE VARIABILITY IN THE BUILDING SECTOR OF ANTIGUA AND BARBUDA**

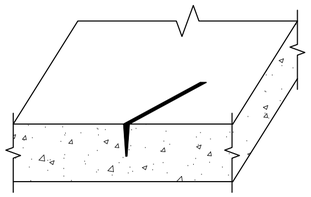
TITLE: **UNDERPINNING DETAILS**

SCALE: **AS SHOWN** | DRAWN: **H.A.**

DATE: **SEPTEMBER, 2018** | CHECKED: **E. LOUIS** (REG. ENGINEER)

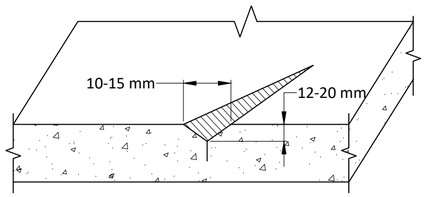
DRAWING #: **18106-S-502** | REV #:

SLAB REPAIRS & RETROFIT MEASURES

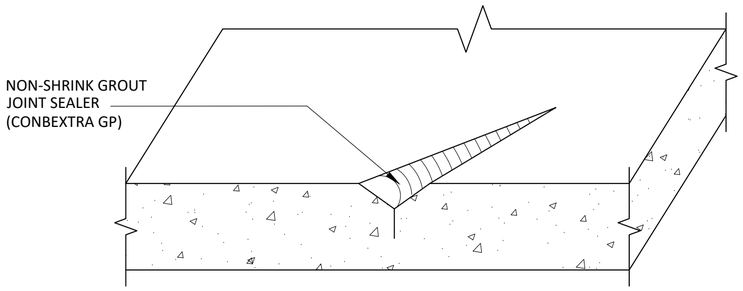


(a) ORIGINAL CRACK

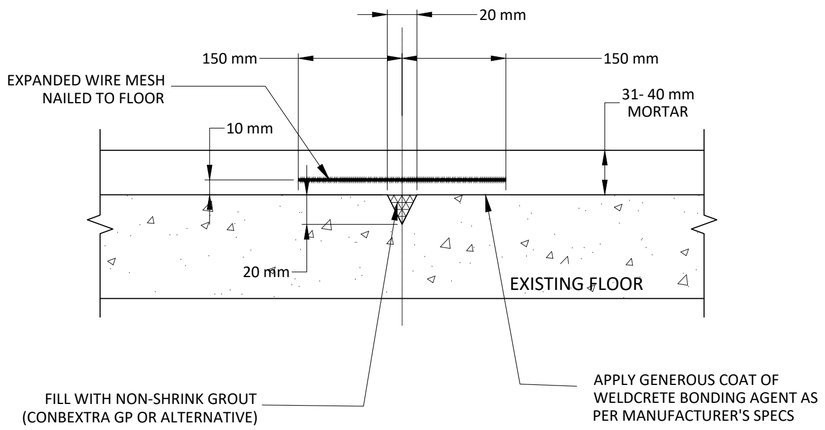
GROOVE CUT WITH SAW, GRINDER, OR CHIPPING TOOLS



(b) ROUTING



(c) SEALING



1 REPAIR SOLUTION OF CRACKS IN SLAB

SCALE: NTS

REPAIR METHODOLOGY 2 - CRACKS IN SLABS

1. USING A DEMOLITION/BREAKER HAND DRILL, BREAK UP THE EXISTING MORTAR AND CART AWAY;
2. CLEAR THE FLOOR OF ALL LOOSE DEBRIS;
3. SEPARATE THE GROUND FLOOR INTO FOUR DISTINCT ZONES;
4. REQUEST AN INSPECTION FROM THE ENGINEER IN ORDER FOR THE SEVERITY OF CRACKS TO BE ESTABLISHED AND CATEGORIZED;
5. BASED ON THE ENGINEER'S RECOMMENDATION ONE OF THE FOLLOWING THREE SOLUTIONS SHOULD BE ADOPTED:

A. MINOR HAIRLINE CRACKS

(a) USE A GRINDER WITH A CONCRETE GRADE BLADE TO OPEN UP CRACK LINE;
(b) USING AN AIR COMPRESSOR, CLEAN CRACK OF ALL DEBRIS AND DUST;
(c) USING A 1' [25 mm] BRUSH, APPLY A THIN COAT OF A BONDING AGENT (WELDCRETE) WITHIN THE CRACK;
(d) USING A LARGE PUTTY KNIFE MAX A PORTION OF A NON-SHRINK GROUT (CONBEXTRA GP) AND APPLY TO SURFACE; FINISHING FLUSH WITH CONCRETE SURFACE.

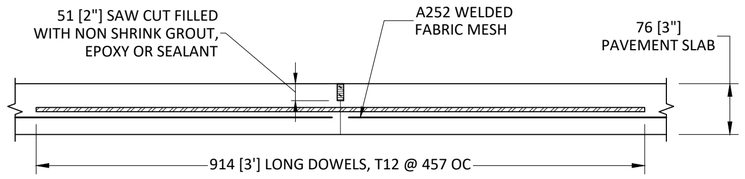
B. CRACKS GREATER THAN ¼" [6 mm] WIDE

(a) USING A GRINDER, CUT A WEDGE ABOUT ¾" [20 mm] WIDE AT THE SURFACE AND ¾" [20 mm] DEEP;
(b) USING AN AIR COMPRESSOR, CLEAN THE CRACK OF ALL DEBRIS.
(c) APPLY GENEROUS COAT OF WELDCRETE;
(d) MIX THE CONBEXTRA GP ACCORDING TO THE MANUFACTURER'S SPECIFICATION AND FILL THE CRACKS.

C. HUGE CRACKS, SURFACE DEFORMITIES AND DEFECTIVE CONCRETE ALONG CRACK

(a) INSCRIBE A CORRIDOR ABOUT 9" [225 mm] ON EITHER SIDE OF THE CRACK LINE, CUT THE CONCRETE WITH A 12" [300 mm] GRINDER BLADE AND REMOVE CONCRETE USING A BREAKER DRILL;
(b) REMOVE ALL DEBRIS DOWN TO SUBGRADE;
(c) INSPECT SUBGRADE, IF COMPRESSIBLE REMOVE AND REPLACE WITH A WELL GRADED PUMICE BACKFILL USING A SMALL HARD TAMPER COMPACT TRENCH TO ORIGINAL LEVEL;
(d) PLACE ¼" [12 mm] DOWELS AT 16" [400 mm] SPACING WITHIN EACH EDGE AND PLACE A142 MESH;
(e) FILL OPEN SPACE WITH CONCRETE OF 28-DAY COMPRESSIVE STRENGTH OF 25N/mm² (3750 PSI).

6. ONCE REPAIRS ARE IMPLEMENTED AS PER ONE OF THE CRACK REPAIRS, USE A BREAKER DRILL AND CHIP FLOOR SLAB LEAVING A PATTERN OF SMALL GASHES ABOUT 6" [150 mm] APART;
7. IDENTIFY ZONE WITHIN WHICH MORTAR REPAIR WILL BE PERFORMED THEN APPLY COAT OF WELDCRETE;
8. WHERE HUGE CRACKS (MENTIONED IN 3 ABOVE) WERE REPAIRED, PLACE A MESH OF LIGHT GAUGE EXPANDED METAL STRIPS APPROXIMATELY 4" [100 mm] WIDE, OVER CRACK LINES;
9. ALLOW TO DRY FOR AN HOUR, THEN APPLY MORTAR USING A MIXTURE OF 1:3 (CEMENT TO SAND) WITH AN ADDITIVE (CONPLAST 430);
10. CONTINUE (1 TO 9) THROUGHOUT THE OTHER SECTIONS OF THE FLOOR SLAB;
11. FINISH FLOOR WITH A SURFACE HARDENER AND DUST PROOFING AGENT.



2 EXPANSION JOINT DETAIL

SCALE: NTS

ENGINEER'S CERTIFICATION/ PROFESSIONAL SEAL

#	DATE	REVISION	BY	CHK

ECMC Ltd
1st Fl. Marie-Colette Bldg.; #9Lawjanv Crescent, Rodney Bay Commercial Blvd;
P.O. Box RB2446; Gros Islet, Saint Lucia;
t: 1-758-453-2093; e: ecmc@candw.lc; w: www.ecmcstlucia.com

CLIENT: **CLIMATE TECHNOLOGY CENTRE AND NETWORK**

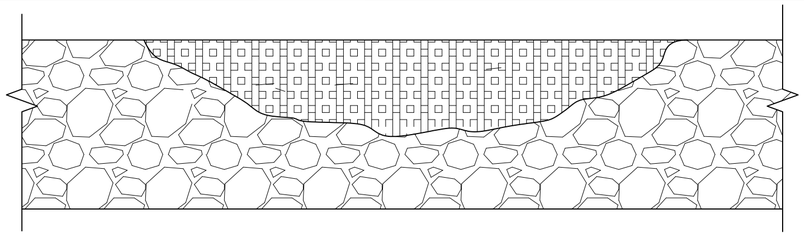
PROJECT: **TECHNICAL ASSISTANCE FOR RESILIENCE TO CLIMATE VARIABILITY IN THE BUILDING SECTOR OF ANTIGUA AND BARBUDA**

TITLE: **CRACKS METHODOLOGIES AND EXPANSION JOINT DETAIL**

SCALE: **AS SHOWN** | DRAWN: **H.A.**

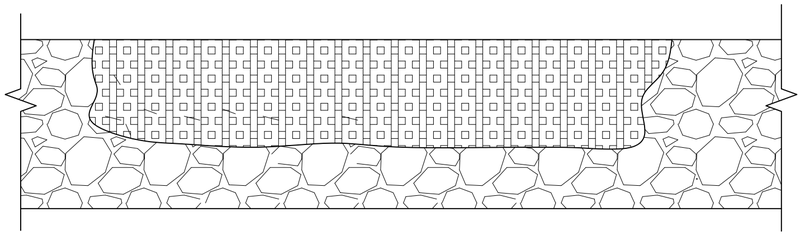
DATE: **SEPTEMBER, 2018** | CHECKED: **E. LOUIS** (REG. ENGINEER)

DRAWING #: **18106-S-506** | REV #:



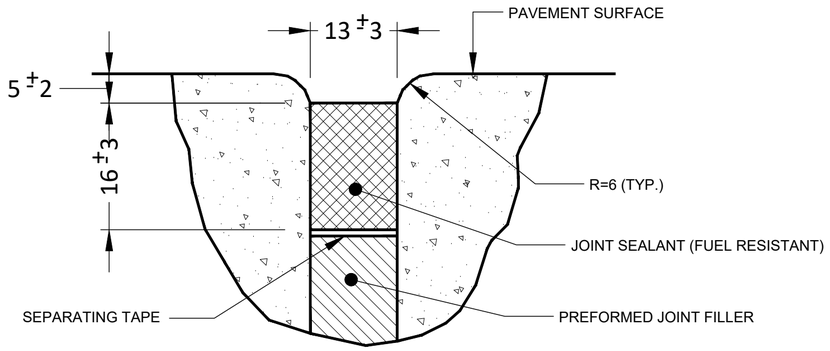
1 INCORRECTLY INSTALLED PATCH

SCALE: NTS



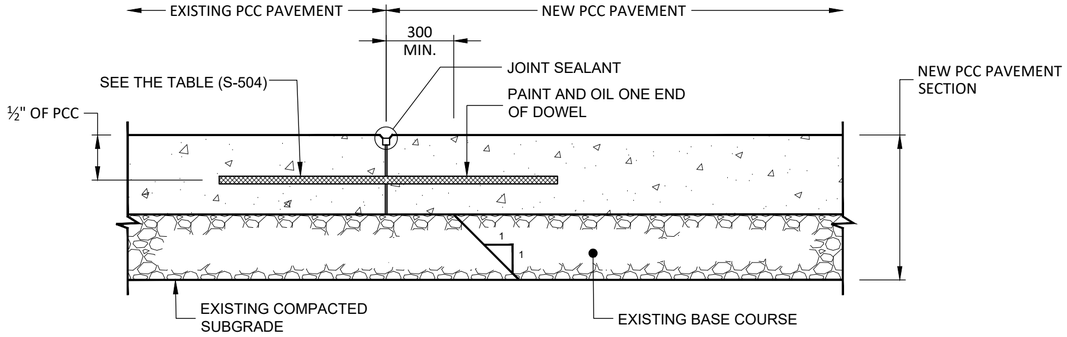
2 CORRECTLY INSTALLED PATCH

SCALE: NTS



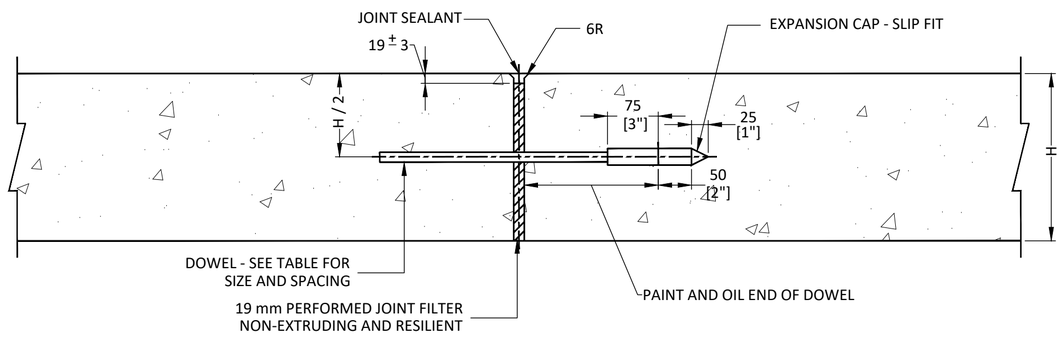
3 CONSTRUCTION JOINT

SCALE: NTS



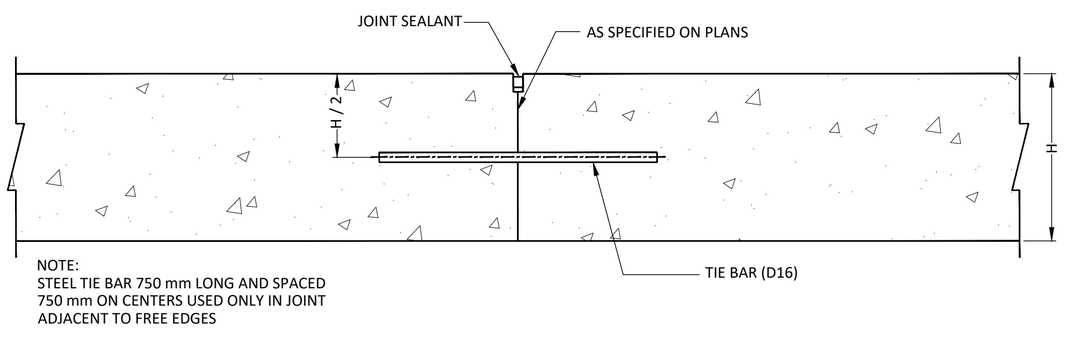
4 NEW / EXISTING PCC PAVEMENT JOINT DETAIL

SCALE: NTS



5 TRANSVERSE EXPANSION JOINT

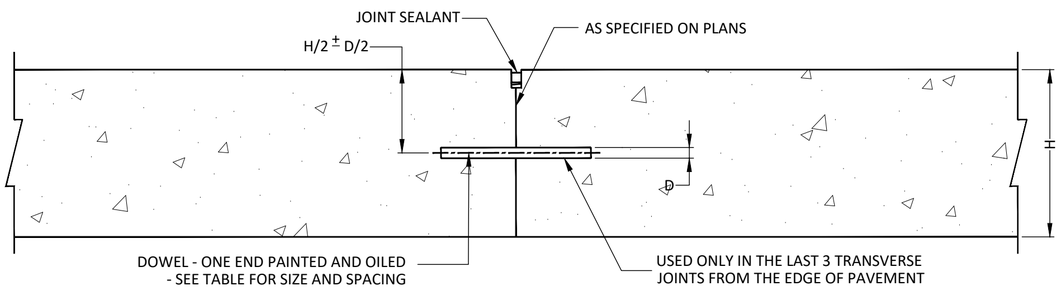
SCALE: NTS



NOTE:
STEEL TIE BAR 750 mm LONG AND SPACED
750 mm ON CENTERS USED ONLY IN JOINT
ADJACENT TO FREE EDGES

6 LONGITUDINAL EXPANSION JOINT

SCALE: NTS



7 TRANSVERSE CONSTRUCTION JOINT

SCALE: NTS

SIZE AND SPACING FOR DOWELS, (mm)

PAVEMENT THICKNESS	DOWEL DIAMETER	MINIMUM DOWEL LENGTH	DOWEL SPACING	DOWEL SIZE (mm) AND TYPE
LESS THAN 200	19	400	300	19 ROUND BAR
200 TO 275	25	400	300	25 ROUND BAR
300 TO 375	31	500	375	32 ROUND BAR

ENGINEER'S CERTIFICATION/ PROFESSIONAL SEAL

#	DATE	REVISION	BY	CHK

ECMC Ltd
1st Fl. Marie-Colette Bldg.; #9Lawjanv Crescent, Rodney Bay Commercial Blvd;
P.O. Box RB2446; Gros Islet, Saint Lucia;
t: 1-758-453-2093; e: ecmc@candw.lc; w: www.ecmcstlucia.com

CLIENT: **CLIMATE TECHNOLOGY CENTRE AND NETWORK**

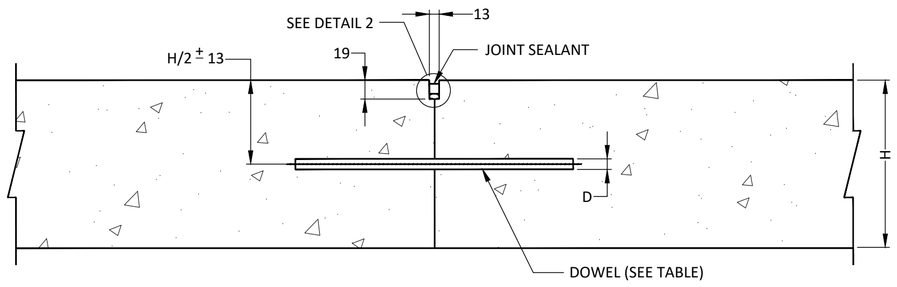
PROJECT: **TECHNICAL ASSISTANCE FOR RESILIENCE TO CLIMATE VARIABILITY IN THE BUILDING SECTOR OF ANTIGUA AND BARBUDA**

TITLE: **SLAB PATCH, CONSTRUCTION AND EXPANSION JOINTS DETAILS**

SCALE: **AS SHOWN** | DRAWN: **H.A.**

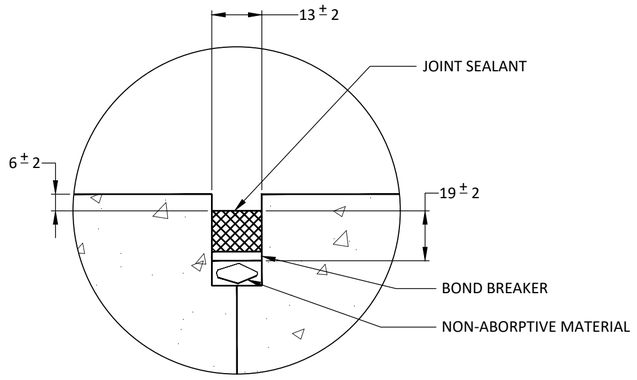
DATE: **SEPTEMBER, 2018** | CHECKED: **E. LOUIS** (REG. ENGINEER)

DRAWING #: **18106-S-507** | REV #:



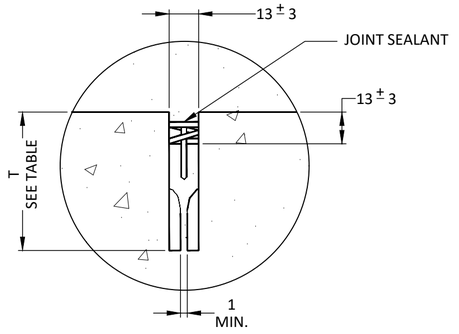
1 DOWELED CONSTRUCTION JOINT

SCALE: NTS



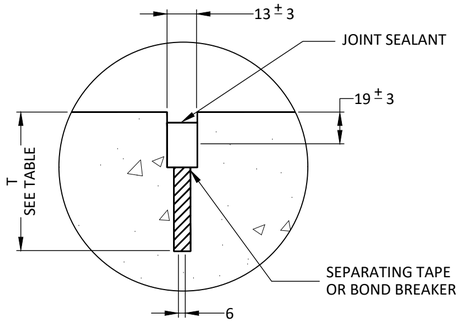
2 CONSTRUCTION JOINT DETAIL

SCALE: NTS



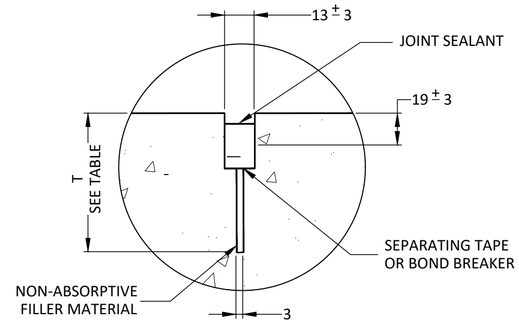
3 PREFAB METAL JOINT DETAIL

SCALE: NTS



5 FIBERBOARD FILLER JOINT DETAIL

SCALE: NTS



6 SAWED JOINT DETAIL

SCALE: NTS

PAVEMENT THICKNESS H (mm)	DEPTH OF CONTRACTION JOINT T (mm)
225 OR LESS	38
250	47
300	50
350	72
400	78

AIR FORCE PROJECTS

PAVEMENT THICKNESS H (mm)	DEPTH OF CONTRACTION JOINT T (mm)
<= 250	$\frac{1}{4}$H
300 - 400	75

NOTE:
DO NOT USE PREFAB METAL JOINT
FOR AIR FORCE PROJECTS

ENGINEER'S CERTIFICATION/ PROFESSIONAL SEAL

#	DATE	REVISION	BY	CHK

ECMC Ltd
1st flr. Marie-Colette Bldg.; #9Lawjanv Crescent, Rodney Bay Commercial Blvd;
P.O. Box RB2446; Gros Islet, Saint Lucia;
t: 1-758-453-2093; e: ecmc@candw.lc; w: www.ecmcstlucia.com

CLIENT: CLIMATE TECHNOLOGY CENTRE AND NETWORK

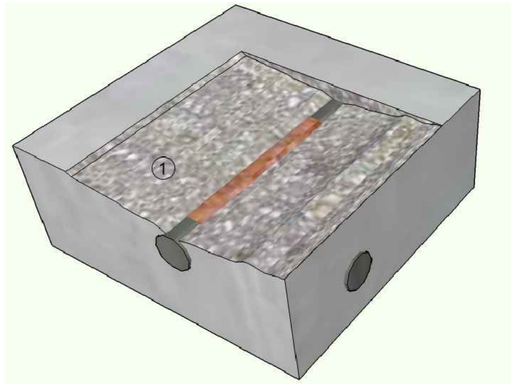
PROJECT: TECHNICAL ASSISTANCE FOR RESILIENCE TO CLIMATE VARIABILITY IN THE BUILDING SECTOR OF ANTIGUA AND BARBUDA

TITLE: CONSTRUCTION, PREFAB, FIBERBPOARD FILLER & SAWED JOINTS DETAILS

SCALE: AS SHOWN | DRAWN: H.A.

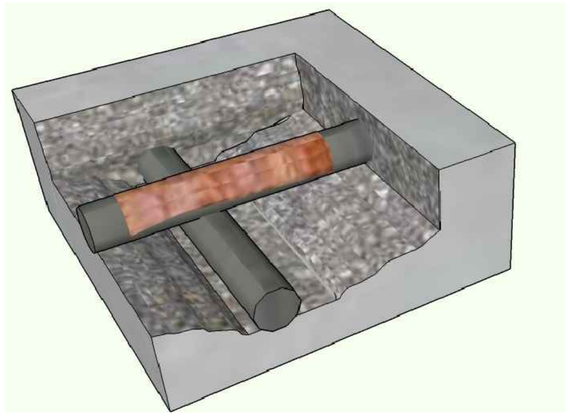
DATE: SEPTEMBER, 2018 | CHECKED: **E. LOUIS** (REG. ENGINEER)

DRAWING #: 18106-S-508 | REV #:



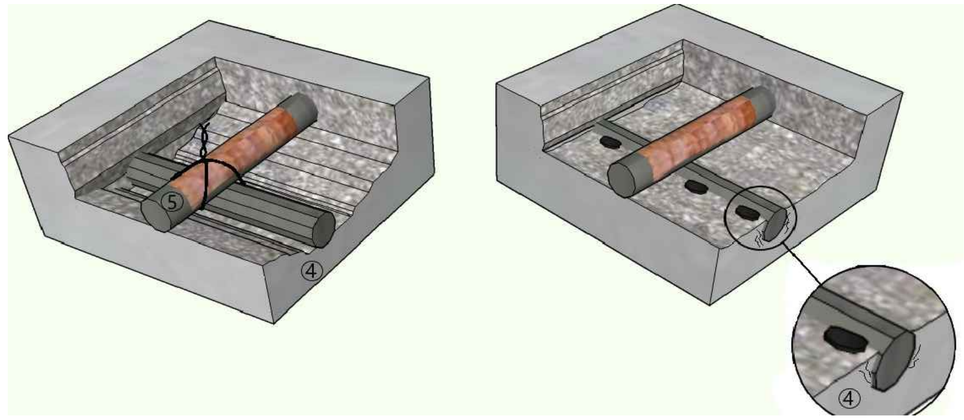
1 EXPOSING & UNDERCUTTING OF REINFORCEMENT STEEL - STEP 1

SCALE: NTS



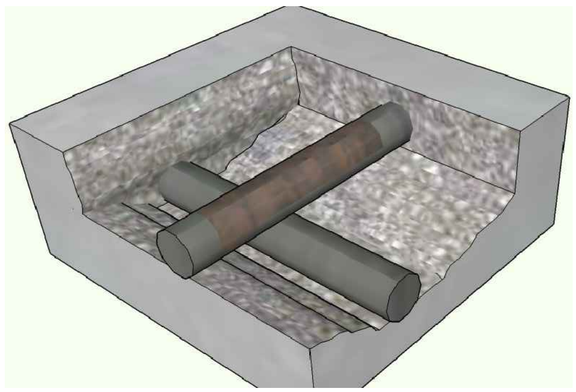
2 EXPOSING & UNDERCUTTING OF REINFORCEMENT STEEL - STEP 2 & 3

SCALE: NTS



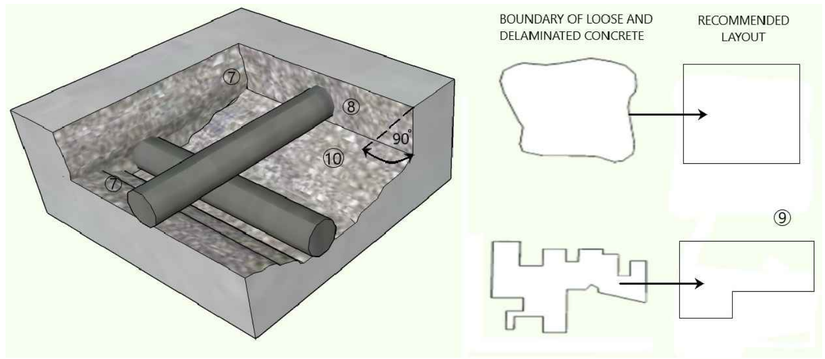
3 EXPOSING & UNDERCUTTING OF REINFORCEMENT STEEL - STEP 4 & 5

SCALE: NTS



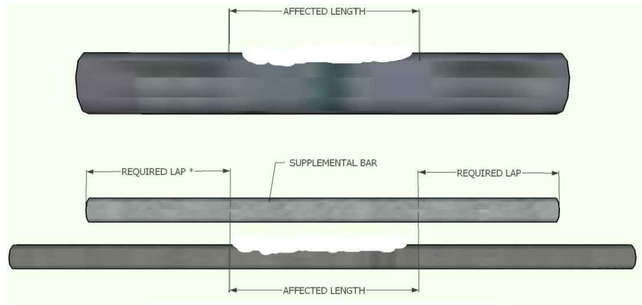
4 EXPOSING & UNDERCUTTING OF REINFORCEMENT STEEL - STEP 1

SCALE: NTS



5 EXPOSING & UNDERCUTTING OF REINFORCEMENT STEEL - STEP 7-10

SCALE: NTS



6 REPAIR OF REINFORCING STEEL DUE TO LOSS OF SECTION

SCALE: NTS

EXPOSING AND UNDERCUTTING OF REINFORCEMENT STEEL METHODOLOGY

1. REMOVE LOOSE OR DELAMINATED CONCRETE ABOVE CORRODED REINFORCING STEEL.
2. ONCE INITIAL REMOVALS ARE MADE, PROCEED WITH THE UNDERCUTTING OF ALL EXPOSED CORRODED BARS. UNDERCUTTING WILL PROVIDE CLEARANCE FOR UNDER BAR CLEANING AND FULL BAR CIRCUMFERENCE BONDING TO SURROUNDING CONCRETE, AND WILL SECURE THE REPAIR STRUCTURALLY. PROVIDE MINIMUM 20 mm [¾"] CLEARANCE BETWEEN EXPOSED REBARS AND SURROUNDING CONCRETE OR 6 mm [¼"] LARGER THAN THE LARGEST AGGREGATE IN REPAIR MATERIAL, WHICHEVER ONE IS GREATER.
3. CONCRETE REMOVAL SHALL EXTEND ALONG THE BARS TO LOCATIONS ALONG THE BAR FREE OF BOND INHIBITING CORROSION, AND WHERE THE BAR IS WELL BONDED TO SURROUNDING CONCRETE.
4. IF NON-CORRODED REINFORCING STEEL IS EIF NON-CORRODED REINFORCING STEEL IS EXPOSED DURING THE UNDERCUTTING PROCESS, CARE SHALL BE TAKEN NOT TO DAMAGE THE BAR'S BOND TO SURROUNDING CONCRETE. IF BOND BETWEEN BAR AND CONCRETE IS BROKEN, UNDERCUTTING OF THE BAR SHALL BE REQUIRED.
5. ANY REINFORCEMENT WHICH IS LOOSE SHALL BE SECURED IN PLACE BY TYING TO OTHER SECURED BARS OR BY OTHER APPROVED METHODS.

CLEANING AND REPAIR METHODOLOGY OF REINFORCING STEEL

6. ALL HEAVY CORROSION AND SCALE SHALL BE REMOVED FROM THE BAR AS NECESSARY TO PROMOTE MAXIMUM BOND OF REPLACEMENT MATERIAL. OIL FREE ABRASIVE BLAST IS THE PREFERRED METHOD. A TIGHTLY BONDED LIGHT RUST BUILD-UP ON THE SURFACE IS USUALLY NOT DETRIMENTAL TO BOND UNLESS A PROTECTIVE COATING IS BEING APPLIED TO THE BAR SURFACE, IN WHICH CASE THE COATING MANUFACTURER'S RECOMMENDATIONS FOR SURFACE PREPARATION SHOULD BE FOLLOWED

EDGE AND SURFACE CONDITIONING OF CONCRETE

THESE DETAILS ARE APPLICABLE TO HORIZONTAL, VERTICAL, AND OVERHEAD LOCATIONS. THEY ARE ALSO APPLICABLE TO REMOVAL BY HYDRO-DEMOLITION, HYDROMILLING, AND ELECTRIC, PNEUMATIC OR HYDRAULIC IMPACT BREAKERS. FOR SHOTCRETE REPAIRS, REFER TO ACI 506 EDGE PREPARATION GUIDELINES.

7. REMOVE DELAMINATED CONCRETE, UNDERCUT REINFORCING STEEL (REFER TO "EXPOSING AND UNDERCUTTING OF REINFORCING STEEL"), REMOVE ADDITIONAL CONCRETE AS REQUIRED TO PROVIDE MINIMUM REQUIRED THICKNESS OF REPAIR MATERIAL.
8. AT EDGE LOCATIONS, PROVIDE RIGHT ANGLE CUTS TO THE CONCRETE SURFACE WITH EITHER OF THE FOLLOWING METHODS:
   - SAWCUT 12 mm [½"] OR LESS AS REQUIRED TO AVOID CUTTING REINFORCING STEEL.
   - USE POWER EQUIPMENT SUCH AS HYDRODEMOLITION OR IMPACT BREAKERS. AVOID FEATHER EDGES.
9. REPAIR CONFIGURATIONS SHOULD BE KEPT AS SIMPLE AS POSSIBLE, PREFERABLY WITH SQUARED CORNERS.
10. AFTER REMOVALS AND EDGE CONDITIONING ARE COMPLETE, REMOVE BOND INHIBITING MATERIALS (DIRT, CONCRETE SLURRY, LOOSELY BONDED AGGREGATES) BY ABRASIVE BLASTING OR HIGH PRESSURE WATERBALSTING WITH OR WITHOUT ABRASIVE. CHECK THE CONCRETE SURFACES AFTER CLEANING TO ENSURE THAT SURFACE IS FREE FROM ADDITIONAL LOOSE AGGREGATE, SO THAT ADDITIONAL DELAMINATIONS ARE NOT PRESENT.
11. IF HYDRODEMOLITION IS USED, CEMENT AND PARTICULATE SLURRY MUST BE REMOVED FROM THE PREPARED SURFACES BEFORE SLURRY HARDENS.

REPAIR OF REINFORCING STEEL DUE TO LOSS OF SECTION

IF REINFORCING STEEL HAS LOST SIGNIFICANT CROSS SECTION, A STRUCTURAL ENGINEER SHOULD BE CONSULTED. IF REPAIRS ARE REQUIRED TO THE REINFORCING STEEL, WHICH IS OBVIOUSLY THE CASE IN SHILSHOLE CONDOMINIUM BUILDING, ONE OF THE FOLLOWING REPAIR METHODS SHOULD BE USED:

- COMPLETE BAR REPLACEMENT, OR
- ADDITION OF SUPPLEMENTAL BAR OVER AFFECTED SECTION.

NEW BARS MAY BE MECHANICALLY SPLICED TO OLD BARS OR REPLACED PARALLEL TO AND APPROXIMATELY 20 mm [¾"] FROM EXISTING BAR. LAP LENGTH SHALL BE DETERMINED IN ACCORDANCE WITH ACI 318[3]; ALSO REFER TO CRSI[4] AND AASHTO[5] MANUAL.

[3]AMERICAN CONCRETE INSTITUTE (ACI) 318: BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE AND COMMENTARY.
[4]CONCRETE REINFORCING STEEL INSTITUTE (CRSI) MANUAL OF STANDARD PRACTICE.
[5]AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO) MANUAL.

ENGINEER'S CERTIFICATION/ PROFESSIONAL SEAL

#	DATE	REVISION	BY	CHK

ECMC Ltd
1st flr. Marie-Colette Bldg.; #9Lawjanv Crescent, Rodney Bay Commercial Blvd;
P.O. Box RB2446; Gros Islet, Saint Lucia;
t: 1-758-453-2093; e: ecmc@candw.lc; w: www.ecmcstlucia.com

CLIENT: CLIMATE TECHNOLOGY CENTRE AND NETWORK

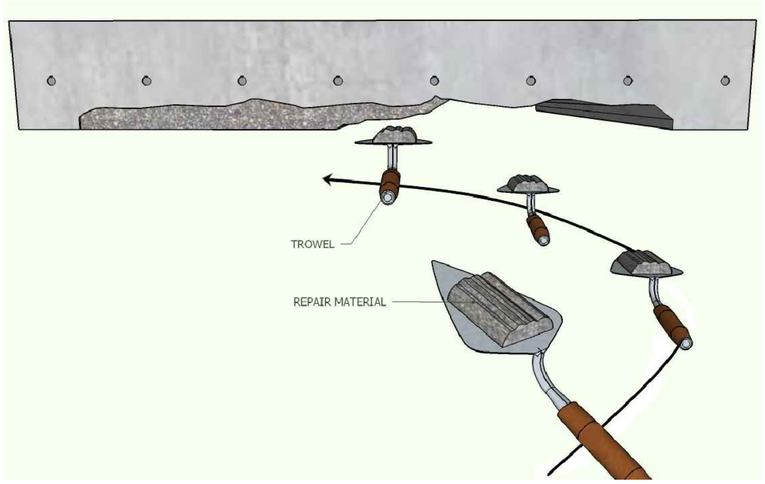
PROJECT: TECHNICAL ASSISTANCE FOR RESILIENCE TO CLIMATE VARIABILITY IN THE BUILDING SECTOR OF ANTIGUA AND BARBUDA

TITLE: SLAB REPAIR DETAIL AND METHODOLOGIES

SCALE: AS SHOWN | DRAWN: H.A.

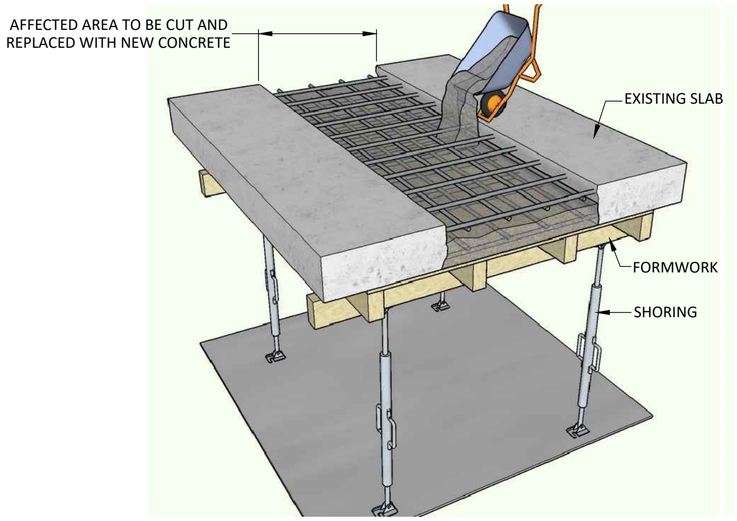
DATE: SEPTEMBER, 2018 | CHECKED: **E. LOUIS** (REG. ENGINEER)

DRAWING #: 18106-S-509 | REV #:



1 SLAB SPALLING REPAIR DETAIL

SCALE: NTS



2 DETERIORATED SLAB REPAIR DETAIL

SCALE: NTS

SLAB REPAIR METHODOLOGY:

CONSISTENT SUCCESS IN CONCRETE REPAIR BEGINS WITH THE RECOGNITION THAT EACH REPAIR SITUATION IS DEFINED BY A UNIQUE COMBINATION OF CIRCUMSTANCES SHAPED BY ENGINEERING, EXPOSURE, CONSTRUCTABILITY, COST, AND TIME CONSIDERATIONS.

THE INSTALLATION METHOD MUST DELIVER THE SELECTED REPAIR MATERIAL TO THE PREPARED SUBSTRATE WITH PREDICTABLE RESULTS. THE PROPERTIES OF REPAIR MATERIALS GENERALLY SPECIFIED ARE COMPRESSIVE STRENGTH, BOND STRENGTH, SHEAR STRENGTH, AND THOSE PROPERTIES THAT INFLUENCE VOLUME CHANGES, SUCH AS DRYING SHRINKAGE, MODULUS OF ELASTICITY, AND COEFFICIENT OF THERMAL EXPANSION. OTHER PROPERTIES SUCH AS RESISTANCE TO FREEZE AND THAWING, LOW PERMEABILITY, OR SULFATE RESISTANCE MAY BE SPECIFIED. THE REPAIR MATERIAL MUST FULLY ENCAPSULATE EXPOSED REINFORCING STEEL, ACHIEVE SATISFACTORY BOND WITH THE SUBSTRATE, AND FILL THE PREPARED CAVITY WITHOUT SEGREGATING. IF THESE REQUIREMENTS ARE NOT ACHIEVED, THE REPAIR WILL NOT PERFORM ITS INTENDED PURPOSE.

BONDING OF THE REPAIR MATERIAL WITH THE EXISTING SUBSTRATE DEPENDS UPON THE REPAIR MATERIAL REACTING WITH, AND INTERLOCKING TO, THE PROFILE OF THE PREPARED CONCRETE SURFACE. SOME MATERIALS MAY REQUIRE A BONDING AGENT TO INSURE INTIMATE CONTACT WITH PREPARED SURFACES. IF THE REPAIR MATERIAL IS SELF-BONDING, IT MUST HAVE SUFFICIENT BINDER (E.G. CEMENT PASTE, EPOXY RESIN) TO THOROUGHLY WET OUT THE SUBSTRATE.

FORCE MUST BE APPLIED TO DRIVE THE REPAIR MATERIAL INTO INTIMATE CONTACT WITH THE PREPARED SURFACE. THE TYPE OF FORCE WILL VARY WITH THE APPLICATION METHOD. IN TROWEL APPLIED SYSTEMS, THE REPAIR MATERIAL IS FORCED INTO THE PREPARED SURFACE BY THE PRESSURE APPLIED TO THE TROWEL BY THE FINISHER

OR CEMENT MASON. IN CAST-IN-PLACE SYSTEMS, THE PRESSURE IS PROVIDED BY INITIAL VIBRATION, OR HYDRAULIC PRESSURE DEVELOPED BY CONCRETE OR GROUT PUMP. HIGH VELOCITY PNEUMATIC PLACEMENT TECHNIQUES DEVELOP EXCEPTIONAL FORCES THROUGH IMPACT. THE DRY PACKING PROCESS GENERATES PRESSURE WHEN THE RODDING TOOL POUNDS THE MATERIAL AGAINST THE SUBSTRATE.
THE REQUIREMENT THAT THE REPAIR MATERIALS BE MIXED AND APPLIED WITHOUT SEGREGATING IS EQUALLY IMPORTANT. ANY SEGREGATION OF MATERIAL COMPONENTS WILL ALTER PHYSICAL PROPERTIES AND REDUCE OR NEGATE THE ABILITY OF THE REPAIR TO FULFILL ITS PRIMARY FUNCTION – TO RESTORE THE STRUCTURE TO ITS ORIGINAL CONDITION TO THE FULLEST EXTENT POSSIBLE.LACE IN VERTICAL OR OVERHEAD APPLICATIONS.

GENERAL DESCRIPTION:
REPAIR MATERIAL IS MIXED INTO A TROWLABLE, NON-SAG CONSISTENCY. TROWEL OR OTHER SUITABLE PLACING TOOLS ARE USED TO TRANSPORT THE REPAIR MATERIAL TO THE PREPARED SUBSTRATE. THE REPAIR MATERIAL IS PRESSED INTO THE SUBSTRATE TO DEVELOP INTIMATE CONTACT WITHOUT VOIDS.

BEST APPLICATION:
SURFACE RESTORATION WHEN REINFORCING STEEL IS NOT ENCOUNTERED.

MATERIAL REQUIREMENTS:
FINE-GRAINED MATERIAL EASILY FINISHED, WITH NON-SAG PROPERTIES TO STAY IN PLACE IN VERTICAL OR OVERHEAD APPLICATIONS.

GENERAL DESCRIPTION:
IN LIEU OF PARTIAL-DEPTH REPAIRS, THE MEMBER IN QUESTION CAN BE REMOVED AND REPLACED IN TOTAL. PLACEMENT METHODS SHOULD FOLLOW GOOD CONCRETE PRACTICE.

BEST APPLICATION:
WHEN DETERIORATION IS EXTENSIVE THROUGHOUT THE MEMBER.

MATERIAL REQUIREMENTS:
CONVENTIONAL CASTIN-PLACE CONCRETE WITH LOW SHRINKAGE, LOW WATER-CEMENT RATIO, AND HIGHLY WORKABLE MIXTURE.

REFERENCE:
ACI 304R"GUIDE FOR MEASURING, MIXING, TRANSPORTING, AND PLACING CONCRETING"

ENGINEER'S CERTIFICATION/ PROFESSIONAL SEAL

#	DATE	REVISION	BY	CHK

ECMC Ltd
1st flr. Marie-Colette Bldg.; #9Lawjanv Crescent, Rodney Bay Commercial Blvd;
P.O. Box RB2446; Gros Islet, Saint Lucia;
t: 1-758-453-2093; e: ecmc@candw.lc; w: www.ecmcstlucia.com

CLIENT: CLIMATE TECHNOLOGY CENTRE AND NETWORK

PROJECT: TECHNICAL ASSISTANCE FOR RESILIENCE TO CLIMATE VARIABILITY IN THE BUILDING SECTOR OF ANTIGUA AND BARBUDA

TITLE: SPALLING AND DETERIORATED SLAB REPIAR METHODOLOGIES & DETAILS

SCALE: AS SHOWN | DRAWN: H.A.

DATE: SEPTEMBER, 2018 | CHECKED: **E. LOUIS** (REG. ENGINEER)

DRAWING #: 18106-S-510 | REV #:

WALL REPAIRS & RETROFIT MEASURES

REPAIR METHODOLOGY FOR HORIZONTAL CRACKS IN BLOCK WALL

1. WET THE SURFACE OF THE WALL TO MINIMIZE DUST WHILE CUTTING;

2. USE A SMALL GRINDER AND CUT A STRAIGHT LINE APPROXIMATELY 6" [152 mm] ON EITHER SIDE OF THE CRACK;

3. AGAIN WET CRACK LINE AND USE A SMALL GRINDER TO CUT A "V" SECTION ALONG THE CRACK TO ACHIEVE A ½" [12 mm] WIDE OPENING AT THE SURFACE;

4. USE CONBEXTRA GP NON-SHRINK GROUT WITHIN THE GOUGED CRACK;

5. APPLY A HIGH STRENGTH BONDING AGENT TO THE 6" [152 mm] WIDE SURFACES ON EITHER SIDE OF THE CRACK;

6. PLACE A 12" [305 mm] WIDE LIGHT GAUGE MESH OVER THE CRACK AND FIX TO THE WALL WITH 1" [25 mm] LONG CONCRETE NAILS;

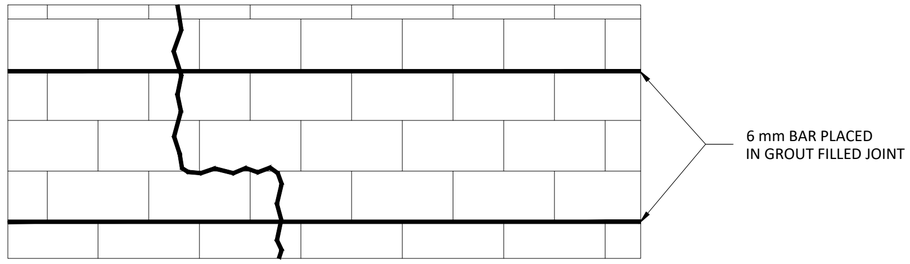
7. APPLY A SCRATCH COAT OF THE CONBEXTRA GP NON-SHRINK GROUT;

8. PLASTER SURFACE WITH A 1:1 MIX OF THE CONBEXTRA GP GROUT AND A NORMAL MORTAR MIX;

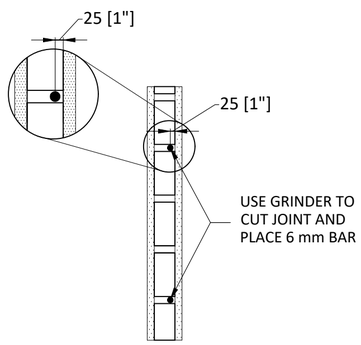
9. FINISH PATCH WORK TO OBTAIN A SIMILAR SURFACE TO THAT OF THE ADJACENT WALL;

10. APPLY CURING COMPOUND AS PER SPECIFICATIONS AND MANUFACTURER APPLICATION INSTRUCTIONS;

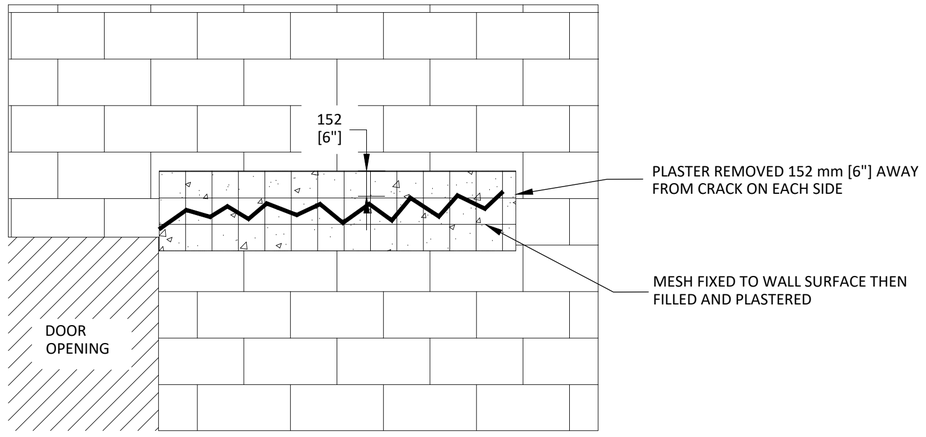
11. DECORATE WALL WITH PAINT OF THE SAME COLOR.

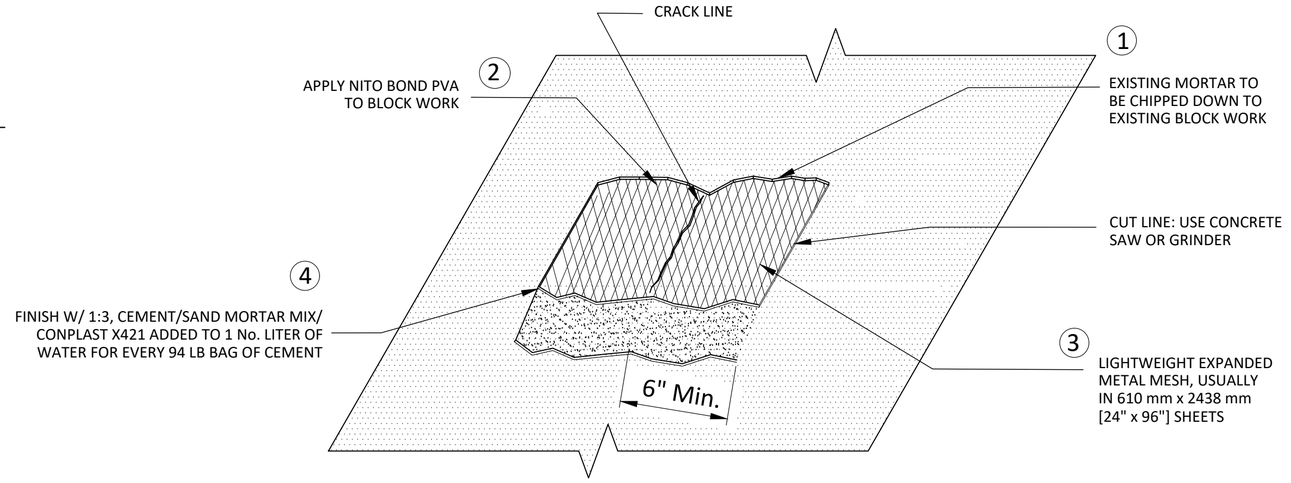


1 STITCHING BAR IN HIGH STRENGTH GROUT FOR VERTICAL CRACK REPAIR
SCALE: NTS



2 SECTION B-B
SCALE: NTS





3 REPAIR METHODOLOGIES FOR HORIZONTAL CRACKS IN BLOCKWORK WALL
SCALE: NTS

ENGINEER'S CERTIFICATION/ PROFESSIONAL SEAL

#	DATE	REVISION	BY	CHK

ECMC Ltd
1st flr. Marie-Colette Bldg.; #9Lawjanv Crescent, Rodney Bay Commercial Blvd;
P.O. Box RB2446; Gros Islet, Saint Lucia;
t: 1-758-453-2093; e: ecmc@candw.lc; w: www.ecmcstlucia.com

CLIENT: **CLIMATE TECHNOLOGY CENTRE AND NETWORK**

PROJECT: **TECHNICAL ASSISTANCE FOR RESILIENCE TO CLIMATE VARIABILITY IN THE BUILDING SECTOR OF ANTIGUA AND BARBUDA**

TITLE: **REPAIR METHODOLOGIES FOR CRACKS IN BLOCK WORK WALL**

SCALE: **AS SHOWN** | DRAWN: **H.A.**

DATE: **SEPTEMBER, 2018** | CHECKED: **E. LOUIS** (REG. ENGINEER)

DRAWING #: **18106-S-511** | REV #:

CATEGORIES OF CRACKS ON WALLS

HAIRLINE CRACKS

1. UNDER 1 mm WIDE; WITHIN BLOCK WORK SURFACES;
2. ON THE REINFORCED CONCRETE WALLS OUTSIDE OF THE STAIRWELL;

OTHER CRACKS

1. CRACKS IN BLOCK WORK WHICH ARE WIDER THAN 2 mm;
2. CRACKS AT THE COLUMN TO BLOCK WORK INTERFACE;
3. CRACKS AT THE INTERFACE OF BLOCK WORK AND CONCRETE BEAM
4. AND WHERE THE PLASTERING IS FLUSH OVER BOTH THOSE ELEMENTS; CRACKS WITHIN THE STAIRWELL WHICH ARE GREATER THAN 4 mm WIDE AND OVER WHICH THE DELAMINATING OF THE PLASTERING HAS OCCURRED.
5. HIBITOR AND ANTI-CORROSIVE PAINTS TO EXTERNAL FACE OF STEEL JACKET.

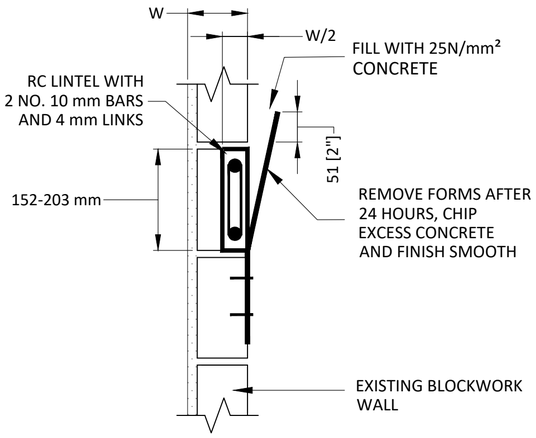
REPAIR METHODOLOGY NO. 2 - HAIRLINE CRACKS IN BLOCK WORK AND CONCRETE SURFACES

1. WET SURFACE OF WALL TO MINIMIZE DUST WHILST CUTTING OF WALLS;
2. USE SMALL GRINDER AND CUT STRAIGHT LINE APPROXIMATELY 152 mm ON EITHER SIDE OF CRACK;
3. WET CRACK LINE AGAIN AND USE SMALL GRINDER TO NOTCH A 2 TO 3 mm WIDE GAP ALONG CRACK;
4. USE AN EPOXY GROUT INJECTION APPLICATION TO FILL SPACE/ CRACK;
5. IF AN EPOXY GROUT APPLICATION IS NOT AVAILABLE LOCALLY, USE CONBEXTRA GP NON-SHRINK GROUT WITHIN THE GOUGED CRACK;
6. APPLY A HIGH STRENGTH BONDING AGENT TO THE 152 mm WIDE SURFACES ON EITHER SIDE OF THE CRACK;
7. PLACE A 305 mm WIDE LIGHT GAUGE MESH OVER CRACK AND FIXED TO THE WALL WITH 25 mm LONG CONCRETE NAILS;
8. APPLY A SCRATCH COAT THE CONBEXTRA GP NON-SHRINK GROUT;
9. PLASTER SURFACE WITH A 1:1 MIX OF THE CONBEXTRA GP GROUT AND A NORMAL MORTAR MIX;
10. FINISH PATCH WORK TO OBTAIN A SIMILAR SURFACE TO THAT OF THE ADJACENT WALL;
11. APPLY CURING COMPOUND AS PER SPECIFICATIONS AND MANUFACTURER APPLICATION INSTRUCTIONS
12. DECORATE WALL WITH PAINT OF SAME COLOUR.

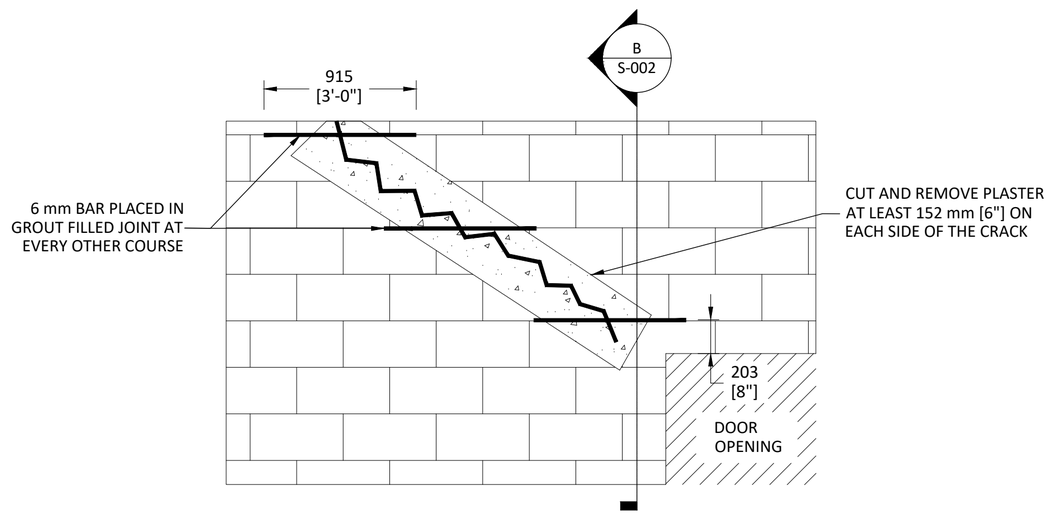
REPAIR METHODOLOGY FOR DIAGONAL CRACKS IN BLOCK WALL

1. WET THE SURFACE OF THE WALL TO MINIMIZE DUST WHILE CUTTING;
2. USE A SMALL GRINDER AND CUT A STRAIGHT LINE APPROXIMATELY 152 mm [6"] ON EITHER SIDE OF CRACK;
3. AGAIN WET CRACK LINE AND USE A SMALL GRINDER TO CUT 25 mm [1"] INTO THE MORTAR JOINT TO ACHIEVE A 12 mm [1/2"] OPENING
4. USE CONBEXTRA GP WITHIN THE GOUGED MORTAR JOINT;
5. APPLY A HIGH STRENGTH BONDING AGENT TO THE 152 mm [6"] WIDE SURFACES ON EITHER SIDE OF THE CRACK;
6. PLASTER SURFACE WITH A 1:1 MIX OF THE CONBEXTRA GP GROUT AND A NORMAL MORTAR MIX;
7. FINISH PATCH WORK TO OBTAIN A SIMILAR SURFACE TO THAT OF THE ADJACENT WALL;
8. APPLY CURING COMPOUND AS PER SPECIFICATIONS AND MANUFACTURER APPLICATION INSTRUCTIONS
9. DECORATE WALL WITH PAINT OF THE SAME COLOUR.

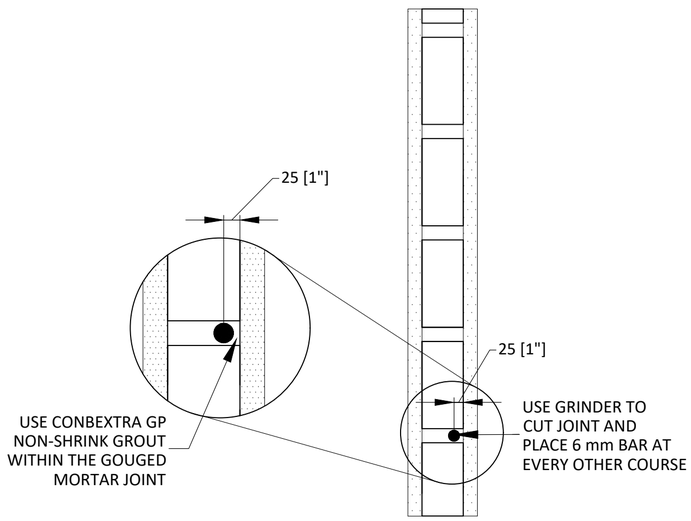
NB. THE DIAGRAM BELOW DEPICTS THE REPAIR PROCEDURES.



1 FORMWORK DETAIL
SCALE: NTS



2 STITCHING BAR IN HIGH STRENGTH GROUT FOR DIAGONAL CRACK REPAIR
SCALE: NTS



3 SECTION B-B
SCALE: NTS

ENGINEER'S CERTIFICATION/ PROFESSIONAL SEAL

#	DATE	REVISION	BY	CHK

ECMC Ltd
1st floor Jane-Colette Bldg.; #9Lawjanv Crescent, Rodney Bay Commercial Blvd;
P.O. Box RB2446; Gros Islet, Saint Lucia;
t: 1-758-453-2093; e: ecmc@candw.lc; w: www.ecmcstlucia.com

CLIENT: **CLIMATE TECHNOLOGY CENTRE AND NETWORK**

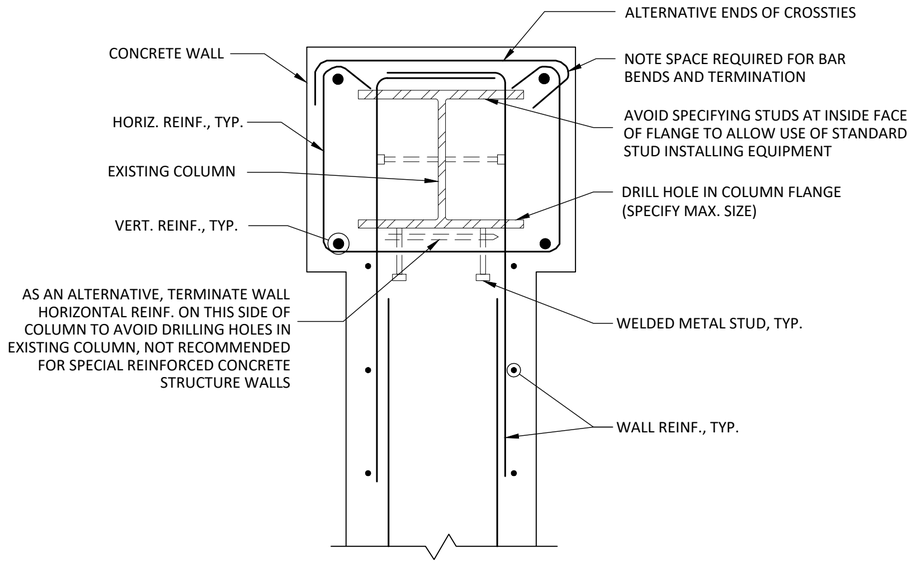
PROJECT: **TECHNICAL ASSISTANCE FOR RESILIENCE TO CLIMATE VARIABILITY IN THE BUILDING SECTOR OF ANTIGUA AND BARBUDA**

TITLE: **REPAIR METHODOLOGIES FOR CRACKS IN BLOCK WORK WALL**

SCALE: **AS SHOWN** | DRAWN: **H.A.**

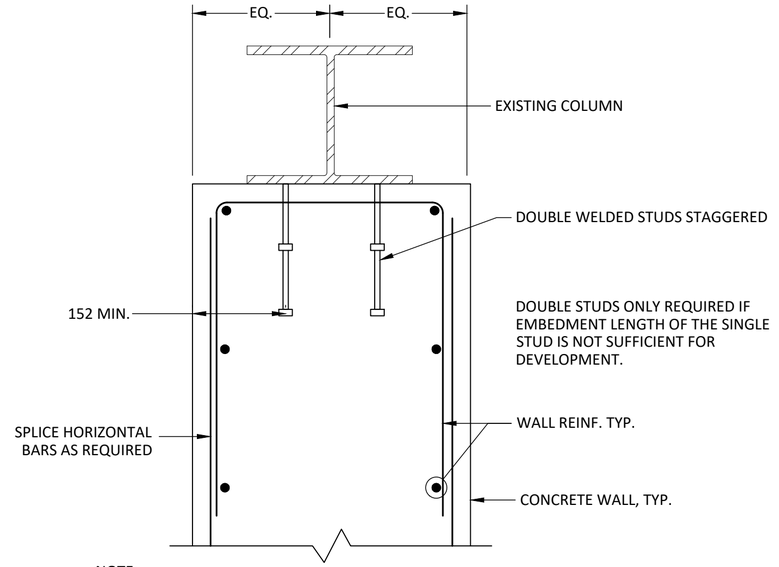
DATE: **SEPTEMBER, 2018** | CHECKED: **E. LOUIS** (REG. ENGINEER)

DRAWING #: **18106-S-512** | REV #:



1 CAST-IN-PLACE CONCRETE WALL ENCASING EXISTING COLUMN (PLAN)

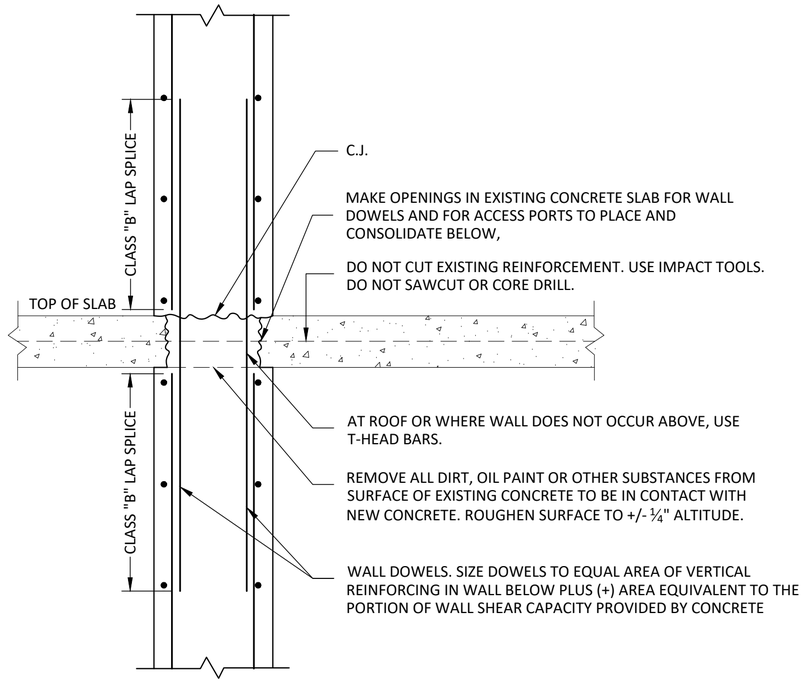
SCALE: NTS



NOTE:
DETAIL NOT APPROPRIATE FOR SPECIAL REINFORCED CONCRETE STRUCTURAL WALLS DUE TO LACK OF CONFINEMENT FOR BOUNDARY ELEMENT.

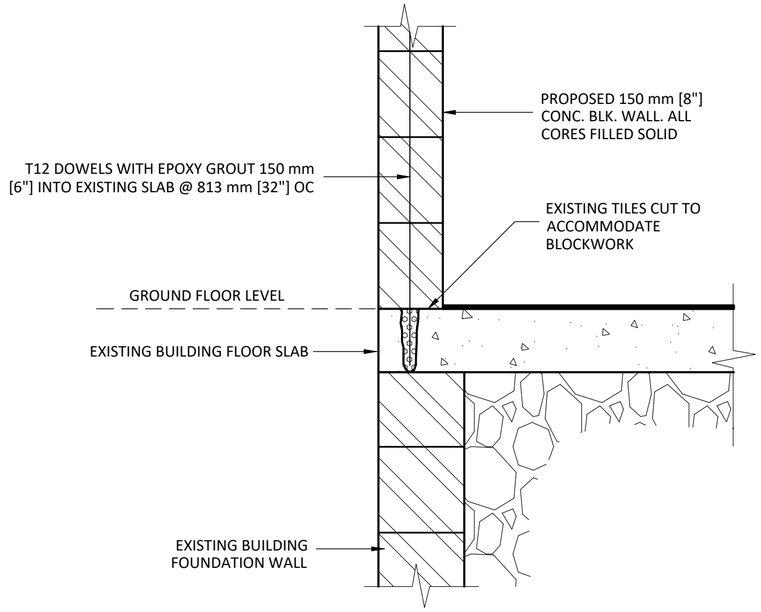
2 PLAN SHOWING WALL AT EXISTING COLUMN

SCALE: NTS



3 SECTION SHOWING CONCRETE WALL CONNECTION TO CONCRETE SLAB

SCALE: NTS



NOTES:
1. SAW CUT EXISTING FLOOR TILES TO APPROPRIATE WIDTH IN THE LOCATION OF THE PROPOSED WALL TO ACCOMMODATE FINISHED MASONRY WALL.
2. DRILL HOLES INTO TILES TO BE DEMOLISHED.
3. BREAK OFF TILES AND REMOVE EXISTING THINSET TO EXPOSED UNDERLYING FLOOR SURFACE.

4 NEW WALL CONSTRUCTION DETAIL

SCALE: 1:10

ENGINEER'S CERTIFICATION/ PROFESSIONAL SEAL

#	DATE	REVISION	BY	CHK

ECMC Ltd
1st flr. Marie-Colette Bldg.; #9Lawjanv Crescent, Rodney Bay Commercial Blvd;
P.O. Box RB2446; Gros Islet, Saint Lucia;
t: 1-758-453-2093; e: ecmc@candw.lc; w: www.ecmcstlucia.com

CLIENT: **CLIMATE TECHNOLOGY CENTRE AND NETWORK**

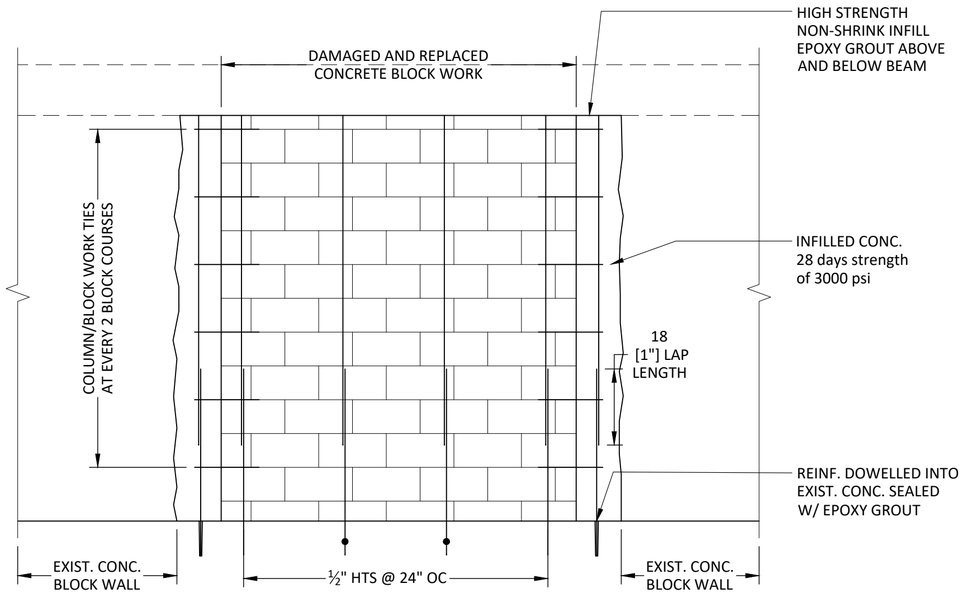
PROJECT: **TECHNICAL ASSISTANCE FOR RESILIENCE TO CLIMATE VARIABILITY IN THE BUILDING SECTOR OF ANTIGUA AND BARBUDA**

TITLE: **NEW WALL TO EXISTING WALL OR COLUMN CONNECTION DETAILS**

SCALE: **AS SHOWN** | DRAWN: **H.A.**

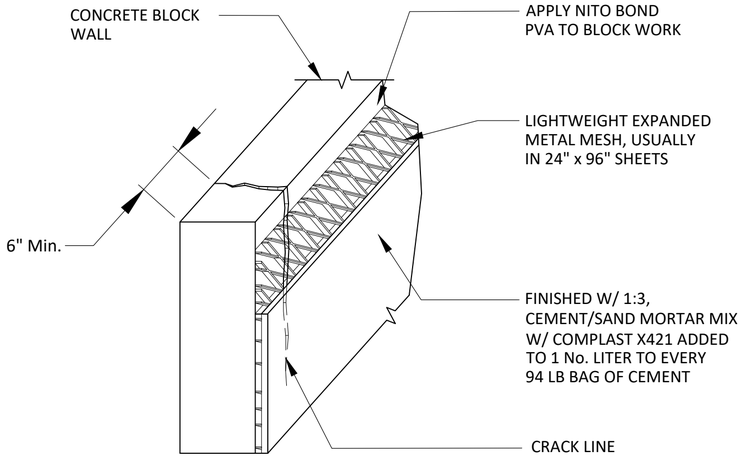
DATE: **SEPTEMBER, 2018** | CHECKED: **E. LOUIS** (REG. ENGINEER)

DRAWING #: **18106-S-513** | REV #:



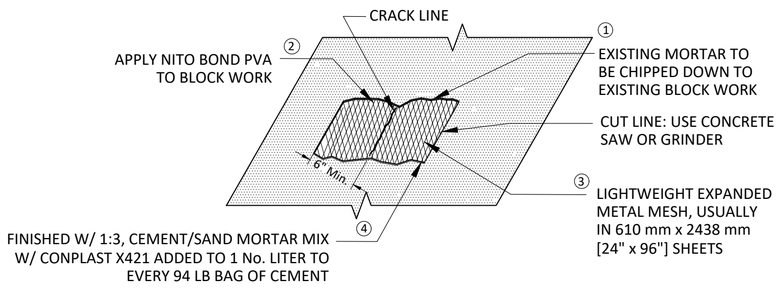
1 BLOCKWORK WALL REPAIR DETAILS

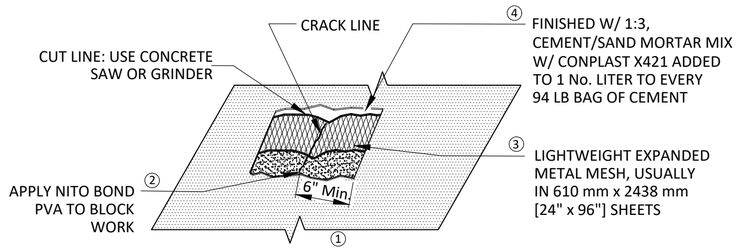
SCALE: NTS



2 VERTICAL CRACK REPAIR IN BLOCKWORK WALL

SCALE: NTS

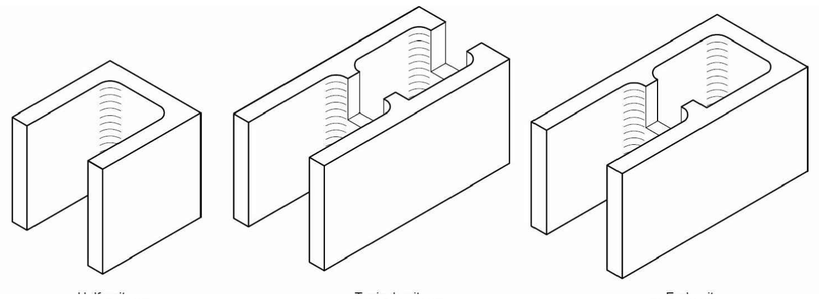




NOTE:
EXISTING MORTAR TO BE CHIPPED DOWN
TO EXISTING BLOCK WORK

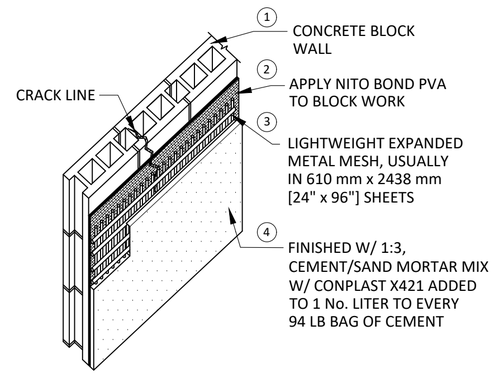
3 BLOCKWORK CRACK REPAIR DETAILS

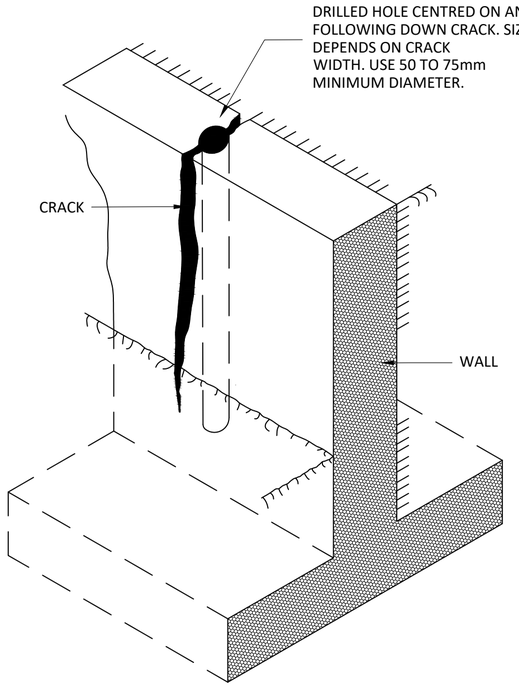
SCALE: NTS



4 MASONRY UNIT DETAIL

SCALE: NTS





5 RETAINING WALL VERTICAL CRACK REPAIR DETAIL

SCALE: NTS

ENGINEER'S CERTIFICATION/ PROFESSIONAL SEAL

#	DATE	REVISION	BY	CHK

ECMC Ltd
1st flr. Marie-Colette Bldg.; #9Lawjanv Crescent, Rodney Bay Commercial Blvd;
P.O. Box RB2446; Gros Islet, Saint Lucia;
t: 1-758-453-2093; e: ecmc@candw.lc; w: www.ecmcstlucia.com

CLIENT: **CLIMATE TECHNOLOGY CENTRE AND NETWORK**

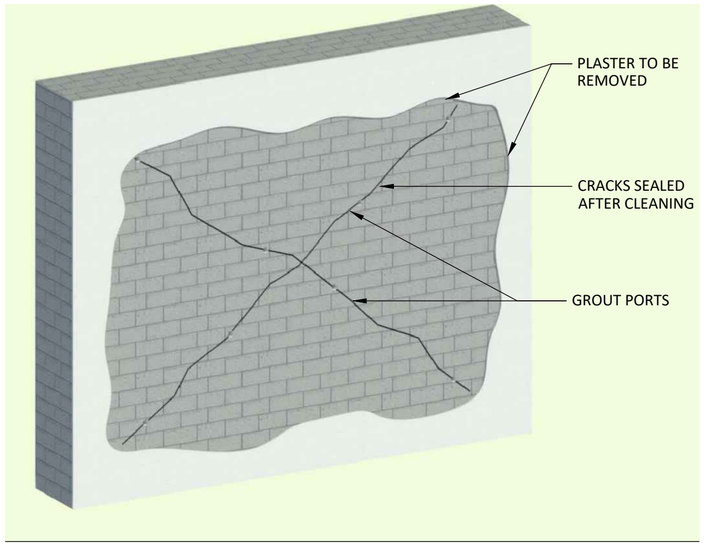
PROJECT: **TECHNICAL ASSISTANCE FOR RESILIENCE TO CLIMATE VARIABILITY IN THE BUILDING SECTOR OF ANTIGUA AND BARBUDA**

TITLE: **BLOCKWORK & RETAINING WALLS REPAIR AND MASONRY UNIT DETAILS**

SCALE: **AS SHOWN** | DRAWN: **H.A.**

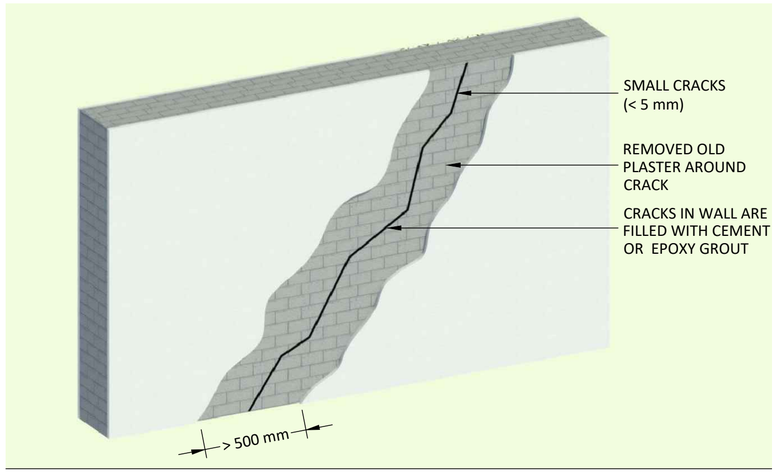
DATE: **SEPTEMBER, 2018** | CHECKED: **E. LOUIS** (REG. ENGINEER)

DRAWING #: **18106-S-514** | REV #:



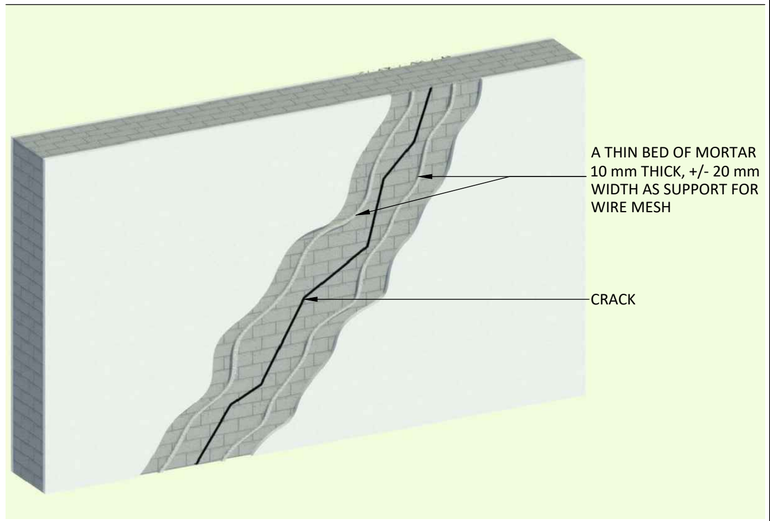
1 STRENGTHENING EXISTING MASONRY WALL

SCALE: NTS



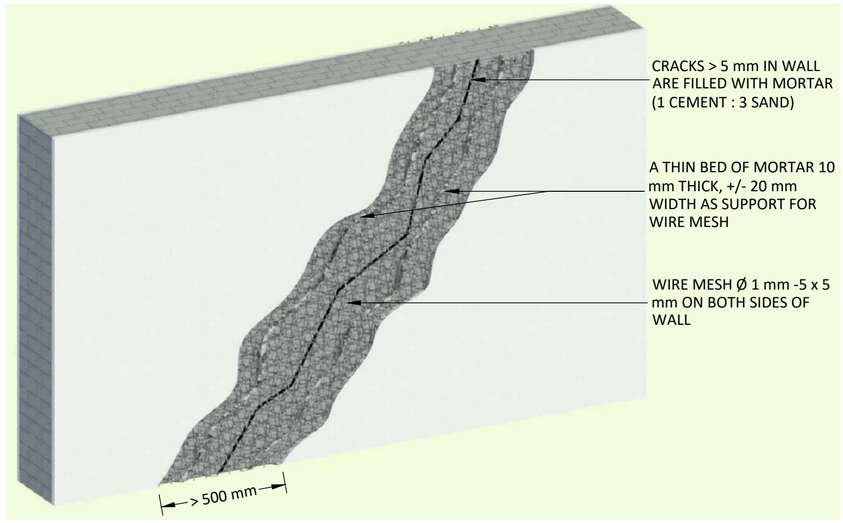
2 STRENGTHENING EXISTING MASONRY WALL GROUT INJECTION IN CRACKS

SCALE: NTS



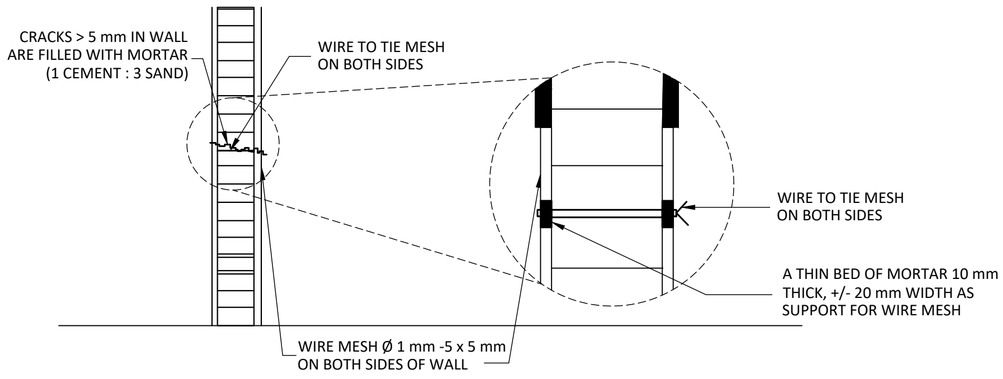
3 STRENGTHENING EXISTING MASONRY WALL - WIRE MESH AND CEMENT PLASTER (1)

SCALE: NTS



4 STRENGTHENING EXISTING MASONRY WALL - WIRE MESH AND CEMENT PLASTER (2)

SCALE: NTS



5 STRENGTHENING EXISTING MASONRY WALL - WIRE MESH AND CEMENT PLASTER (3)

SCALE: NTS

ENGINEER'S CERTIFICATION/ PROFESSIONAL SEAL

ECMC Ltd
1st flr. Marie-Colette Bldg.; #9Lawjanv Crescent, Rodney Bay Commercial Blvd;
P.O. Box RB2446; Gros Islet, Saint Lucia;
t: 1-758-453-2093; e: ecmc@candw.lc; w: www.ecmcstlucia.com

#	DATE	REVISION	BY	CHK

CLIENT: **CLIMATE TECHNOLOGY CENTRE AND NETWORK**

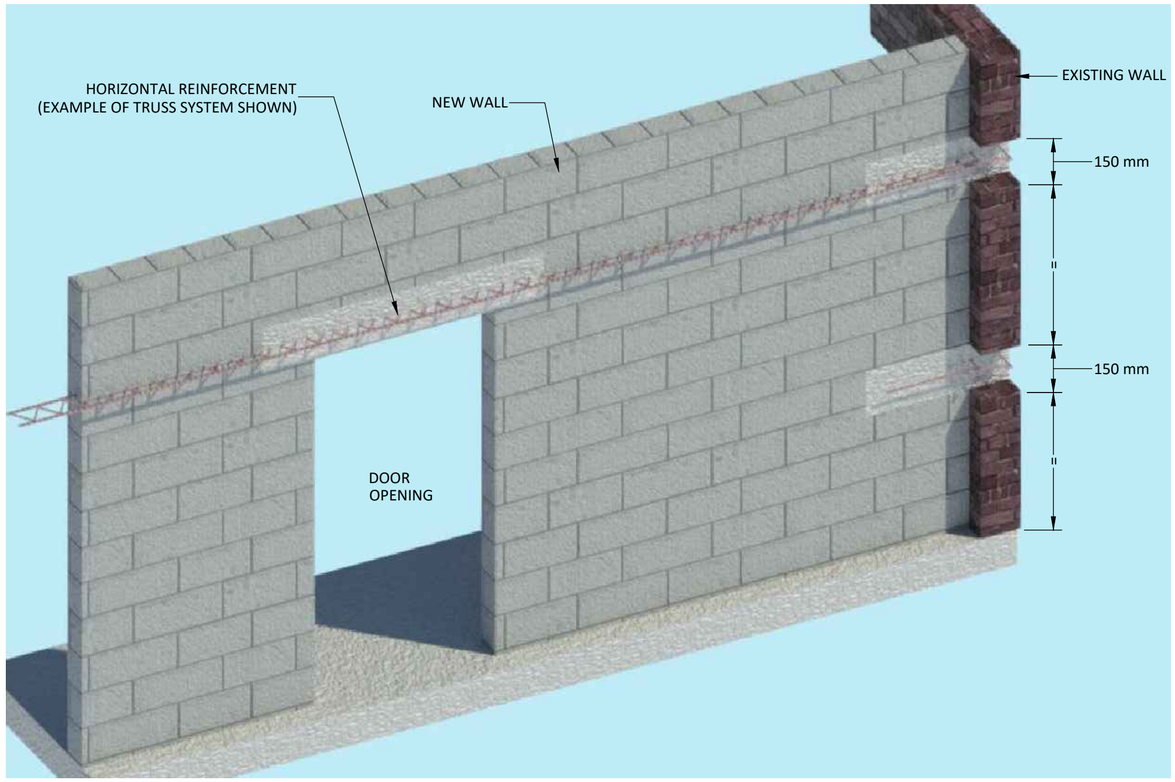
PROJECT: **TECHNICAL ASSISTANCE FOR RESILIENCE TO CLIMATE VARIABILITY IN THE BUILDING SECTOR OF ANTIGUA AND BARBUDA**

TITLE: **DETAILS SHOWING HOW TO STRENGTHENING EXISTING WALL**

SCALE: **AS SHOWN** | DRAWN: **H.A.**

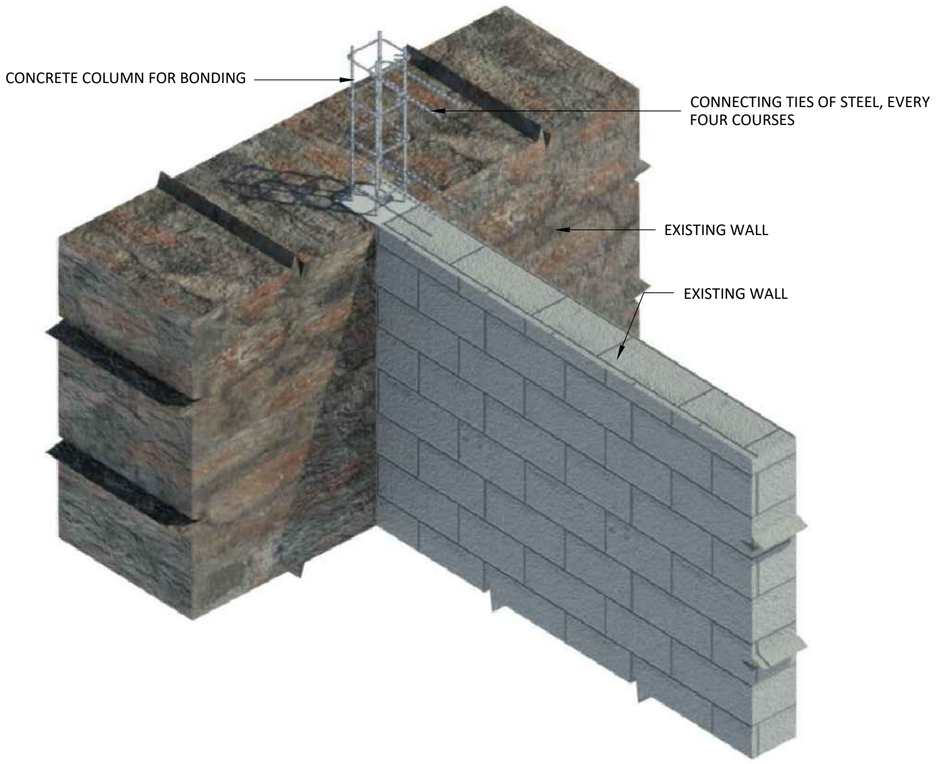
DATE: **SEPTEMBER, 2018** | CHECKED: **E. LOUIS** (REG. ENGINEER)

DRAWING #: **18106-S-515** | REV #:



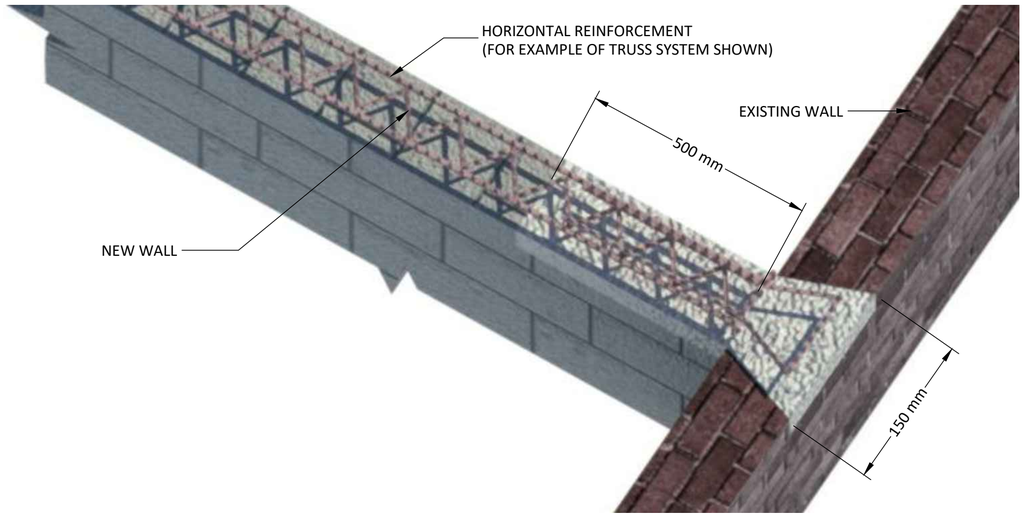
1 CONNECTION OF EXISTING AND NEW MASONRY WALL

SCALE: NTS



2 CONNECTION OF EXISTING AND NEW MASONRY WALL

SCALE: NTS



3 CONNECTION OF EXISTING AND NEW MASONRY WALL

SCALE: NTS

ENGINEER'S CERTIFICATION/ PROFESSIONAL SEAL

#	DATE	REVISION	BY	CHK

ECMC Ltd
1st flr. Marie-Colette Bldg.; #9Lawjanv Crescent, Rodney Bay Commercial Blvd;
P.O. Box RB2446; Gros Islet, Saint Lucia;
t: 1-758-453-2093; e: ecmc@candw.lc; w: www.ecmcstlucia.com

CLIENT: **CLIMATE TECHNOLOGY CENTRE AND NETWORK**

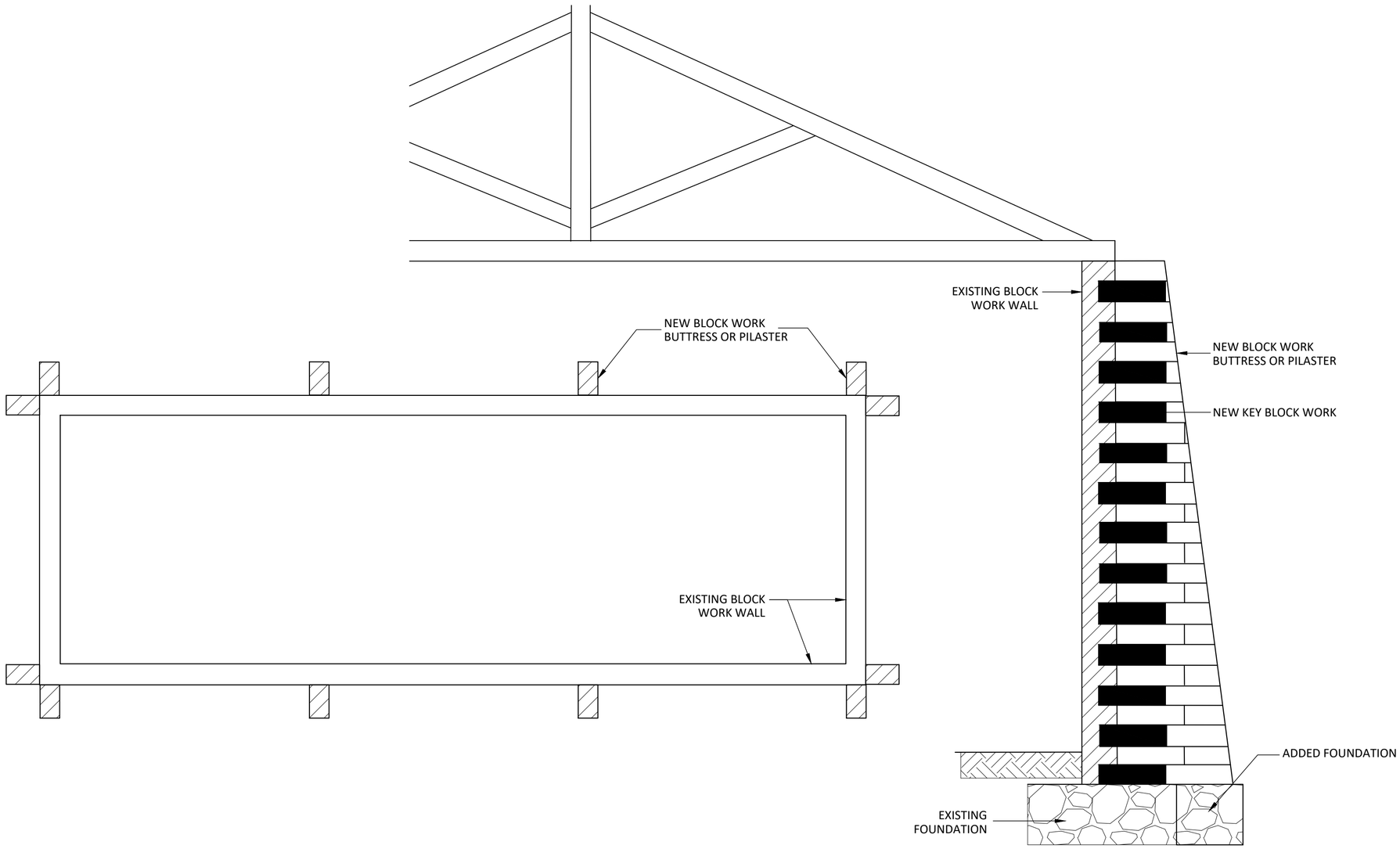
PROJECT: **TECHNICAL ASSISTANCE FOR RESILIENCE TO CLIMATE VARIABILITY IN THE BUILDING SECTOR OF ANTIGUA AND BARBUDA**

TITLE: **NEW WALL TO EXISTING WALL CONNECTION DETAILS**

SCALE: **AS SHOWN** | DRAWN: **H.A.**

DATE: **SEPTEMBER, 2018** | CHECKED: **E. LOUIS** (REG. ENGINEER)

DRAWING #: **18106-S-516** | REV #:



1 STRENGTHENING OF LONG BLOCK WORK WALL BY BUTTRESSES

SCALE: NTS

ENGINEER'S CERTIFICATION/ PROFESSIONAL SEAL

#	DATE	REVISION	BY	CHK

ECMC Ltd
1st flr. Marie-Colette Bldg.; #9Lawjanv Crescent, Rodney Bay Commercial Blvd;
P.O. Box RB2446; Gros Islet, Saint Lucia;
t: 1-758-453-2093; e: ecmc@candw.lc; w: www.ecmcstlucia.com

CLIENT: **CLIMATE TECHNOLOGY CENTRE AND NETWORK**

PROJECT: **TECHNICAL ASSISTANCE FOR RESILIENCE TO CLIMATE VARIABILITY IN THE BUILDING SECTOR OF ANTIGUA AND BARBUDA**

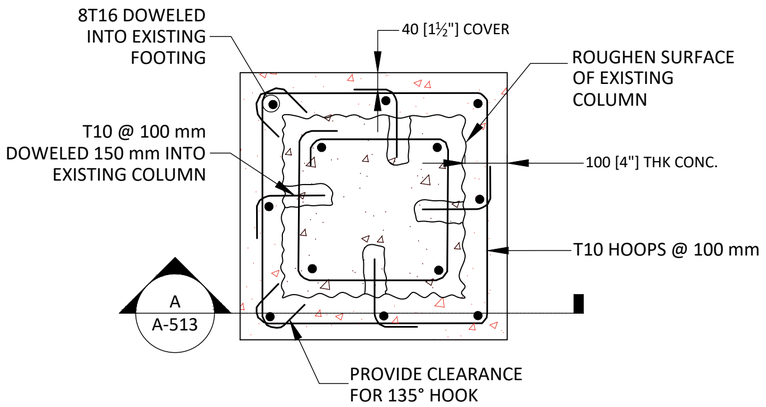
TITLE: **STRENGTHENING OF BLOCKWORK WALL BY BUTTRESSES**

SCALE: **AS SHOWN** | DRAWN: **H.A.**

DATE: **SEPTEMBER, 2018** | CHECKED: **E. LOUIS** (REG. ENGINEER)

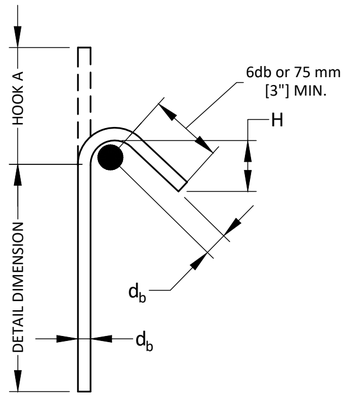
DRAWING #: **18106-S-517** | REV #:

COLUMN REPAIRS & RETROFIT MEASURES



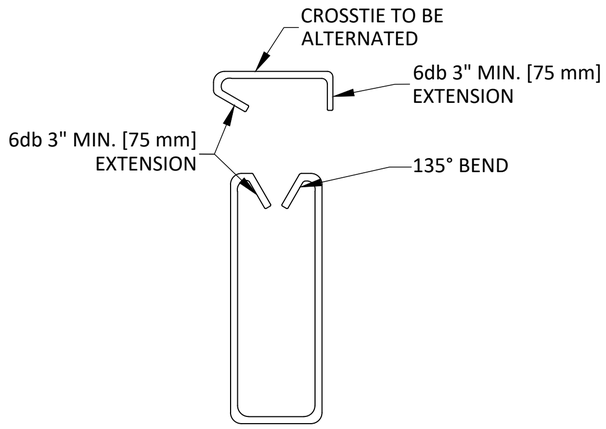
1 CONCRETE JACKET DETAIL

SCALE: 1:10



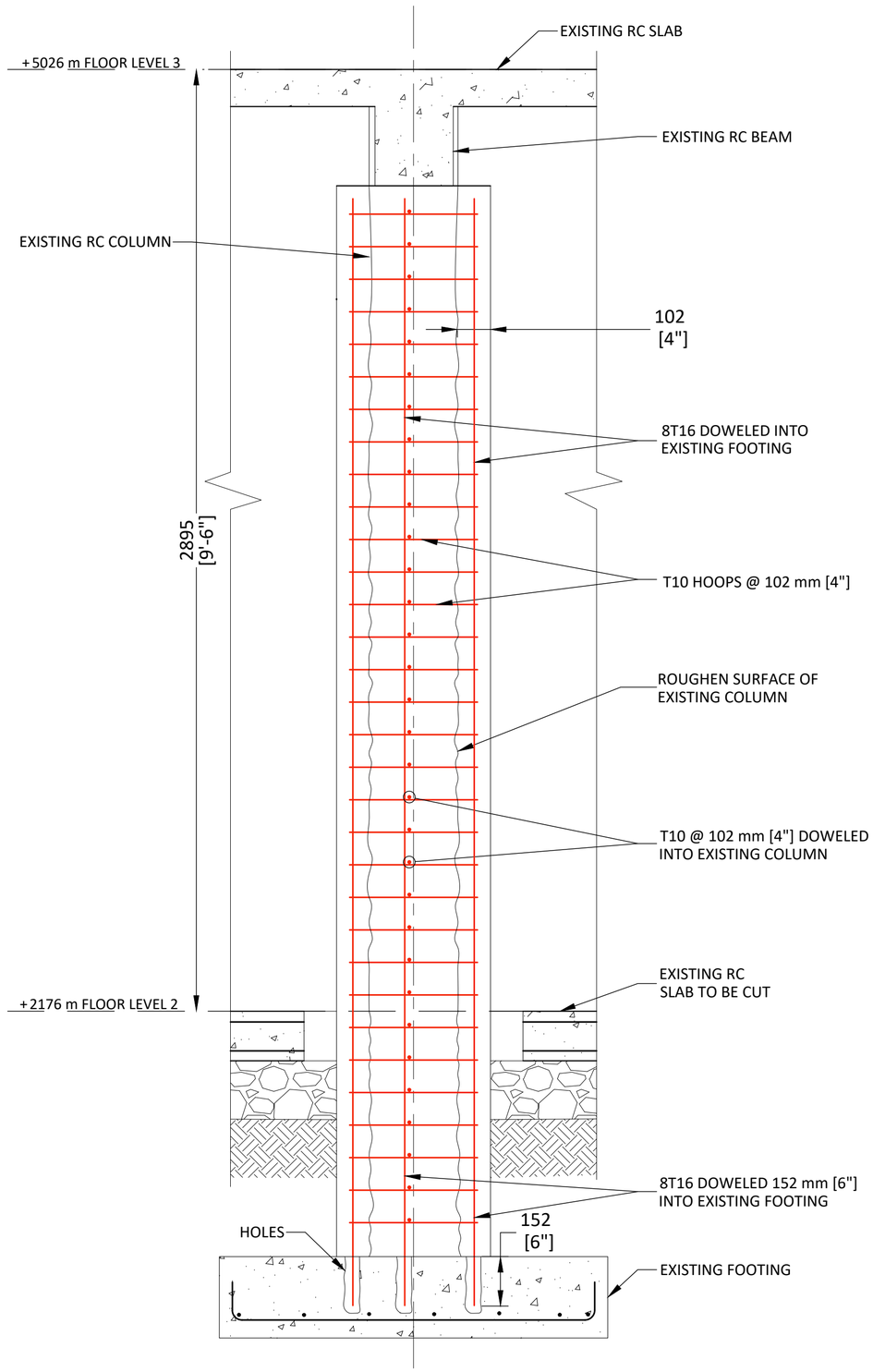
2 135° TIE HOOK DETAIL

SCALE: 1:10



3 U BAR DETAIL

SCALE: 1:10



A SECTION ALONG CONCRETE JACKET

SCALE: 1:12

CONSTRUCTION METHODOLOGY FOR JACKETING CONCRETE COLUMNS

1. ROUGHEN CONCRETE SURFACE WITH HAND CHIPPING TO ASSIST WITH CONNECTION BETWEEN EXISTING AND NEW CONCRETE; ENGINEER TO BE NOTIFIED IF MICRO-CRACKING OF THE SUBSTRATE OCCURS;
2. APPLY TWO COMPONENT EPOXY RESIN BONDING AGENT COMPLYING WITH ASTM C881;
3. INSTALL TEMPORARY SHORING 610 mm [2'-0"] AWAY FROM COLUMNS AND UNDERNEATH BEAMS SO THAT THE RC JACKET IS INTRODUCED ON THE UNLOADED COLUMN;
4. INSTALL ADDITIONAL LONGITUDINAL REINFORCEMENT;
   a. USE 8 NO. 16 mm ASTM A706 GRADE 60 REINFORCING BARS;
   b. DRILL HOLES IN THE FOOTING AFTER CUTTING THROUGH THE EXISTING SLAB AND CLEAN HOLES WITH A VACUUM;
   c. ANCHOR THE STEEL REINFORCING BARS INTO THE DRILLED HOLES USING A TWO-COMPONENT EPOXY RESIN MEETING EN 1504-6;
5. INSTALL ADDITIONAL TRANSVERSE REINFORCEMENT;
   a. USE 10 mm DIAMETER ASTM A706 GRADE 60 REINFORCING BARS AT A SPACING OF 102 mm [4"]
   b. USE U BARS ON THREE SIDES WITH A SINGLE CLOSURE PIECE OR OVERLAPPING L-SHAPED BARS WITH 135 DEGREE HOOKS
   c. DOWEL 10 mm BARS INTO EXISTING COLUMN. MINIMUM EMBEDMENT DEPTH OF 152 mm [6"];
6. ADD C28/35 NON-SHRINKAGE CONCRETE WITH CHARACTERISTICS OF SELF-COMPACTING, HIGH-STRENGTH AND HIGH DURABILITY CONCRETE;
7. APPLY CURING COMPOUND AS PER SPECIFICATIONS AND MANUFACTURER APPLICATION INSTRUCTIONS;
8. FINISH COLUMN WITH PAINT MATCHING ORIGINAL COLOUR.

ENGINEER'S CERTIFICATION/ PROFESSIONAL SEAL

#	DATE	REVISION	BY	CHK

ECMC Ltd
1st flr. Marie-Colette Bldg.; #9Lawjanv Crescent, Rodney Bay Commercial Blvd;
P.O. Box RB2446; Gros Islet, Saint Lucia;
t: 1-758-453-2093; e: ecmc@candw.lc; w: www.ecmcstlucia.com

CLIENT: **CLIMATE TECHNOLOGY CENTRE AND NETWORK**

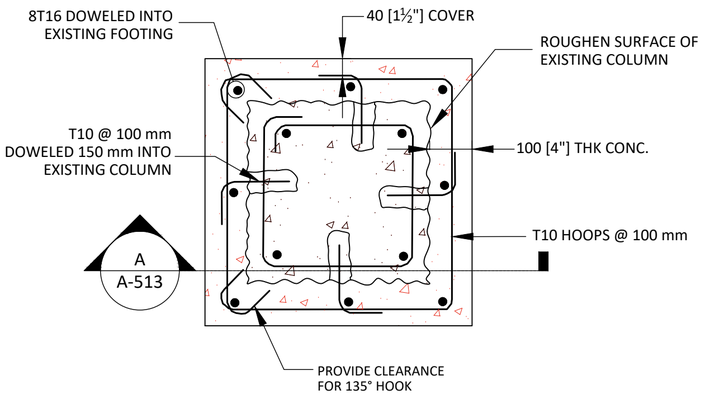
PROJECT: **TECHNICAL ASSISTANCE FOR RESILIENCE TO CLIMATE VARIABILITY IN THE BUILDING SECTOR OF ANTIGUA AND BARBUDA**

TITLE: **CONCRETE JACKET ESCTION AND DETAILS**

SCALE: **AS SHOWN** DRAWN: **H.A.**

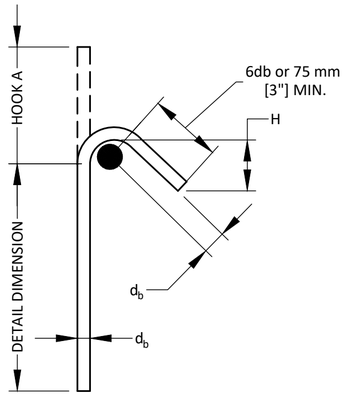
DATE: **SEPTEMBER, 2018** CHECKED: **E. LOUIS** (REG. ENGINEER)

DRAWING #: **18106-S-521** REV #:



1 CONCRETE JACKET DETAIL

SCALE: 1:10



2 135° TIE HOOK DETAIL

SCALE: 1:10

CONSTRUCTION METHODOLOGY FOR JACKETING CONCRETE COLUMNS (ONLY INTERNAL COLUMNS)

1. ROUGHEN CONCRETE SURFACE WITH HAND CHIPPING TO ASSIST WITH CONNECTION BETWEEN EXISTING AND NEW CONCRETE; ENGINEER TO BE NOTIFIED IF MICRO-CRACKING OF THE SUBSTRATE OCCURS;

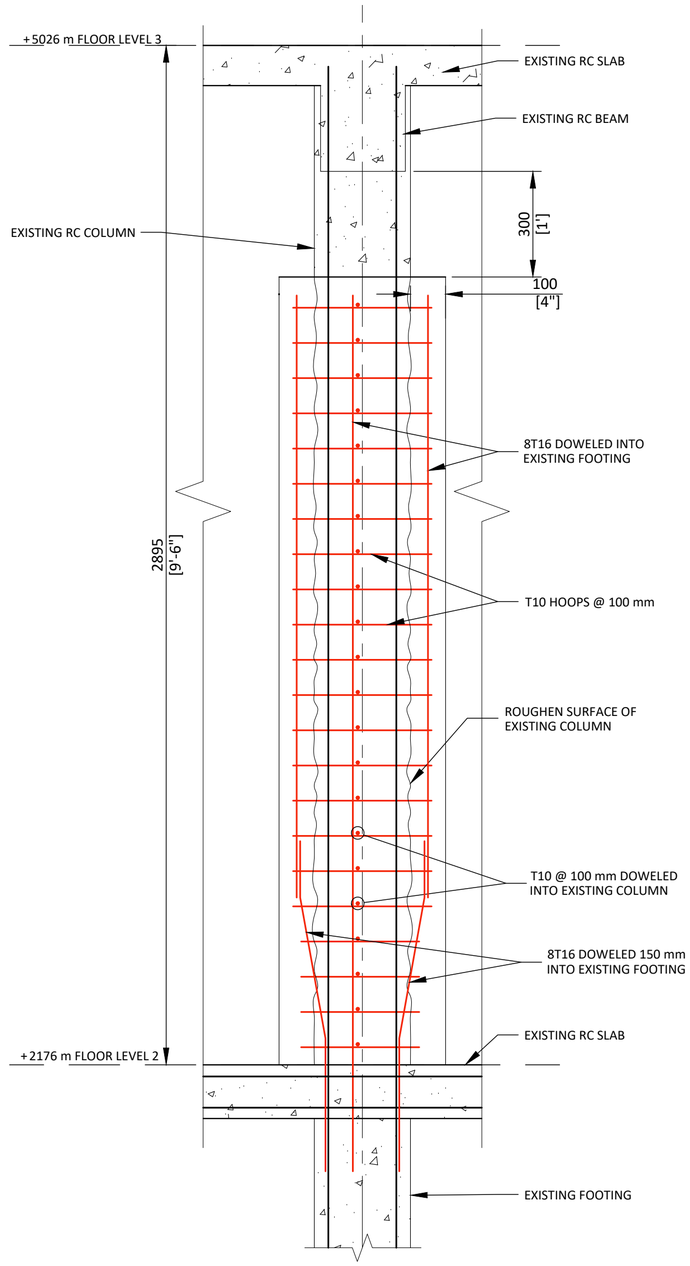
2. APPLY TWO COMPONENT EPOXY RESIN BONDING AGENT;

3. INSTALL TEMPORARY SHORING AROUND COLUMNS SO THAT THE RC JACKET IS INTRODUCED ON THE UNLOADED COLUMN AND THE RC JACKET WILL RESIST PART OF THE TOTAL LOAD AND NOT ONLY PART OF THE LOAD INCREMENTS;

4. INSTALL ADDITIONAL LONGITUDINAL REINFORCEMENT;
   a. USE 8 NO. 16 mm ASTM A615 GRADE 60 REINFORCING BARS ONCE THEY MEET THE REQUIREMENTS SPECIFIED BY ACI 318M-14 20.2.2.5 (B)
   b. DRILL HOLES IN THE FOOTING AFTER CUTTING THROUGH THE EXISTING SLAB AND CLEAN WITH A VACUUM;
   c. ANCHOR THE STEEL REINFORCING BARS INTO THE DRILLED HOLES USING A TWO-COMPONENT EPOXY RESIN
   d. IT IS NOT NECESSARY TO DRILL HOLES IN THE SLAB FOR THE STEEL BARS TO PASS THROUGH AS THE FOCUS IS TO INCREASE THE COLUMN SHEAR STRENGTH AND DUCTILITY;

6. INSTALL ADDITIONAL TRANSVERSE REINFORCEMENT;
   a. USE 10 mm DIAMETER ASTM A615 GRADE 60 REINFORCING BARS (AS PER REQUIREMENTS OF 5A) ABOVE) AT A SPACING OF 100 mm
   b. USE U BARS ON THREE SIDES WITH A SINGLE CLOSURE PIECE OR OVERLAPPING L-SHAPED BARS WITH 135 DEGREE HOOKS
   c. DOWEL 10 mm BARS INTO EXISTING COLUMN. MINIMUM EMBEDMENT DEPTH OF

7. ADD C28/35 NON-SHRINKAGE CONCRETE WITH CHARACTERISTICS OF SELF-COMPACTING, HIGH-STRENGTH AND HIGH DURABILITY CONCRETE.



A SECTION ALONG CONCRETE JACKET

SCALE: 1:12

ENGINEER'S CERTIFICATION/ PROFESSIONAL SEAL

#	DATE	REVISION	BY	CHK

ECMC Ltd
1st flr. Marie-Colette Bldg.; #9Lawjanv Crescent, Rodney Bay Commercial Blvd;
P.O. Box RB2446; Gros Islet, Saint Lucia;
t: 1-758-453-2093; e: ecmc@candw.lc; w: www.ecmcstlucia.com

CLIENT: **CLIMATE TECHNOLOGY CENTRE AND NETWORK**

PROJECT: **TECHNICAL ASSISTANCE FOR RESILIENCE TO CLIMATE VARIABILITY IN THE BUILDING SECTOR OF ANTIGUA AND BARBUDA**

TITLE: **CONCRETE JACKET ESCTION AND DETAILS**

SCALE: **AS SHOWN** | DRAWN: **H.A.**

DATE: **SEPTEMBER, 2018** | CHECKED: **E. LOUIS** (REG. ENGINEER)

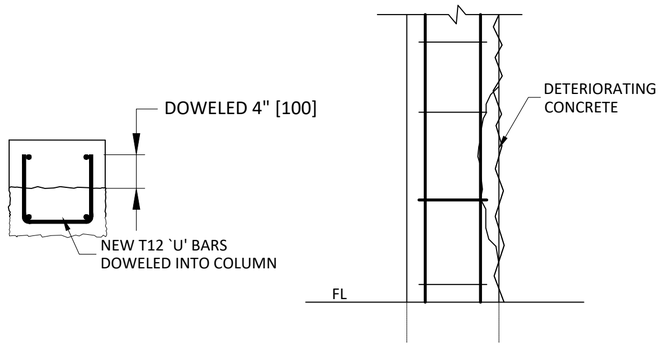
DRAWING #: **18106-S-522** | REV #:

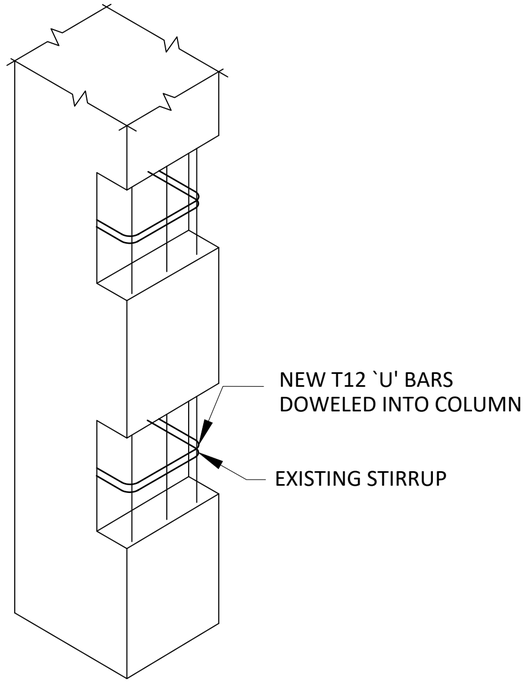
REPAIR METHODOLOGY

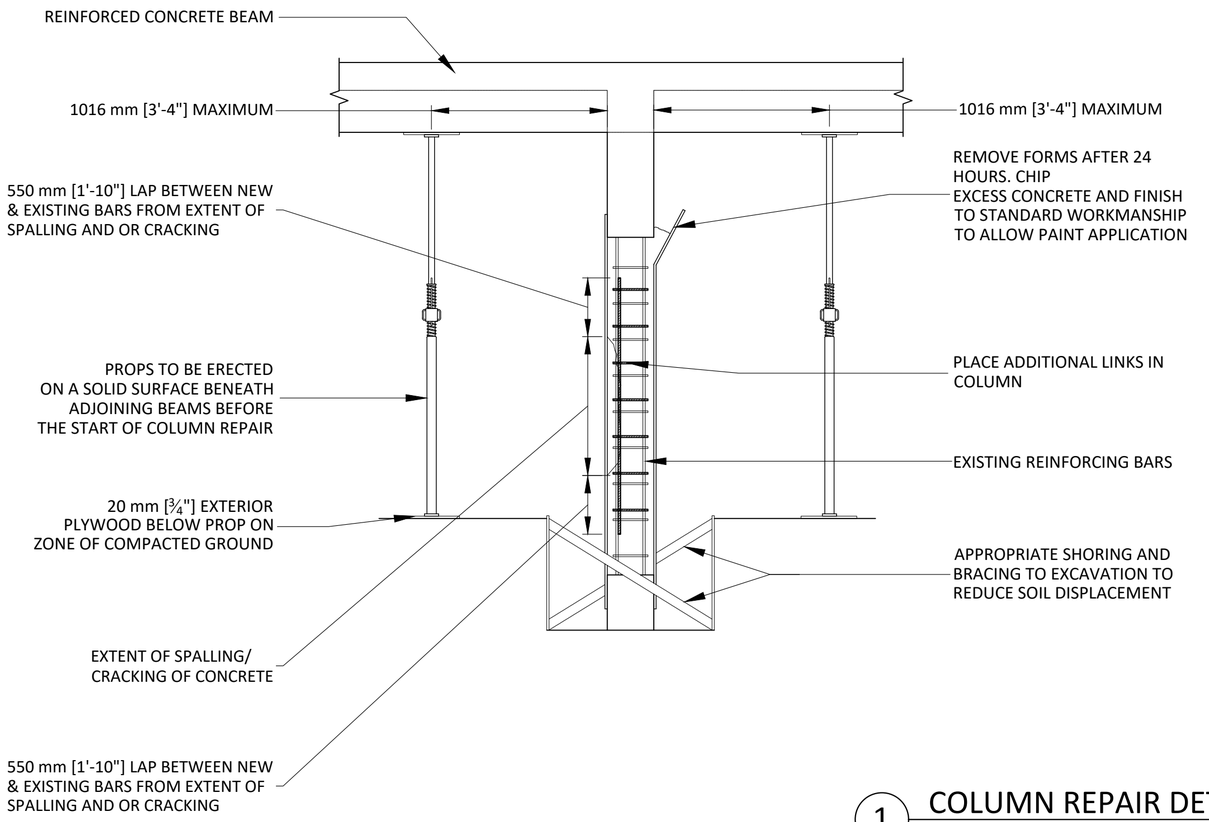
1. USING A SMALL ELECTRICAL BREAKER OR CHISEL, REMOVE ALL DETERIORATED CONCRETE, AND CUT CONCRETE DOWN TO THE FOUNDATION LEVEL, DEPENDING ON THE EXTENT OF THE DAMAGE;
2. USING A WIRE BRUSH, CLEAN AND REMOVE ALL SCALING OF THE EXISTING REINFORCING BARS;
3. REINFORCE THE BADLY CORRODED BARS WITH SIMILAR 16 mm [⅝"] HIGH TENSILE (HT) BARS, MAINTAINING THE REQUIRED LAP LENGTH OF 550 mm [22"] WITH THE SOUND PORTION OF THE EXISTING REINFORCING BARS;
4. USING 10 mm [⅜"] HT BARS, PLACE ADDITIONAL LINKS AT 152 mm [6"] SPACING AND APPLY A GENEROUS COAT OF RUST INHIBITOR ON STEEL BARS;
5. FORM COLUMN IN 915 mm [3'-0"] HEIGHTS LEAVING SPACE FOR THE POURING AND COMPACTION OF THE CONCRETE;
6. USING A HIGH STRENGTH ADMIXTURE LIKE CONPLAST X421, FILL FORM WITH CONCRETE MADE WITH WELL GRADED FINE AGGREGATE AND A BLEND OF 10 mm AND 12 mm [½"] COARSE AGGREGATE;
7. ALLOW TO CURE FOR 24 HOURS, REMOVE FORM AND APPLY A CURING COMPOUND TO SURFACE (CONCURE WB);
8. AFTER 2 DAYS OF CURING, USE CHIPPING HAMMER AND REDUCE COLUMN TO CORRECT SIZE
9. FINISH COLUMN TO STANDARD WORKMANSHIP TO ALLOW PAINT APPLICATION.

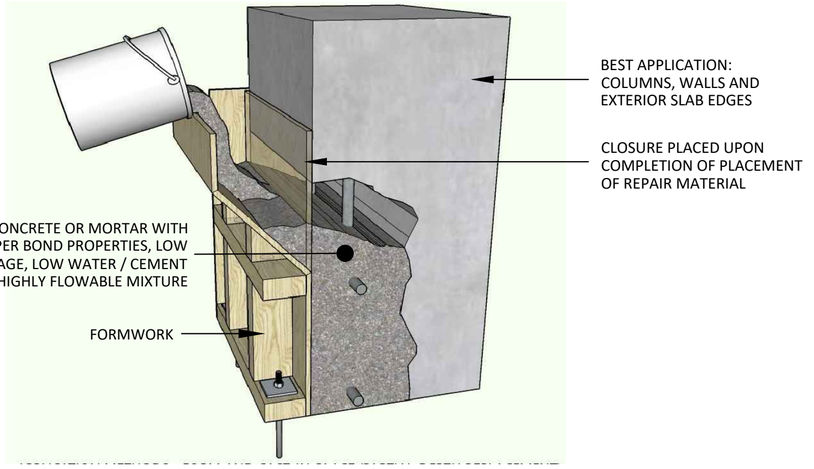
NOTES:

1. PROPS TO BE ERECTED BEFORE ANY REPAIR WORKS TO COLUMN COMMENCES.
2. USE 20 mm [¾"] EXTERIOR PLYWOOD ON SUPPORTING/(ED) MEMBERS AT PROP LOCATIONS.
3. MIN. REQUIRED COMPRESSIVE CUBE STRENGTH OF CONCRETE, f_{cu} = 25 N/mm^2
4. REQUIRED TENSILE STRENGTH OF STEEL , fy = 420 N/mm^2









1 COLUMN REPAIR DETAILS

SCALE: NTS

ENGINEER'S CERTIFICATION/ PROFESSIONAL SEAL

#	DATE	REVISION	BY	CHK

ECMC Ltd
1st flr. Marie-Colette Bldg.; #9Lawjanv Crescent, Rodney Bay Commercial Blvd;
P.O. Box RB2446; Gros Islet, Saint Lucia;
t: 1-758-453-2093; e: ecmc@candw.lc; w: www.ecmcstlucia.com

CLIENT: **CLIMATE TECHNOLOGY CENTRE AND NETWORK**

PROJECT: **TECHNICAL ASSISTANCE FOR RESILIENCE TO CLIMATE VARIABILITY IN THE BUILDING SECTOR OF ANTIGUA AND BARBUDA**

TITLE: **COLUMN REPAIR METHODOLOGIES AND DETAILS**

SCALE: **AS SHOWN** | DRAWN: **H.A.**

DATE: **SEPTEMBER, 2018** | CHECKED: **E. LOUIS** (REG. ENGINEER)

DRAWING #: **18106-S-523** | REV #:

REPAIR METHODOLOGY FOR SPALLED REINFORCED CONCRETE COLUMN

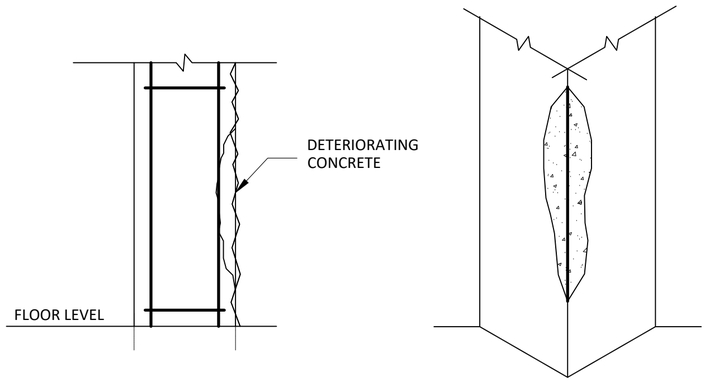
1. USING A SMALL ELECTRICAL BREAKER OR CHISEL, REMOVE ALL DETERIORATED CONCRETE AND CUT CONCRETE DOWN TO THE FLOOR;
2. USING WIRE BRUSH CLEAN, AND REMOVE ALL SCALING OFF REINFORCING BARS;
3. DOWEL DOWN 203 mm [8"] NEAR THE BADLY CORRODED BARS IF APPLICABLE, USING EPOXY GROUT IN THE HOLES;
4. USING 10 mm [⅜"] HIGH TENSILE BARS, PLACE LINKS AT 152 mm [6"] SPACING IF NECESSARY AND APPLY A GENEROUS COAT OF RUST INHIBITOR ON THE STEEL;
5. FORM COLUMN LEAVING SPACE FOR THE POURING OF CONCRETE;
6. USING A HIGH STRENGTH ADMIXTURE LIKE CONPLAST SP 430, FILL FORM WITH CONCRETE MADE WITH WELL GRADED FINE AGGREGATE AND A BLEND OF 10 mm [⅜"] AND 12 mm [½"] COARSE AGGREGATE;
7. ALLOW TO CURE FOR 24 HOURS, REMOVE FORM AND APPLY A CURING COMPOUND TO THE SURFACE (CONCURE WB);
8. AFTER 2 DAYS OF CURING, USE CHIPPING HAMMER AND REDUCE COLUMN TO THE CORRECT SIZE;
9. FINISH COLUMN TO WORKMANSHIP SPECIFIED IN THE CONTRACT.

REPAIR METHODOLOGY FOR HONEYCOMBING

1. USING A LIGHT CHIPPING HAMMER 7 KG OR LESS, REMOVE THE HONEYCOMBED CONCRETE UNTIL THE SOLID SURFACE IS REACHED;
2. FOLLOW THE CHIPPING WITH THOROUGH CLEANING OF ANY LOOSE MATERIAL AND DUST FROM THE AREA;
3. APPLY A GENEROUS COAT OF HIGH STRENGTH BONDING AGENT TO THE EXPOSED SURFACES AS PER MANUFACTURER'S INSTRUCTIONS;
4. PRODUCE A SUITABLE MORTAR:
   a. FROM A NON-SHRINK GROUT LIKE CONBEXTRA-GP AS PER MANUFACTURER'S INSTRUCTIONS OR,
   b. USING - 1 PART PORTLAND CEMENT AND 3 PARTS SAND WITH A WATER-CEMENT RATIO OF ABOUT 0.35 AND A NON SHRINK-ADDITIVE;
5. IF THE REPAIR IS DEEPER THAN 1" [25 mm] APPLY THE MORTAR IN LAYERS NO THICKER THAN ¾" [20 mm] TO AVOID SAGGING AND LOSS OF BOND;
6. AFTER PLACING EACH LAYER, ALLOW TO SET FOR ABOUT 30 MINUTES BEFORE PLACING THE NEXT LAYER;
7. COMPLETE THE REPAIR BY OVERFILLING THE VOID. ONCE THE MORTAR HAS HARDENED SLIGHTLY BUT CAN STILL BE TRIMMED OFF WITH THE EDGE OF A STEEL TROWEL, SHAVE OFF THE EXCESS MATERIAL.
8. APPLY CURING COMPOUND AS PER SPECIFICATIONS AND MANUFACTURER APPLICATION INSTRUCTIONS.

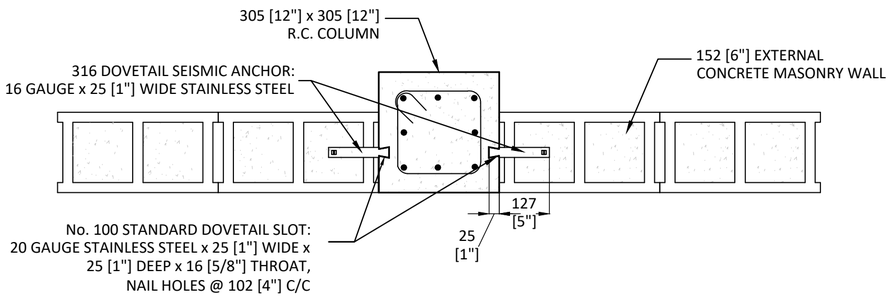
REPAIR METHODOLOGY NO. 1 - SHEAR CRACK REPAIR ON BEAMS OR COLUMNS

1. IDENTIFY THE BEAMS COLUMN WITH THE DIAGONAL SHEAR FAILURE;
2. IDENTIFY AND SCRIBE ON THE BEAM CROSS-SECTION, THE SHEAR ZONE WHICH WILL BE TAKEN AS 0.25 OF ITS CLEAR SPAN;
3. CLEAN AND GRIT BLAST OR GRIND THE SURFACE OF THE BEAM AND THE STEEL PLATES;
4. WELD TOGETHER A 3 mm THICK STEEL "U" JACKET WITH INTERNAL DIMENSIONS 2 mm GREATER THAN THE CROSS-SECTION OF THE BEAM;
5. APPLY 1 mm THICK OF SIKADUR 31 EPOXY ADHESIVE TO BOTH THE CONCRETE SURFACES AND THE STEEL JACKET;
6. BOND THE JACKET IN POSITION WITHIN THE ZONE IDENTIFIED IN "A" ABOVE; APPLY GENEROUS COATS OF THE RUST IN



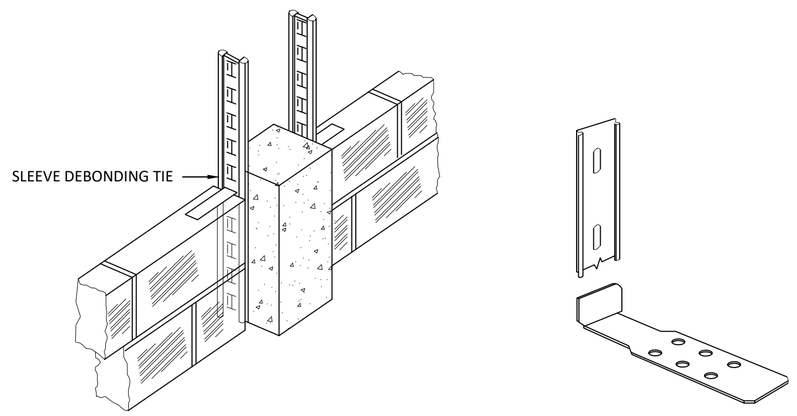
1 SPALLING REINFORCED CONCRETE COLUMN

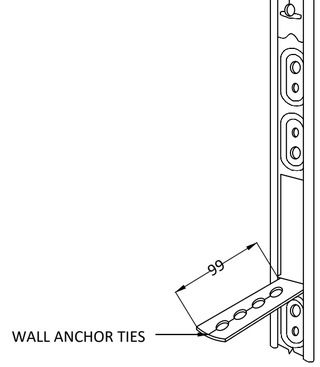
SCALE: NTS



2 COLUMN TO MASONRY CONNECTION DETAIL

SCALE: NTS





3 COLUMN FIX CEEJAY DETAILS

SCALE: NTS

ENGINEER'S CERTIFICATION/ PROFESSIONAL SEAL

#	DATE	REVISION	BY	CHK

ECMC Ltd
1st flr. Marie-Colette Bldg.; #9Lawjanv Crescent, Rodney Bay Commercial Blvd;
P.O. Box RB2446; Gros Islet, Saint Lucia;
t: 1-758-453-2093; e: ecmc@candw.lc; w: www.ecmcstlucia.com

CLIENT: **CLIMATE TECHNOLOGY CENTRE AND NETWORK**

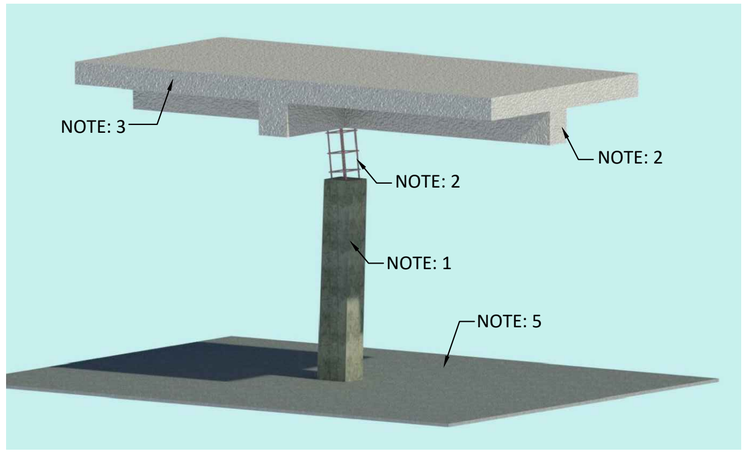
PROJECT: **TECHNICAL ASSISTANCE FOR RESILIENCE TO CLIMATE VARIABILITY IN THE BUILDING SECTOR OF ANTIGUA AND BARBUDA**

TITLE: **COLUMN REPAIR METHODOLOGIES & COULMN TO MASORY CONNECTION DETAIL**

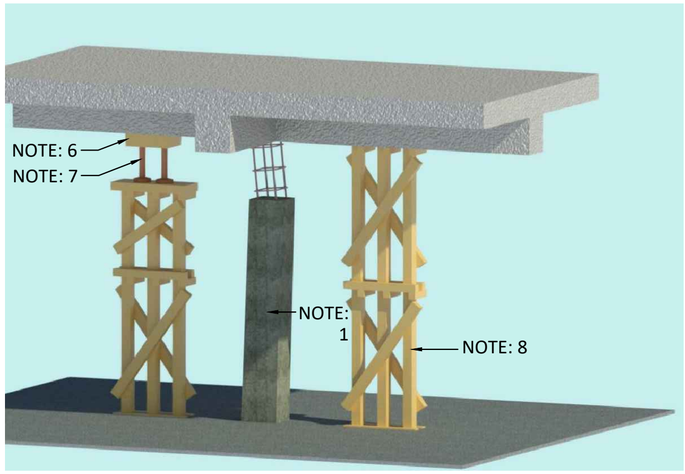
SCALE: **AS SHOWN** | DRAWN: **H.A.**

DATE: **SEPTEMBER, 2018** | CHECKED: **E. LOUIS** (REG. ENGINEER)

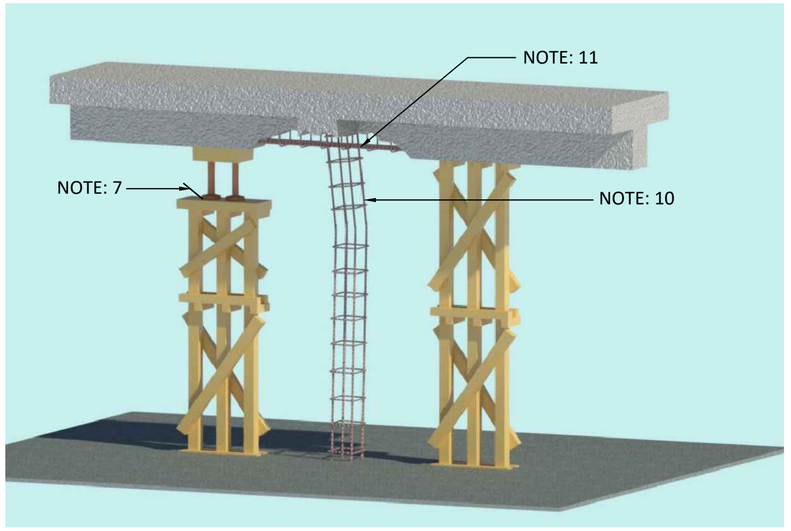
DRAWING #: **18106-S-524** | REV #:



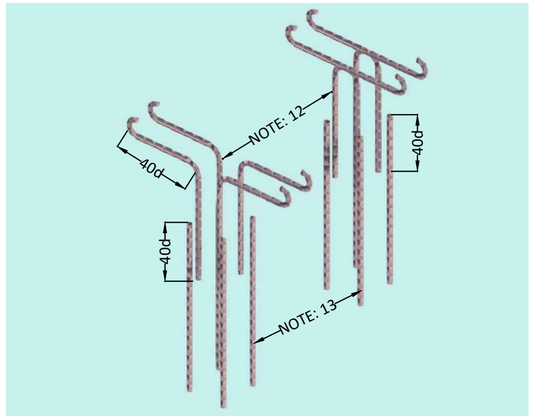
1 RETROFITTING COLUMN - INITIAL CONDITION
SCALE: NTS



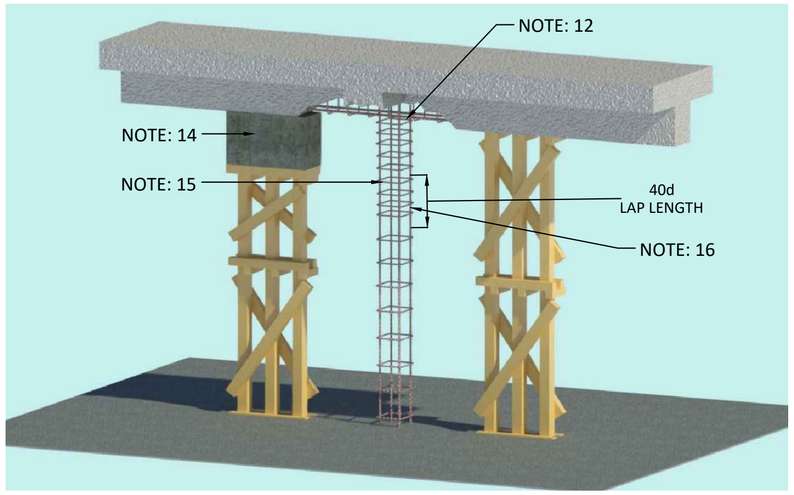
2 RETROFITTING COLUMN - STEP 1
SCALE: NTS



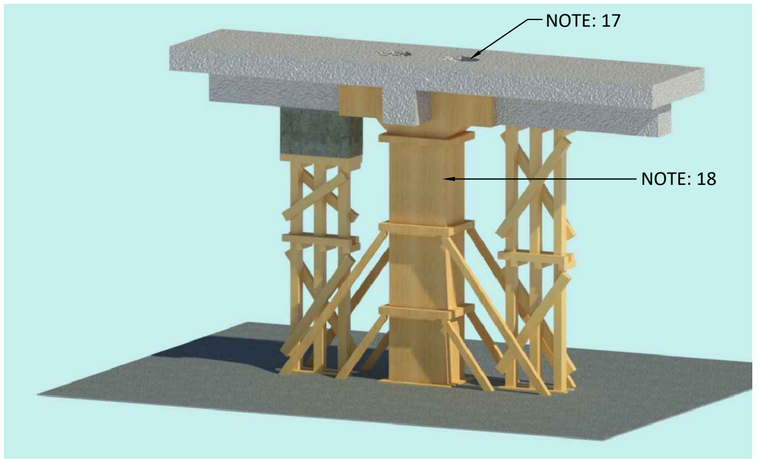
3 RETROFITTING COLUMN - STEP 2
SCALE: NTS



4 RETROFITTING COLUMN - STEP 3
SCALE: NTS



5 RETROFITTING COLUMN - STEP 4
SCALE: NTS



5 RETROFITTING COLUMN - STEP 5
SCALE: NTS

NOTES:
1. INCLINED COLUMN TO BE RESTORED
2. COLUMN CRUSHED (DEFORMED)
3. CONCRETE SLAB NOT HORIZONTAL
4. BEAM
5. FLOOR
6. TIMBER BLOCKS AS FOOTING
7. JACKS TO RESTORE THE LEVEL / TO ADJUST THE DESIRED LEVEL
8. TIMBER FRAMES SCAFFOLDING
9. REMOVE THE CONCRETE OF THE INCLINED COLUMN
10. CUT THE DEFORMED REINFORCING BARS
11. CHIP THE BEAM TO ANCHOR COLUMN REINFORCEMENT
12. NEW MAIN COLUMN REINFORCEMENT, ANCHOR TO THE BEAM OR THE SLAB
13. EXISTING REINFORCING BARS,
14. TIMBER BLOCK TO REPLACE THE JACK
15. RE-ARRANGE AND IF NECESSARY THE COLUMN STIRRUPS
16. LAP BARS TO BE WELDED
17. HOLES IN SLABS TO POUR CONCRETE
18. FORMWORK

ENGINEER'S CERTIFICATION/ PROFESSIONAL SEAL

#	DATE	REVISION	BY	CHK

ECMC Ltd
1st flr. Marie-Colette Bldg.; #9Lawjanv Crescent, Rodney Bay Commercial Blvd;
P.O. Box RB2446; Gros Islet, Saint Lucia;
t: 1-758-453-2093; e: ecmc@candw.lc; w: www.ecmcstlucia.com

CLIENT: **CLIMATE TECHNOLOGY CENTRE AND NETWORK**

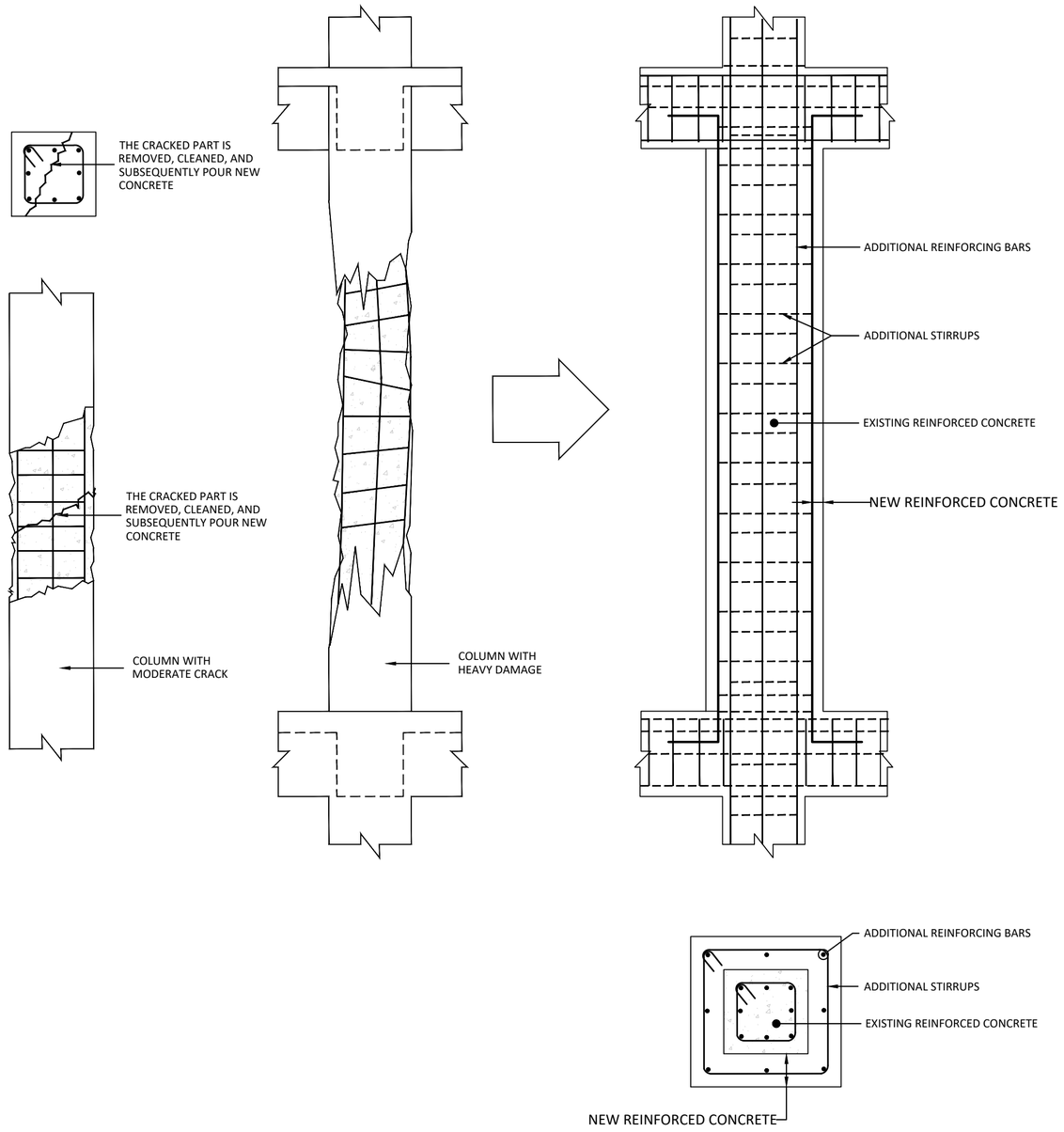
PROJECT: **TECHNICAL ASSISTANCE FOR RESILIENCE TO CLIMATE VARIABILITY IN THE BUILDING SECTOR OF ANTIGUA AND BARBUDA**

TITLE: **COLUMN RETROFTTING DETAILS**

SCALE: **AS SHOWN** | DRAWN: **H.A.**

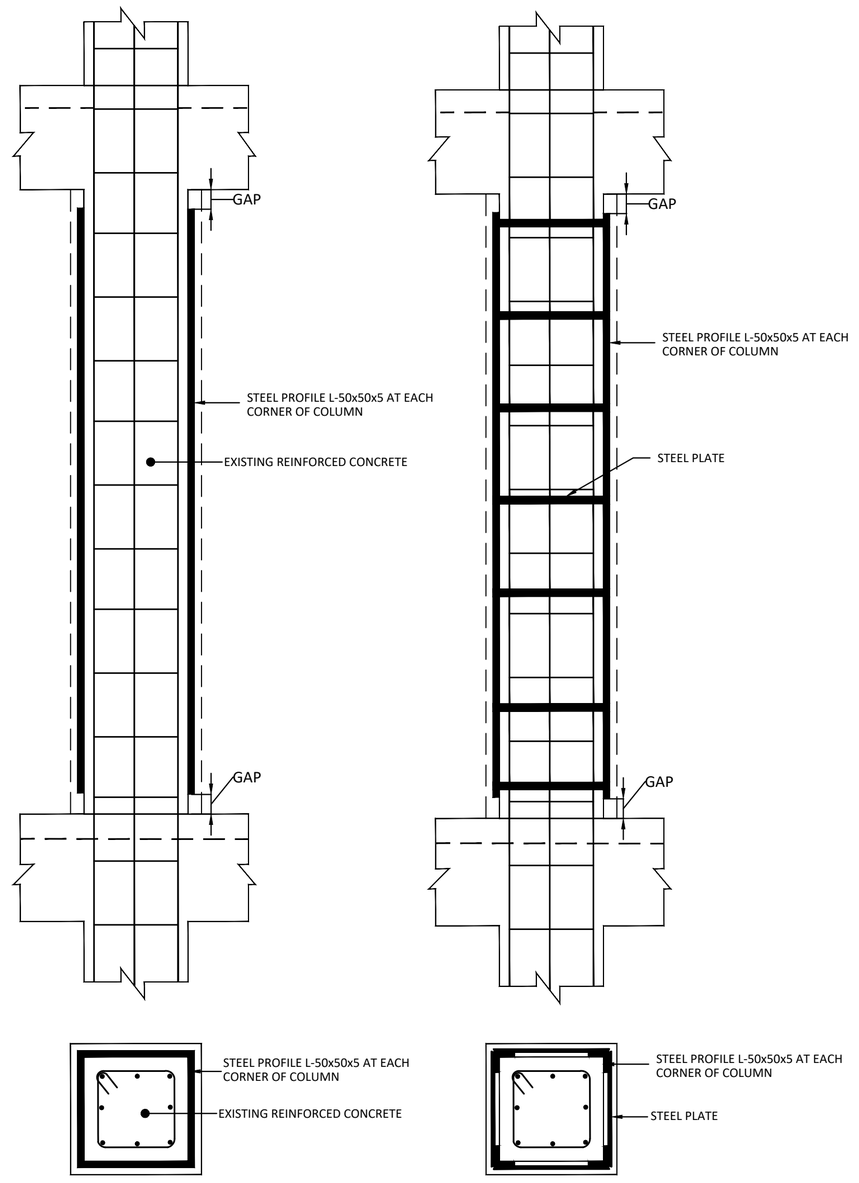
DATE: **SEPTEMBER, 2018** | CHECKED: **E. LOUIS** (REG. ENGINEER)

DRAWING #: **18106-S-525** | REV #:



1 STRENGTHENING OF DAMAGED COLUMN BY ADDING FLEXURAL AND SHEAR STRENGTH

SCALE: NTS



2 ADDING STEEL PROFILE TO INCREASE SHEAR STRENGTH WITHOUT INCREASING FLEXURAL CAPACITY

SCALE: NTS

ENGINEER'S CERTIFICATION/ PROFESSIONAL SEAL

#	DATE	REVISION	BY	CHK

ECMC Ltd
1st flr. Marie-Colette Bldg.; #9Lawjanv Crescent, Rodney Bay Commercial Blvd;
P.O. Box RB2446; Gros Islet, Saint Lucia;
t: 1-758-453-2093; e: ecmc@candw.lc; w: www.ecmcstlucia.com

CLIENT: **CLIMATE TECHNOLOGY CENTRE AND NETWORK**

PROJECT: **TECHNICAL ASSISTANCE FOR RESILIENCE TO CLIMATE VARIABILITY IN THE BUILDING SECTOR OF ANTIGUA AND BARBUDA**

TITLE: **STRENGTHENING OF DAMAGED COLUMN DETAILS**

SCALE: **AS SHOWN** | DRAWN: **H.A.**

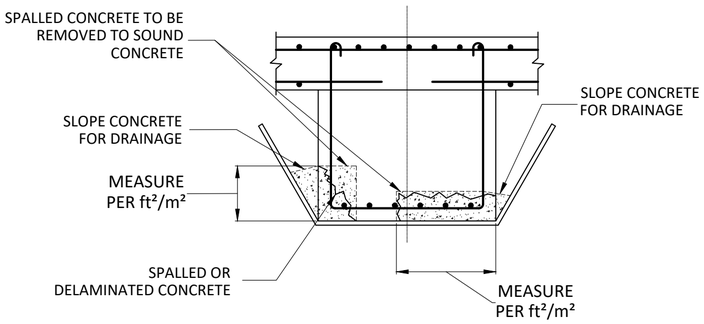
DATE: **SEPTEMBER, 2018** | CHECKED: **E. LOUIS** (REG. ENGINEER)

DRAWING #: **18106-S-526** | REV #:

BEAM REPAIRS & RETROFIT MEASURES

REPAIR METHODOLOGY NO. 1

1. REMOVE ALL SPALLED OR DELAMINATED CONCRETE TO A MINIMUM OF 32 mm [1¼"] BEYOND REINFORCEMENT;
2. CLEAN AND SANDBLAST REINFORCING STEEL BARS;
3. IF ENGINEER DETERMINES THAT REINFORCEMENT IS DETERIORATED AND REQUIRES REPLACEMENT, REPLACE AS PER TYPE "3" REPAIR METHODOLOGY;
4. APPLY BONDING AGENT TO CONCRETE [CONCRESIVE LIQUID (LPL) BY MASTER BUILDERS];
5. SET UP FORMS AND POUR LATEX MODIFIED CONCRETE IN FORM WORK.

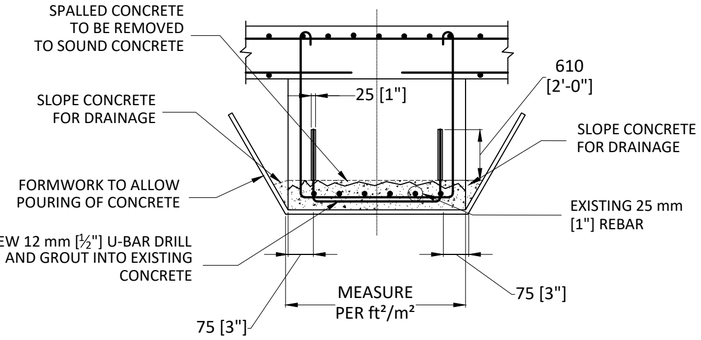


1 BEAM REPAIR DETAIL

SCALE: NTS

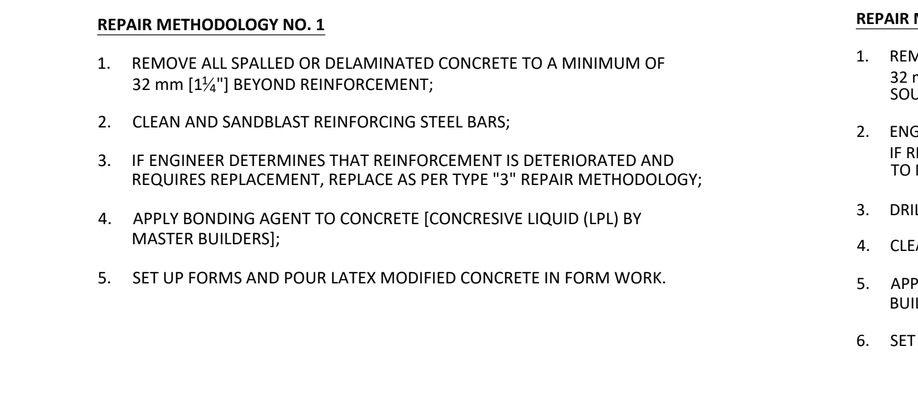
REPAIR METHODOLOGY NO. 2

1. REMOVE ALL SPALLED OR DELAMINATED CONCRETE TO A MINIMUM OF 32 mm [1¼"] BEYOND REBAR OR DEEPER AS DIRECTED BY ENGINEER TO REACH SOUND CONCRETE;
2. ENGINEER TO INSPECT REBAR TO IDENTIFY DETERIORATED BARS TO BE REPLACED. IF REQUIRED REPLACE WITH NEW 12 mm [½"] U-BARS AND LONGITUDINAL BARS TO MATCH ORIGINAL BAR SIZE;
3. DRILL AND GROUT 12 mm [½"] U-BARS INTO EXISTING CONCRETE;
4. CLEAN WITH WIRE BRUSH REINFORCING STEEL BARS;
5. APPLY BONDING AGENT TO CONCRETE [CONCRESIVE LIQUID (LPL) BY MASTER BUILDERS];
6. SET UP FORMS AND POUR LATEX MODIFIED CONCRETE IN FORM WORK.



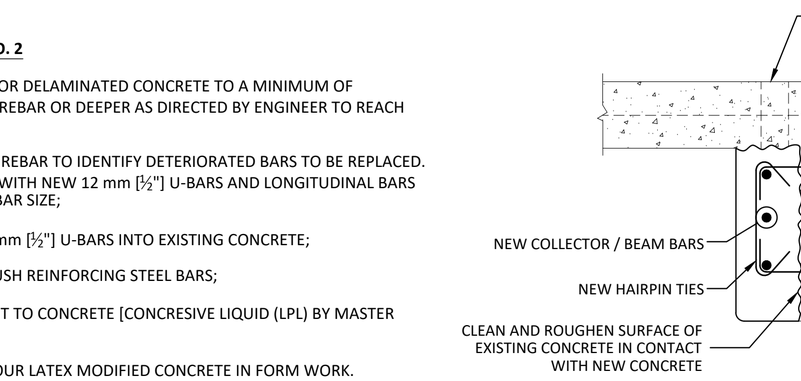
2 BEAM REPAIR DETAIL

SCALE: NTS



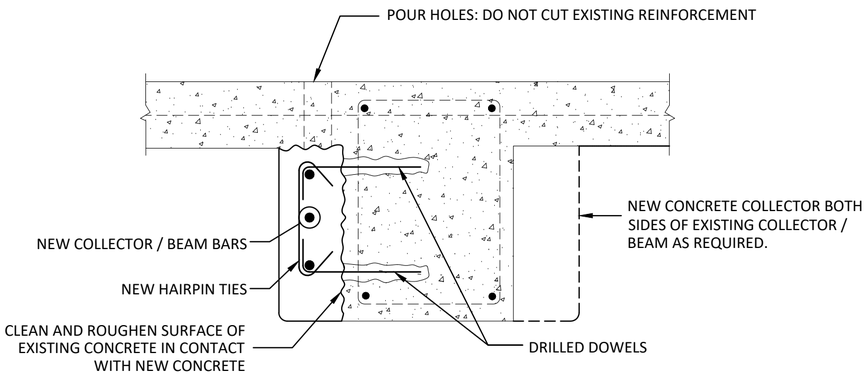
3 BEAM SECTION SHOWING SIDE AND BOTTOM CONDITION

SCALE: NTS



4 SECTION SHOWING CONCRETE BEAM / COLLECTOR AT CONCRETE SLAB

SCALE: NTS



5 BEAM SECTION SHOWING SIDE CONDITION

SCALE: NTS

ENGINEER'S CERTIFICATION/ PROFESSIONAL SEAL

#	DATE	REVISION	BY	CHK

ECMC Ltd
1st flr. Marie-Colette Bldg.; #9Lawjanv Crescent, Rodney Bay Commercial Blvd;
P.O. Box RB2446; Gros Islet, Saint Lucia;
t: 1-758-453-2093; e: ecmc@candw.lc; w: www.ecmcstlucia.com

CLIENT: **CLIMATE TECHNOLOGY CENTRE AND NETWORK**

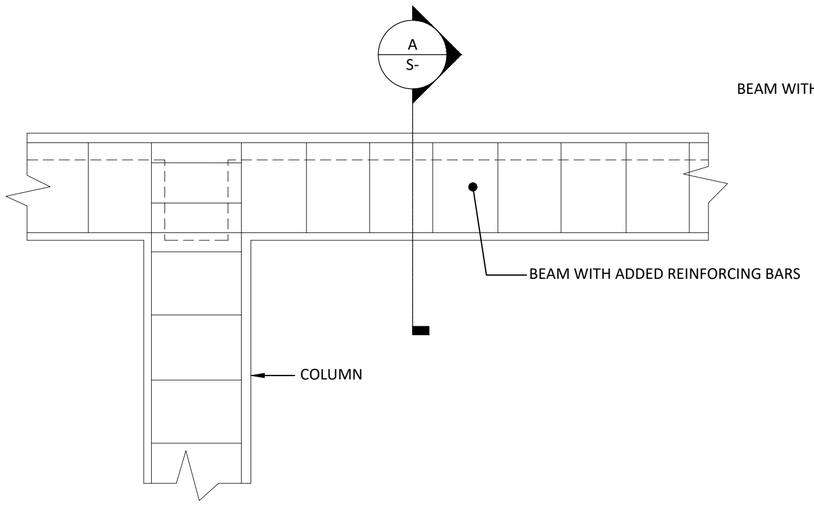
PROJECT: **TECHNICAL ASSISTANCE FOR RESILIENCE TO CLIMATE VARIABILITY IN THE BUILDING SECTOR OF ANTIGUA AND BARBUDA**

TITLE: **BEAM REPAIR METHODOLOGIES AND DETAILS**

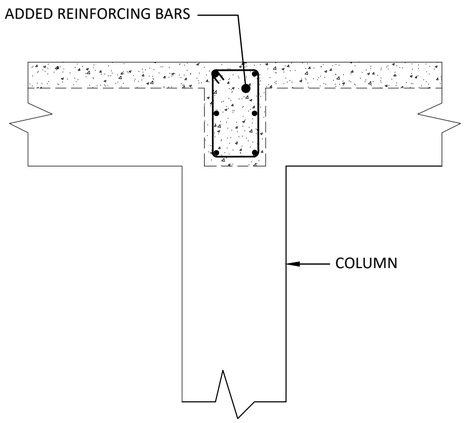
SCALE: **AS SHOWN** | DRAWN: **H.A.**

DATE: **SEPTEMBER, 2018** | CHECKED: **E. LOUIS** (REG. ENGINEER)

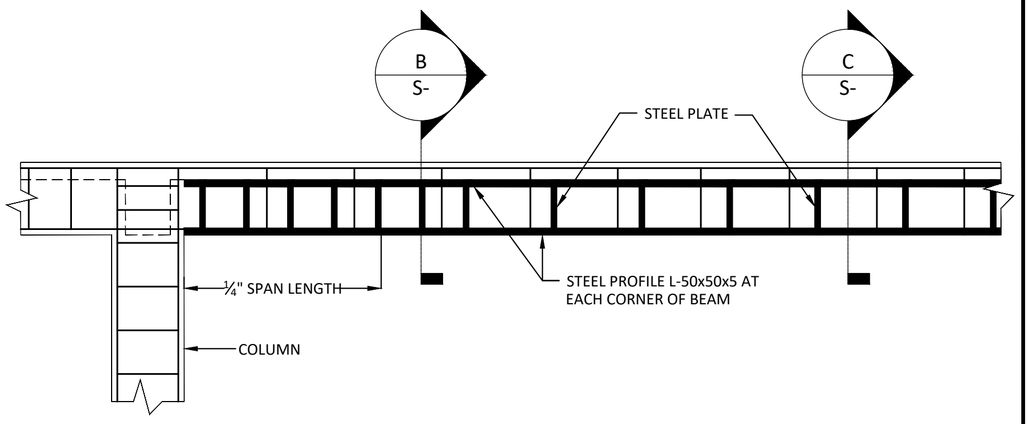
DRAWING #: **18106-S-531** | REV #:



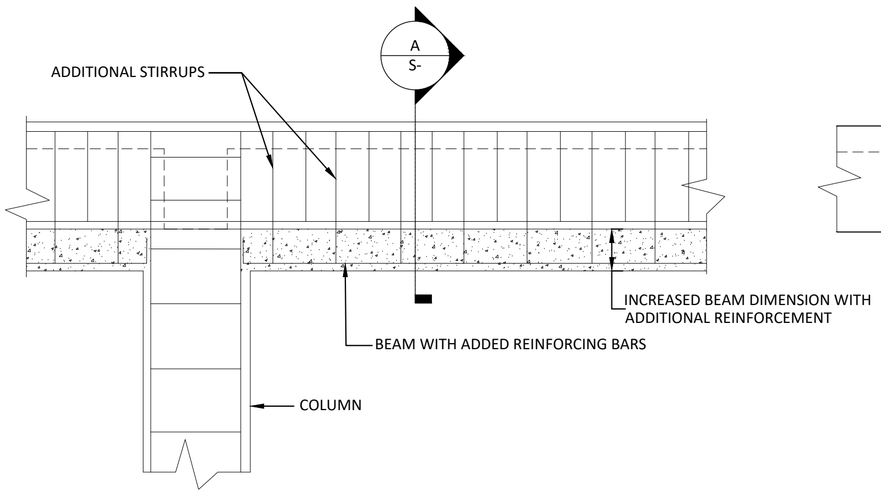
1 EXISTING BEAM
SCALE: NTS

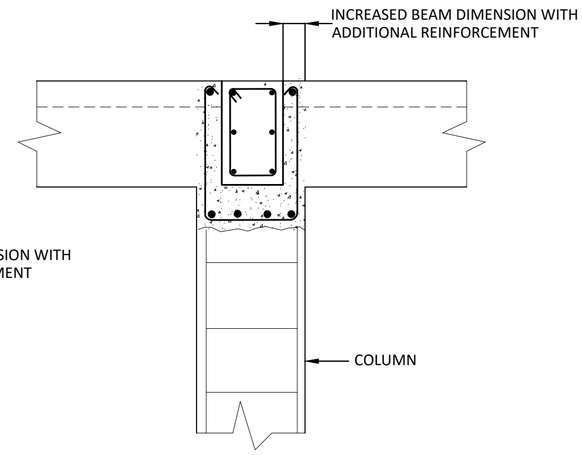


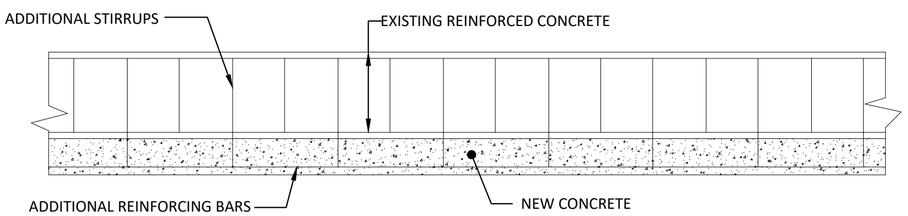
2 SECTION A
SCALE: NTS



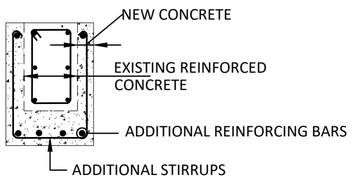
5 INCREASING SHEAR STRENGTH IN EXISTING BEAM
SCALE: NTS



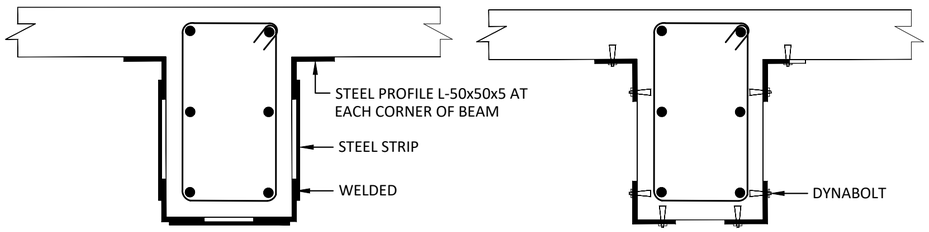




3 INCREASING FLEXURAL AND SHEAR STRENGTH BY ADDING REINFORCING BARS & STIRRUPS
SCALE: NTS

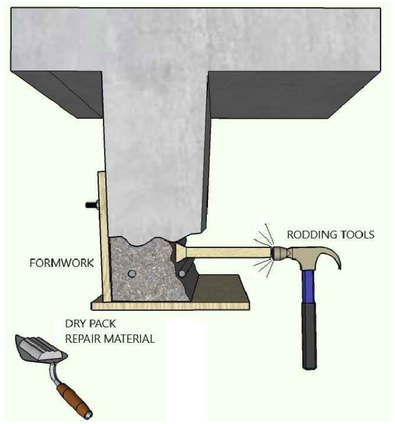


4 SECTION A
SCALE: NTS



6 SECTIONS B
SCALE: NTS

7 SECTIONS C
SCALE: NTS



8 DRY PACKING DETAIL
SCALE: NTS

DRY PACKING
GENERAL DESCRIPTION:
REPAIR MATERIAL IS MIXED INTO A UNIFORM, COHESIVE PLASTIC STATE, THEN TRANSPORTED TO A CONFINED SPACE AND COMPACTED WITH RODDING TOOLS TO PRODUCE A DENSE REPAIR MATERIAL.

BEST APPLICATION:
POST-TENSIONING GROUT POCKETS; TIE HOLES; PAN JOIST BOTTOMS; WAFFLE PAN JOISTS; VERTICAL, OVERHEAD AND HORIZONTAL LOCATIONS.

MATERIAL REQUIREMENTS:
MORTAR WITH CONSISTENCY CAPABLE OF BEING MOLDED INTO A BALL WITHOUT SAGGING.

REFERENCE:
HEADQUARTERS, UNITED STATES ARMY CORPS OF ENGINEERS (1995), "EVALUATION AND REPAIR OF CONCRETE STRUCTURES," EM 1110-2-2002, WASHINGTON, D.C.

ENGINEER'S CERTIFICATION/ PROFESSIONAL SEAL

#	DATE	REVISION	BY	CHK

ECMC Ltd
1st flr. Marie-Colette Bldg.; #9Lawjanv Crescent, Rodney Bay Commercial Blvd;
P.O. Box RB2446; Gros Islet, Saint Lucia;
t: 1-758-453-2093; e: ecmc@candw.lc; w: www.ecmcstlucia.com

CLIENT: **CLIMATE TECHNOLOGY CENTRE AND NETWORK**

PROJECT: **TECHNICAL ASSISTANCE FOR RESILIENCE TO CLIMATE VARIABILITY IN THE BUILDING SECTOR OF ANTIGUA AND BARBUDA**

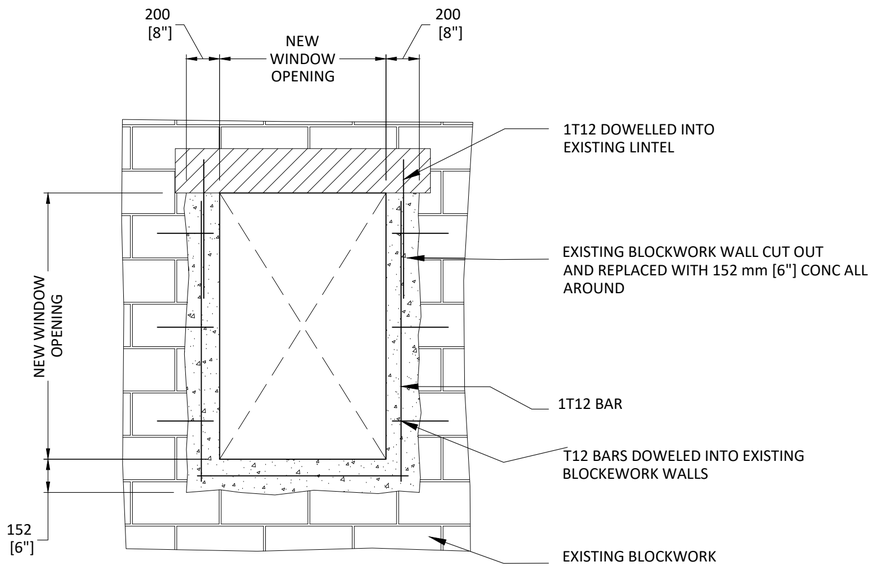
TITLE: **INCREASING SHEAR STRENGTH IN EXISTING BEAM DETAILS**

SCALE: **AS SHOWN** | DRAWN: **H.A.**

DATE: **SEPTEMBER, 2018** | CHECKED: **E. LOUIS** (REG. ENGINEER)

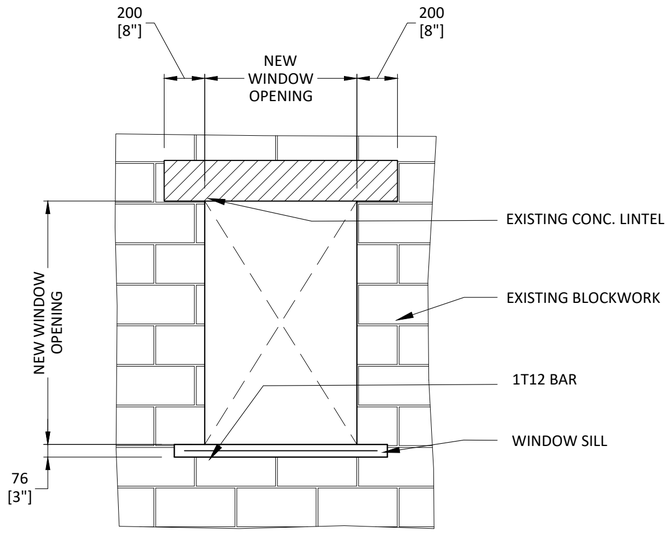
DRAWING #: **18106-S-532** | REV #:

WINDOW REPAIRS & RETROFIT MEASURES



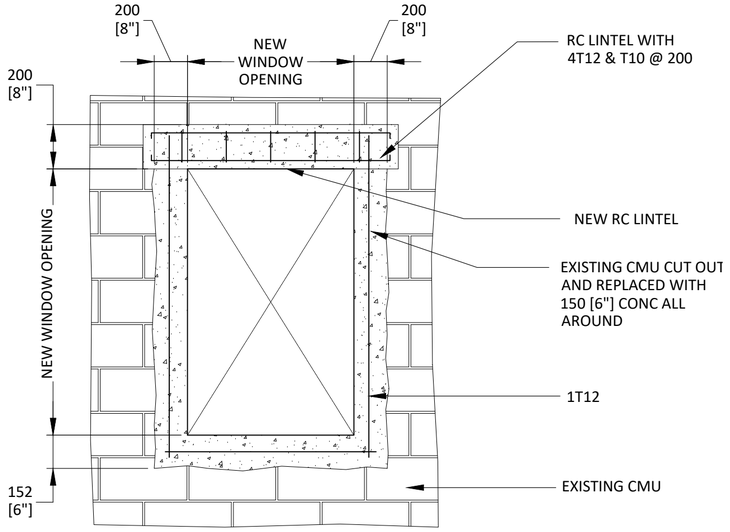
1 RETROFITTING EXIST. OPENING OPT. 1 (WINDOW)

SCALE: NTS



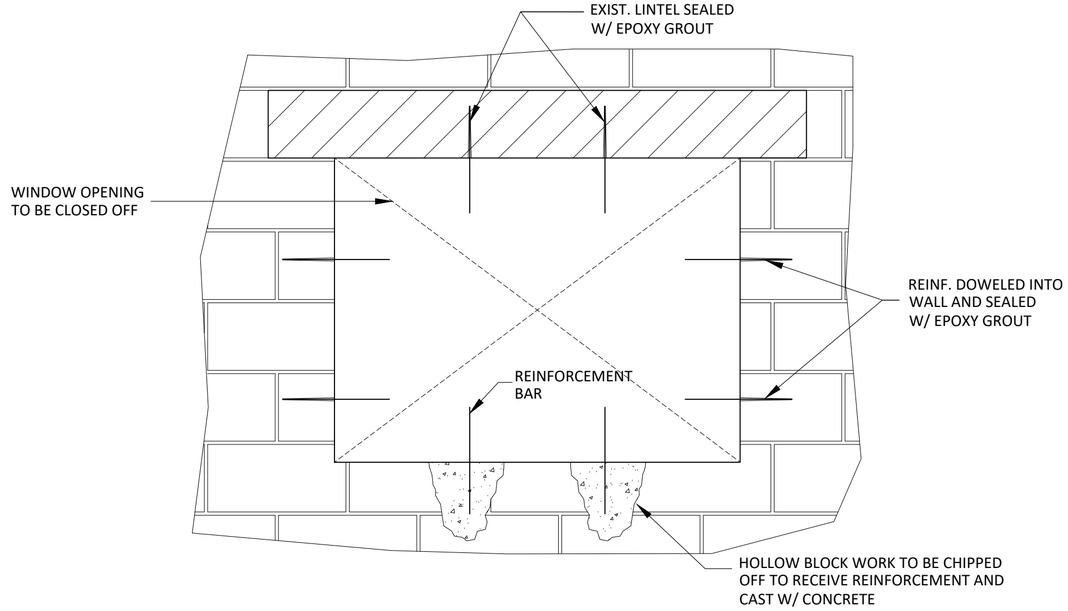
2 RETROFITTING EXIST. OPENING OPT. 2 (WINDOW)

SCALE: NTS



3 NEW OPENING IN EXISTING WALL

SCALE: NTS



4 CLOSING OFF WINDOW OPENING

SCALE: NTS

ENGINEER'S CERTIFICATION/ PROFESSIONAL SEAL

#	DATE	REVISION	BY	CHK

ECMC Ltd
1st flr. Marie-Colette Bldg.; #9Lawjanv Crescent, Rodney Bay Commercial Blvd;
P.O. Box RB2446; Gros Islet, Saint Lucia;
t: 1-758-453-2093; e: ecmc@candw.lc; w: www.ecmcstlucia.com

CLIENT: **CLIMATE TECHNOLOGY CENTRE AND NETWORK**

PROJECT: **TECHNICAL ASSISTANCE FOR RESILIENCE TO CLIMATE VARIABILITY IN THE BUILDING SECTOR OF ANTIGUA AND BARBUDA**

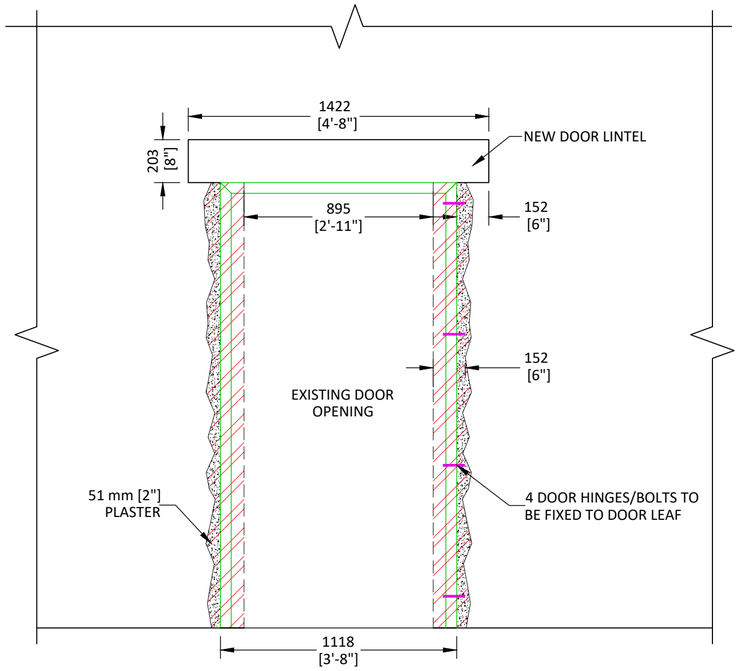
TITLE: **RETROFITTING EXISTING OPENING AND NEW WINDOW OPENING DETAILS**

SCALE: **AS SHOWN** | DRAWN: **H.A.**

DATE: **SEPTEMBER, 2018** | CHECKED: **E. LOUIS** (REG. ENGINEER)

DRAWING #: **18106-S-536** | REV #:

DOOR REPAIRS & RETROFIT MEASURES



NOTES:

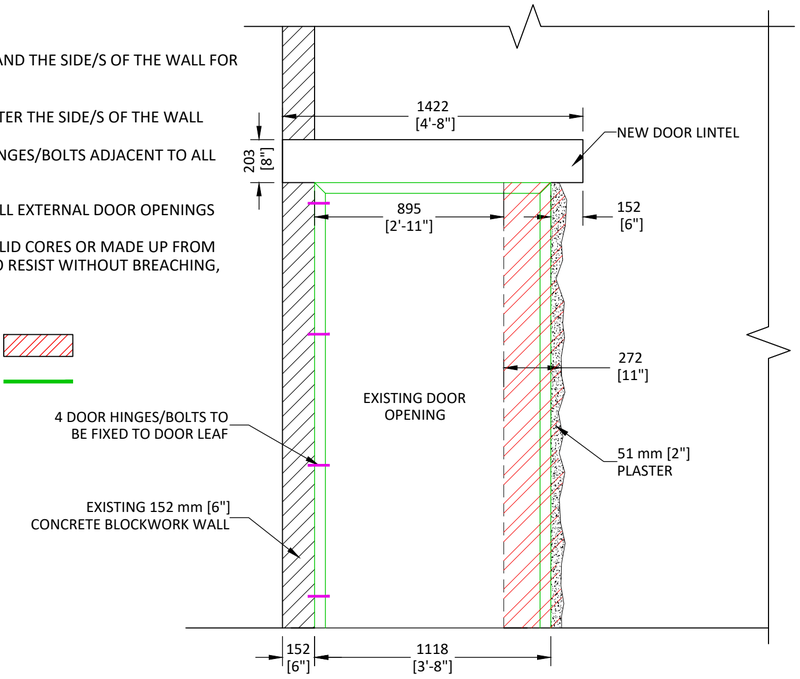
1. DEMOLISH THE EXISTING LINTEL AND THE SIDE/S OF THE WALL FOR THE DOOR OPENING
2. INSTALL A NEW LINTEL AND PLASTER THE SIDE/S OF THE WALL
3. INSTALL DOOR LEAF AND FIX 4 HINGES/BOLTS ADJACENT TO ALL CORNERS
4. INSTALL METAL THRESHOLD TO ALL EXTERNAL DOOR OPENINGS
5. INSTALL TIMBER DOORS WITH SOLID CORES OR MADE UP FROM SOLID TIMBER MEMBERS ABLE TO RESIST WITHOUT BREACHING, THE IMPACT OF FLYING OBJECTS.

SECTION TO BE DEMOLISHED -

PROPOSED DOOR OPENING -

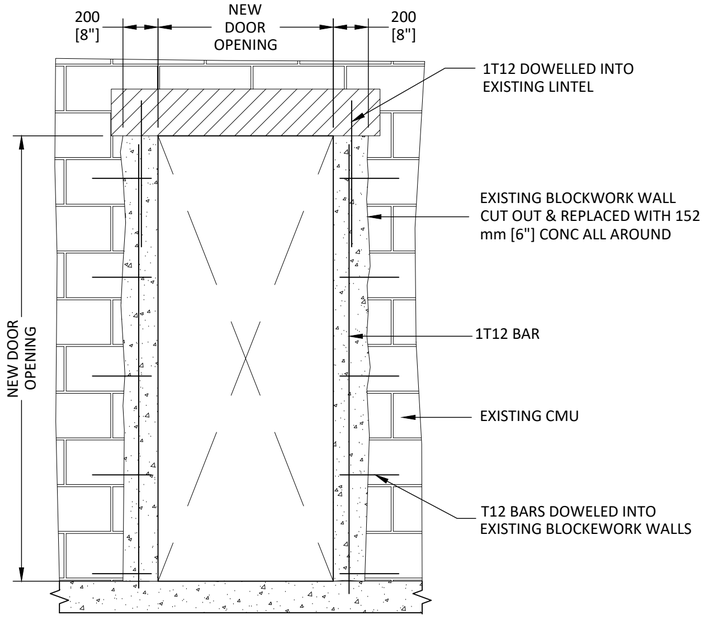
1 EXTERNAL DOOR EXTENSION DETAIL - OPTION 1

SCALE: 1:20



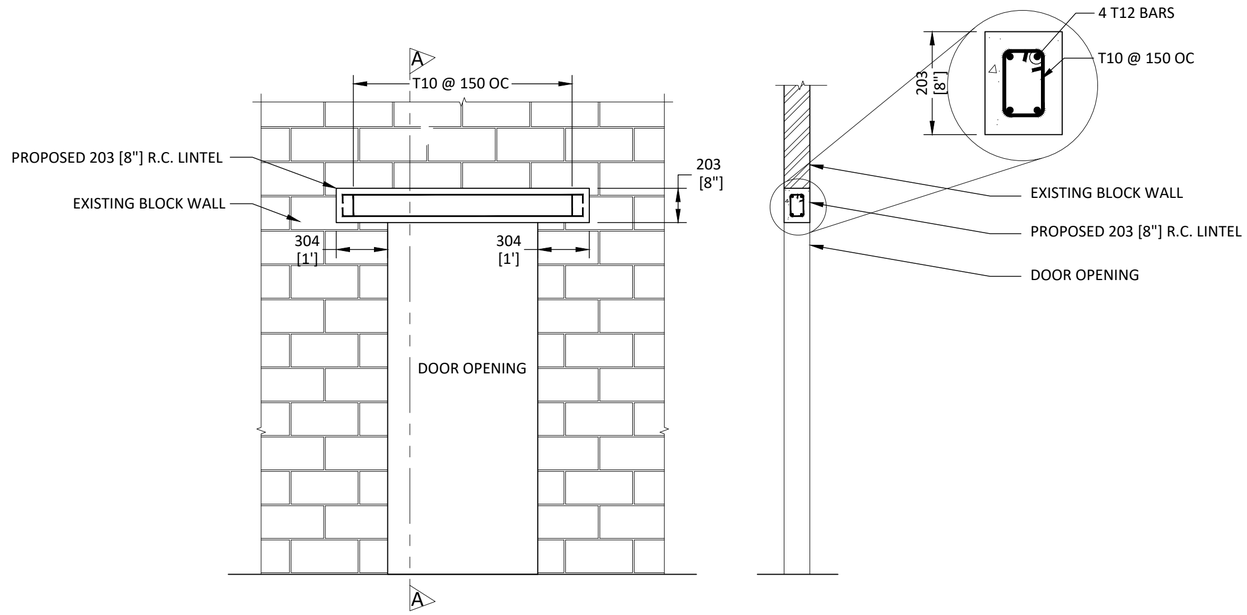
2 EXTERNAL DOOR EXTENSION DETAIL- OPTION 2

SCALE: 1:20



3 RETROFIT EXISTING DOOR OPENING

SCALE: 1:20



4 TYPICAL NEW LINTEL DETAIL

SCALE: 1:25

ENGINEER'S CERTIFICATION/ PROFESSIONAL SEAL

#	DATE	REVISION	BY	CHK

ECMC Ltd
1st flr. Marie-Colette Bldg.; #9Lawjanv Crescent, Rodney Bay Commercial Blvd;
P.O. Box RB2446; Gros Islet, Saint Lucia;
t: 1-758-453-2093; e: ecmc@candw.lc; w: www.ecmcstlucia.com

CLIENT: **CLIMATE TECHNOLOGY CENTRE AND NETWORK**

PROJECT: **TECHNICAL ASSISTANCE FOR RESILIENCE TO CLIMATE VARIABILITY IN THE BUILDING SECTOR OF ANTIGUA AND BARBUDA**

TITLE: **EXTERNAL DOOR EXTENSION AND NEW LINTEL DETAILS**

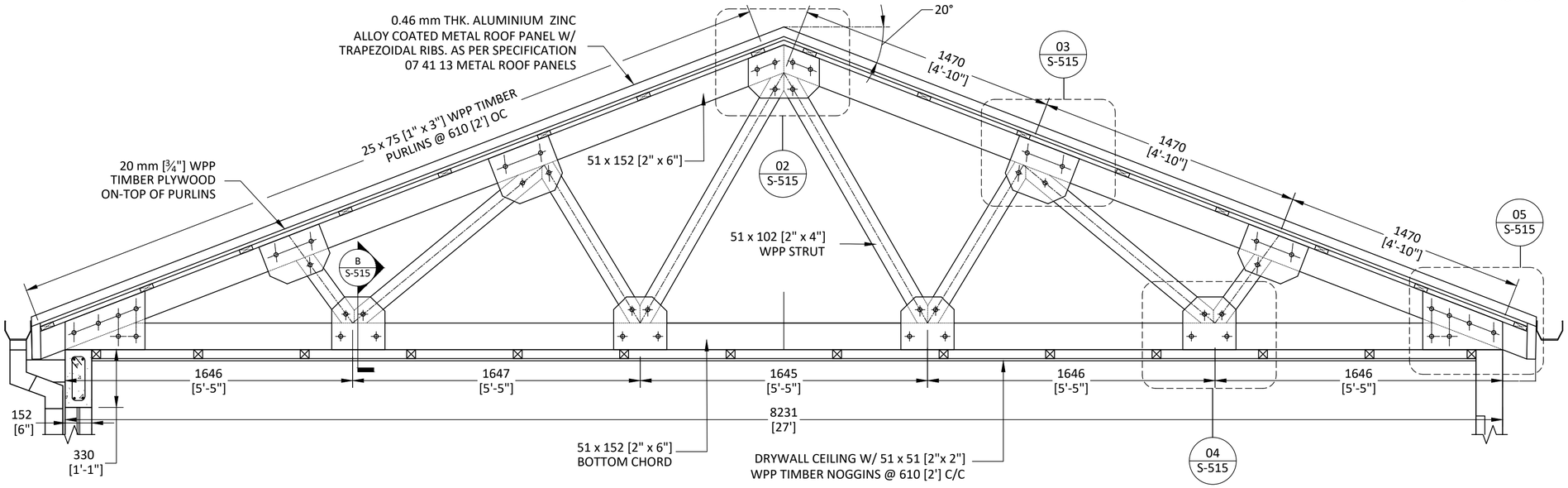
SCALE: **AS SHOWN** | DRAWN: **H.A.**

DATE: **SEPTEMBER, 2018** | CHECKED: **E. LOUIS** (REG. ENGINEER)

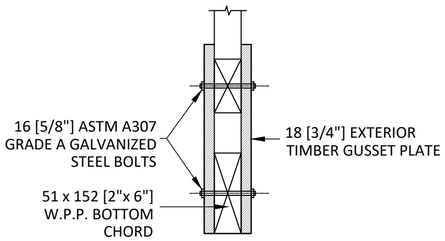
DRAWING #: **18106-S-541** | REV #:

ROOF REPAIRS & RETROFIT MEASURES

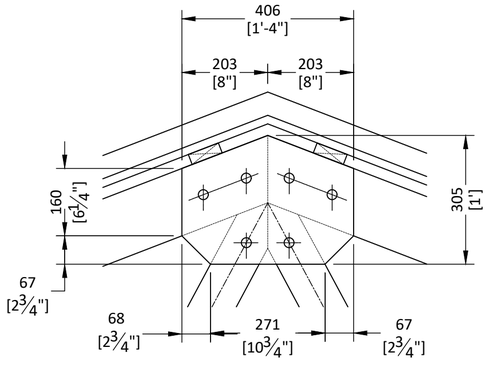
NOTES:
1. ALL BOLTS, WASHERS AND NUTS SHALL BE GALVANIZED STEEL AND CONFORM TO REQUIREMENTS IN 061000 - ROUGH CARPENTRY.
2. SPECIES OF WOOD SHALL BE TREATED PITCH PINE.
3. ALL BOLTS SHALL BE 16 mm [5/8"] ASTM A307 GRADE A GALVANIZED STEEL BOLTS.



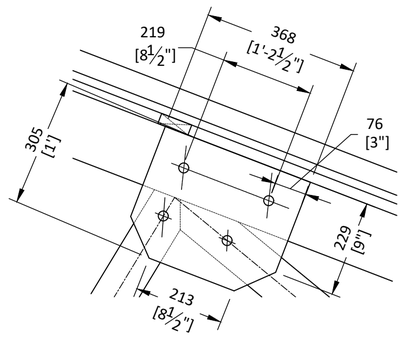
1 TYPICAL TRUSS SECTION
SCALE: 1:20



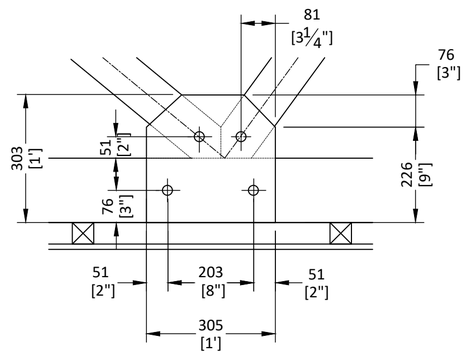
B SECTIONAL DETAIL
SCALE: 1:8



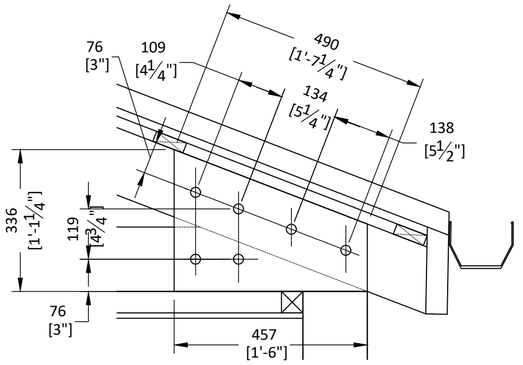
2 GUSSET PLATE DETAIL 2
SCALE: 1:10



3 GUSSET PLATE DETAIL 3
SCALE: 1:10



4 GUSSET PLATE DETAIL 4
SCALE: 1:10



5 GUSSET PLATE DETAIL 5
SCALE: 1:10

ENGINEER'S CERTIFICATION/ PROFESSIONAL SEAL

#	DATE	REVISION	BY	CHK

ECMC Ltd
1st flr. Marie-Colette Bldg.; #9Lawjanv Crescent, Rodney Bay Commercial Blvd;
P.O. Box RB2446; Gros Islet, Saint Lucia;
t: 1-758-453-2093; e: ecmc@candw.lc; w: www.ecmcstlucia.com

CLIENT: **CLIMATE TECHNOLOGY CENTRE AND NETWORK**

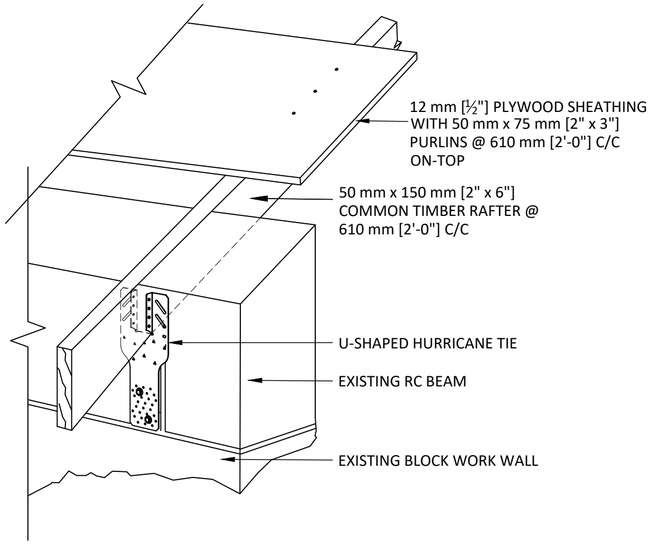
PROJECT: **TECHNICAL ASSISTANCE FOR RESILIENCE TO CLIMATE VARIABILITY IN THE BUILDING SECTOR OF ANTIGUA AND BARBUDA**

TITLE: **TYPICAL TRUSS DETAILS**

SCALE: **AS SHOWN** | DRAWN: **H.A.**

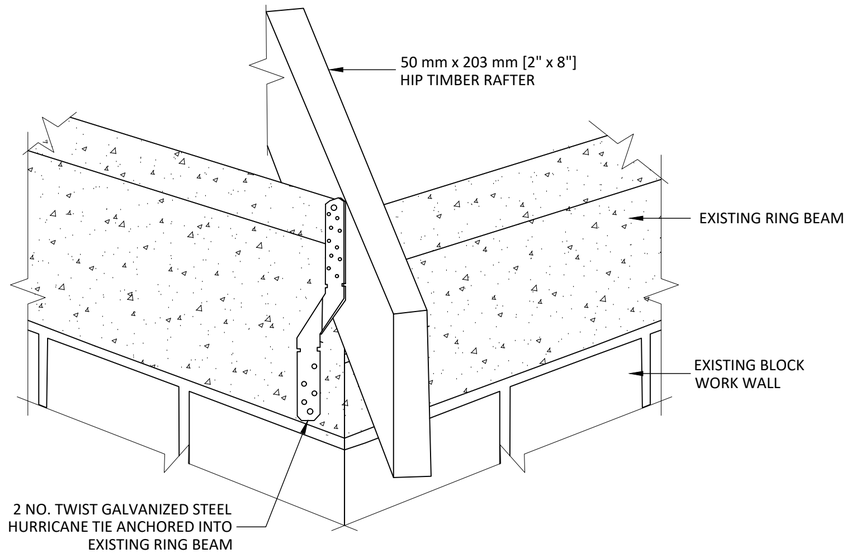
DATE: **SEPTEMBER, 2018** | CHECKED: **E. LOUIS** (REG. ENGINEER)

DRAWING #: **18106-S-546** | REV #:



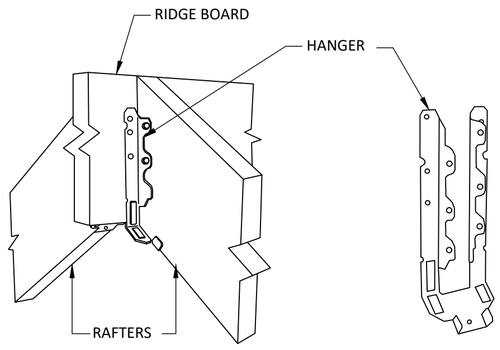
1 U-SHAPED GALVANIZED STEEL HURRICANE TIE

SCALE: 1:5



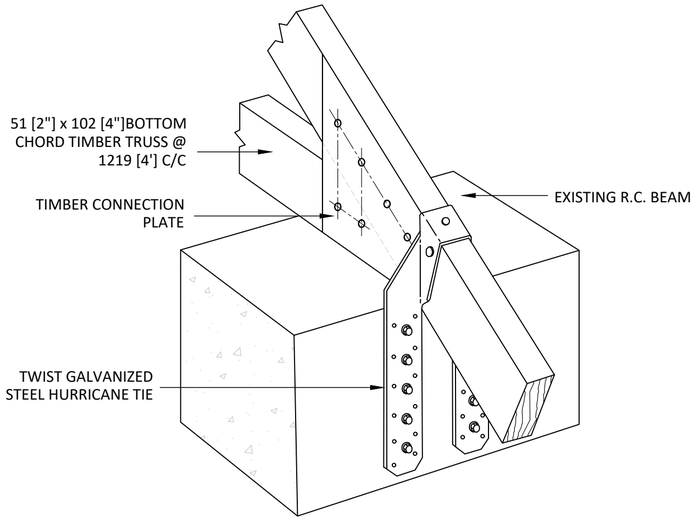
2 TWIST GALVANIZED STEEL HURRICANE TIE

SCALE: 1:5



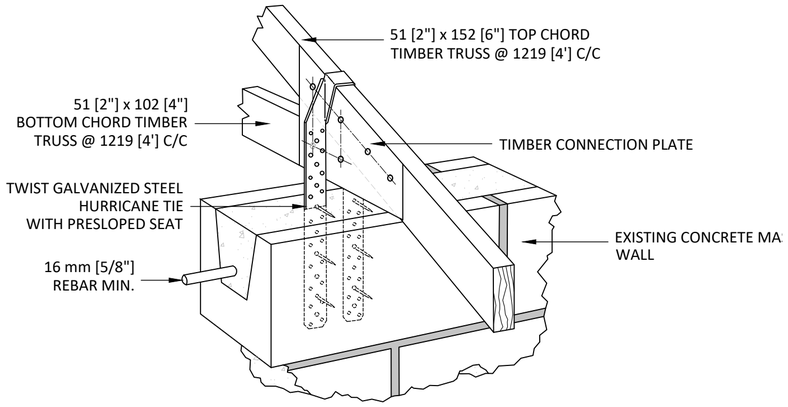
3 U-SHAPED RAFTER TO RIDGE HANGER

SCALE: 1:10



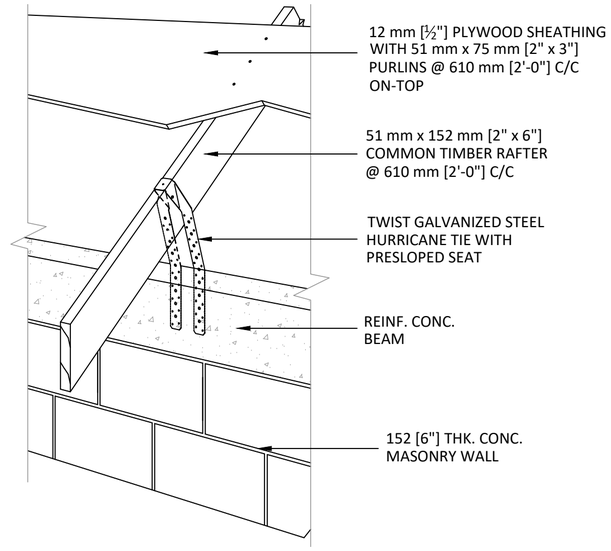
4 TWISTED GALVANIZED STEEL HURRICANE TIE INSTALLED ON RC WALL

SCALE: 1:10



5 TWISTED GALVANIZED STEEL HURRICANE TIE INSTALLED IN CONCRETE MASONRY WALL

SCALE: 1:10



6 TWIST GALVANIZED STEEL HURRICANE TIE WITH PRESLOPED SEAT DETAIL

SCALE: 1:10

NOTES:

1. U-SHAPED GALVANIZED STEEL HURRICANE TIES WITH MINIMUM THICKNESS OF 1.27 mm (18 GAUGE)
   - NO. 10 mm [⅜"] x 102 mm [4"] CARBON STEEL HEAVY-DUTY ZINC PLATED HEAVY-DUTY SCREW ANCHORS TO CONCRETE RING BEAM.
   - 8 NO. 3 mm [0.131"] DIAMETER x 40 mm [1½"] LONG COMMON NAIL AT RAFTER CONNECTION.
   - MINIMUM ALLOWABLE UPLIFT LOAD OF 4,760 N (1070 POUNDS).

2. 2 TWIST GALVANIZED STEEL TWIST STRAPS WITH MINIMUM THICKNESS OF 1.5875 mm (16 GAUGE)
   - 8 NO. 6 mm [¼"] x 57 mm [2¼"] LONG CARBON ZINC STEEL PLATED SCREW ANCHORS TO CONCRETE RING BEAM.
   - 14 NO. 3.8 mm [0.148"] x 40 mm [1½"] LONG COMMON NAIL AT RAFTER CONNECTION.
   - MINIMUM ALLOWANCE UPLIFT LOAD OF 4760 N (1070 POUNDS).

3. SLOPED HANGER (1$\frac{9}{16}$" WIDE BY 5¼" HIGH BY 1$\frac{15}{16}$") FOR THE RAFTER TO RIDGE CONNECTION WITH A FIELD ADJUSTABLE SEAT; 1.27 mm THICK (18 GAUGE) HOT-DIPPED GALVANIZED STEEL WITH 1.85 OZ. OF ZINC PER SQUARE FOOT OF SURFACE AREA (HOT-DIP GALVANIZED PER ASTM A653 TOTAL BOTH SIDES). MINIMUM UPLIFT CAPACITY OF 2,700 N [500 POUNDS]

4. TWIST GALVANIZED STEEL HURRICANE TIES WITH PRESLOPED SEAT.
   - 1.27 mm [0.05"] THK. (18 GAUGE) GALVANIZE STEEL
   - 41 mm [1.625"] WIDE BY 296.8 mm [11.688"] LONG
   - 2 No. 3.8 mm [0.148"] Ø x 38 mm [1.5"] LONG TO TRUSS
   - 6 No. 6 mm [0.25"] x 57 mm [2.25"] LONG STAINLESS-STEEL CONCRETE AND MASONRY SCREWS ZINC-PLATED W/ A PROTECTIVE OVERCOAT TO GROUT-FILLED C.M.U.
   - ALLOWABLE LOAD FOR UPLIFT OF 6533 NEWTONS [1470 POUNDS]

ENGINEER'S CERTIFICATION/ PROFESSIONAL SEAL

#	DATE	REVISION	BY	CHK

ECMC Ltd
1st flr. Marie-Colette Bldg.; #9Lawjanv Crescent, Rodney Bay Commercial Blvd;
P.O. Box RB2446; Gros Islet, Saint Lucia;
t: 1-758-453-2093; e: ecmc@candw.lc; w: www.ecmcstlucia.com

CLIENT: **CLIMATE TECHNOLOGY CENTRE AND NETWORK**

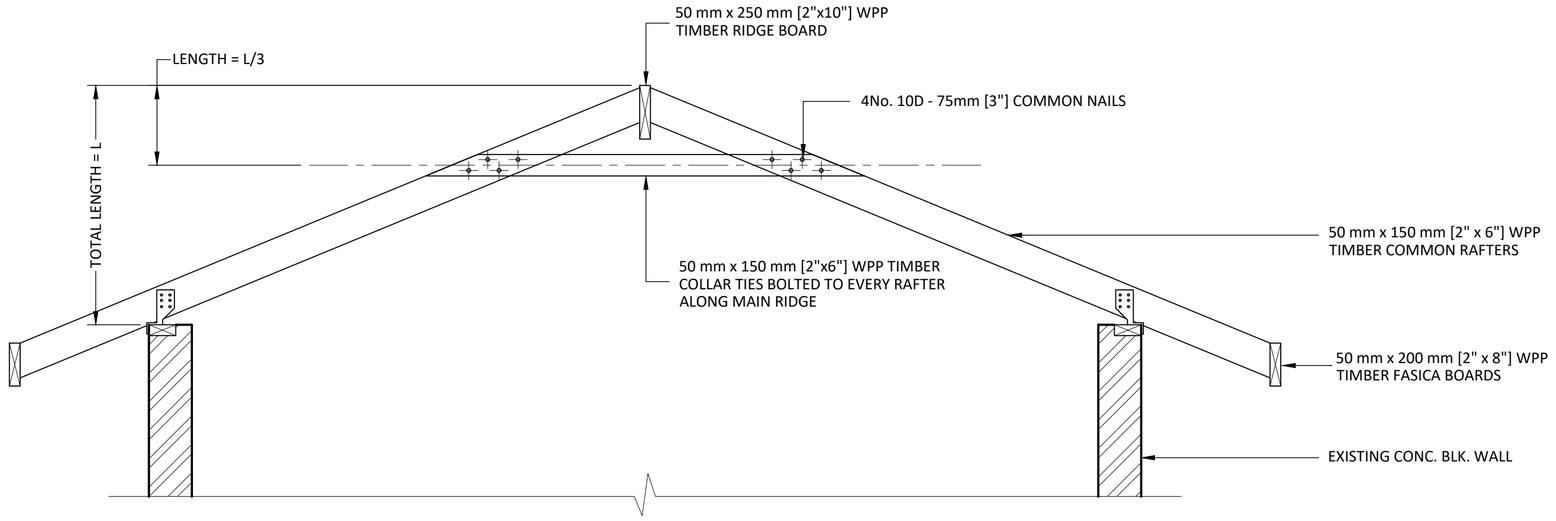
PROJECT: **TECHNICAL ASSISTANCE FOR RESILIENCE TO CLIMATE VARIABILITY IN THE BUILDING SECTOR OF ANTIGUA AND BARBUDA**

TITLE: **HURRICANE TIES DETAILS**

SCALE: **AS SHOWN** | DRAWN: **H.A.**

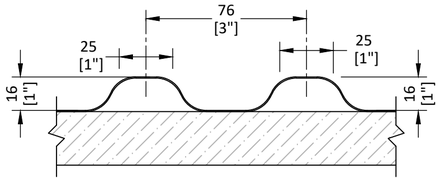
DATE: **SEPTEMBER, 2018** | CHECKED: **E. LOUIS** (REG. ENGINEER)

DRAWING #: **18106-S-547** | REV #:



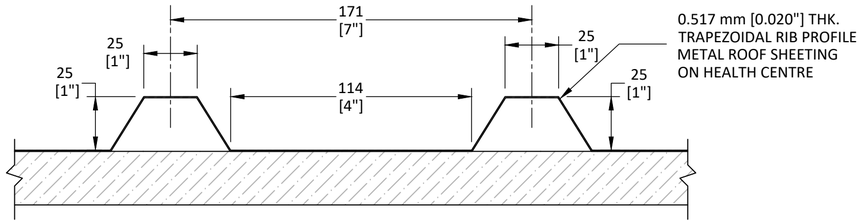
1 COLLAR TIE DETAIL

SCALE: 1:20



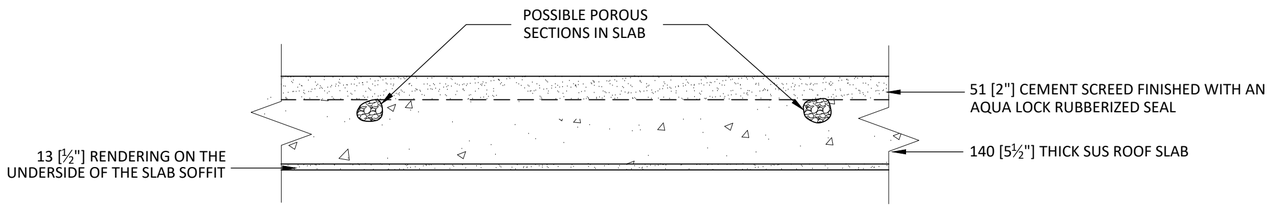
2 CORRUGATED PROFILE METAL ROOF SHEETING

SCALE: 1:2



3 TRAPEZOIDAL RIB PROFILE METAL ROOF SHEETING

SCALE: 1:2



4 CONCRETE ROOF SLAB SECTION

SCALE: 1:2

CONCRETE ROOF SLAB REPAIR METHODOLOGY

1. REMOVE THE EXISTING SCREED ON THE ROOF SLAB, AND CHIP THE CONCRETE SUBSTRATE.
2. PLUG ANY POROUS SECTIONS OF THE CONCRETE SUBSTRATE WITH HYDRAULIC CEMENT.
3. APPLY A HYDRAULIC CEMENT SLURRY AT THE SURFACE OF THE SLAB, BEFORE THE APPLICATION OF A BONDING AGENT.
4. FINISH THE SLAB WITH A DENSE MORTAR, COMBINED WITH A HIGH STRENGTH ADMIXTURE.

ENGINEER'S CERTIFICATION/ PROFESSIONAL SEAL

#	DATE	REVISION	BY	CHK

ECMC Ltd
1st flr. Marie-Colette Bldg.; #9Lawjanv Crescent, Rodney Bay Commercial Blvd;
P.O. Box RB2446; Gros Islet, Saint Lucia;
t: 1-758-453-2093; e: ecmc@candw.lc; w: www.ecmcstlucia.com

CLIENT: **CLIMATE TECHNOLOGY CENTRE AND NETWORK**

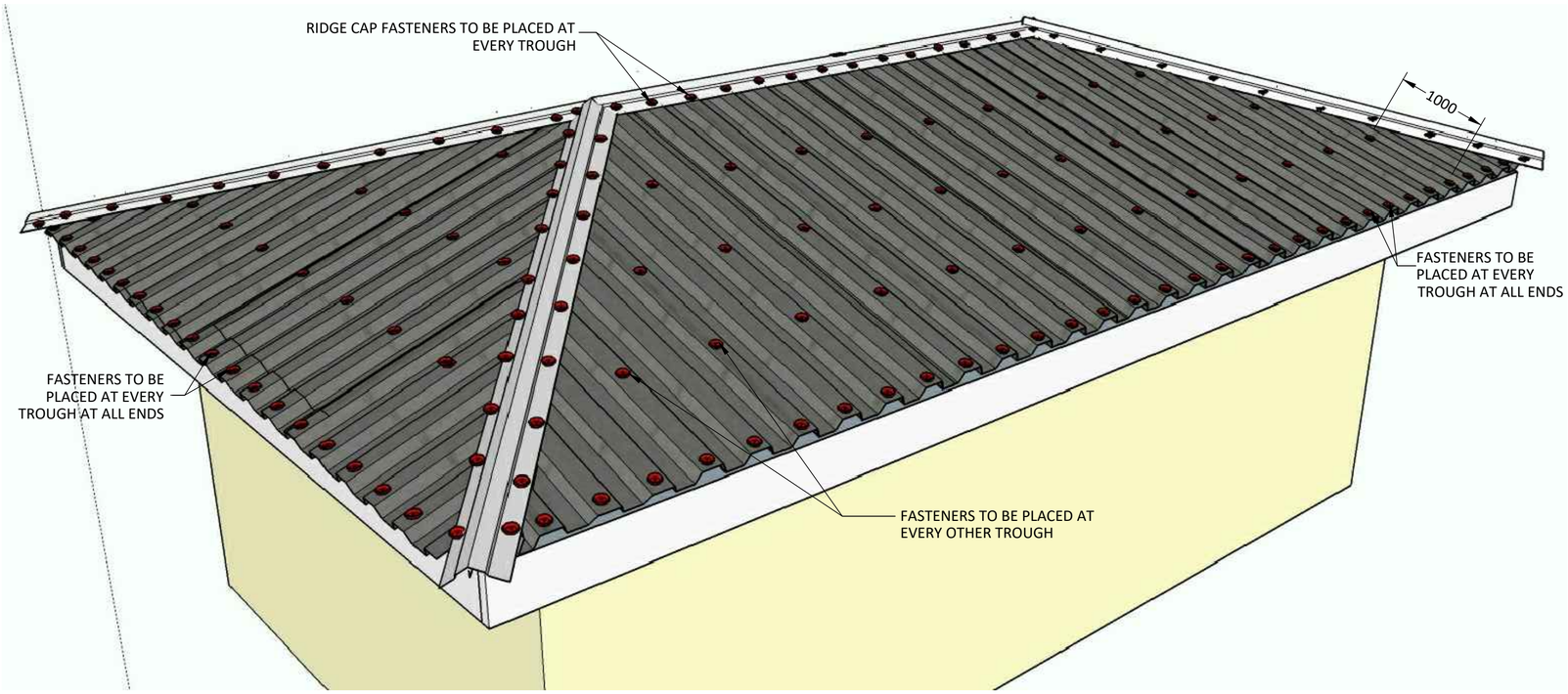
PROJECT: **TECHNICAL ASSISTANCE FOR RESILIENCE TO CLIMATE VARIABILITY IN THE BUILDING SECTOR OF ANTIGUA AND BARBUDA**

TITLE: **ROOF COLLAR TIE AND ROOF SHEETING DETAILS**

SCALE: **AS SHOWN** | DRAWN: **H.A.**

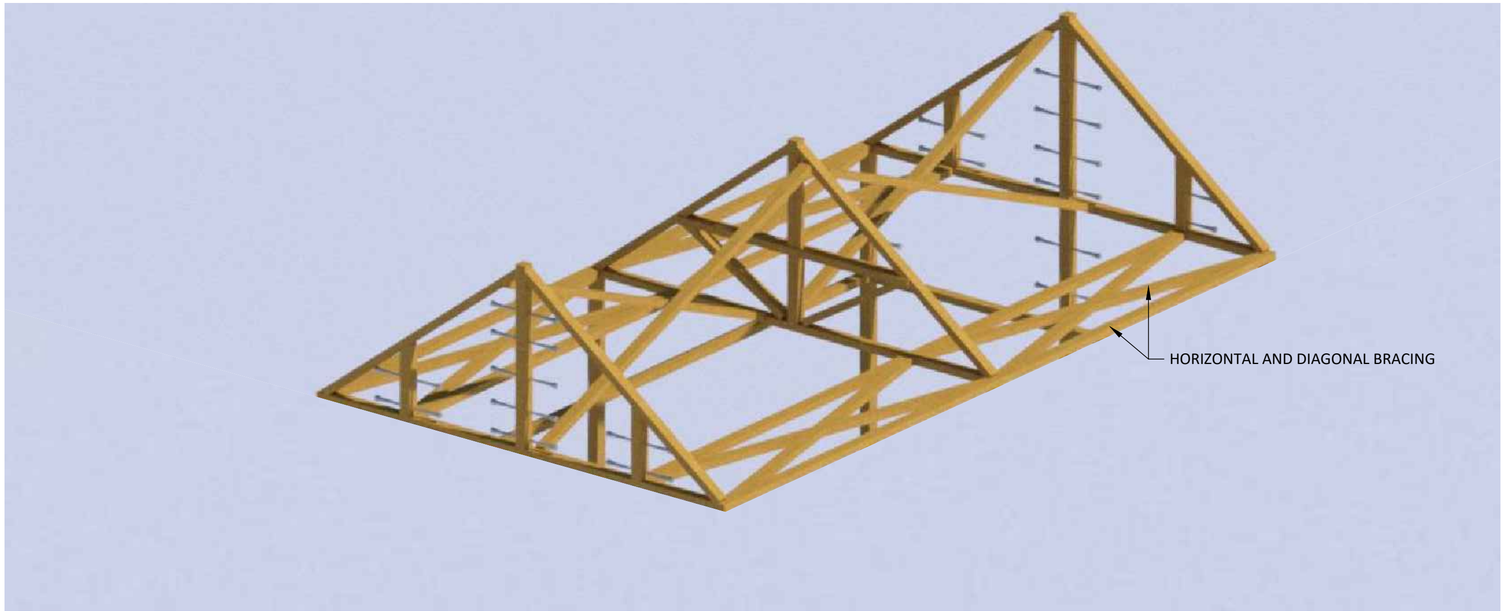
DATE: **SEPTEMBER, 2018** | CHECKED: **E. LOUIS** (REG. ENGINEER)

DRAWING #: **18106-S-548** | REV #:



1 HIP ROOF FASTENERS ARRANGEMENT

SCALE: NTS



2 GABLE ROOF FRAMING - HORIZONTAL BRACING

SCALE: NTS

ENGINEER'S CERTIFICATION/ PROFESSIONAL SEAL

#	DATE	REVISION	BY	CHK

ECMC Ltd
1st flr. Marie-Colette Bldg.; #9Lawjanv Crescent, Rodney Bay Commercial Blvd;
P.O. Box RB2446; Gros Islet, Saint Lucia;
t: 1-758-453-2093; e: ecmc@candw.lc; w: www.ecmcstlucia.com

CLIENT: **CLIMATE TECHNOLOGY CENTRE AND NETWORK**

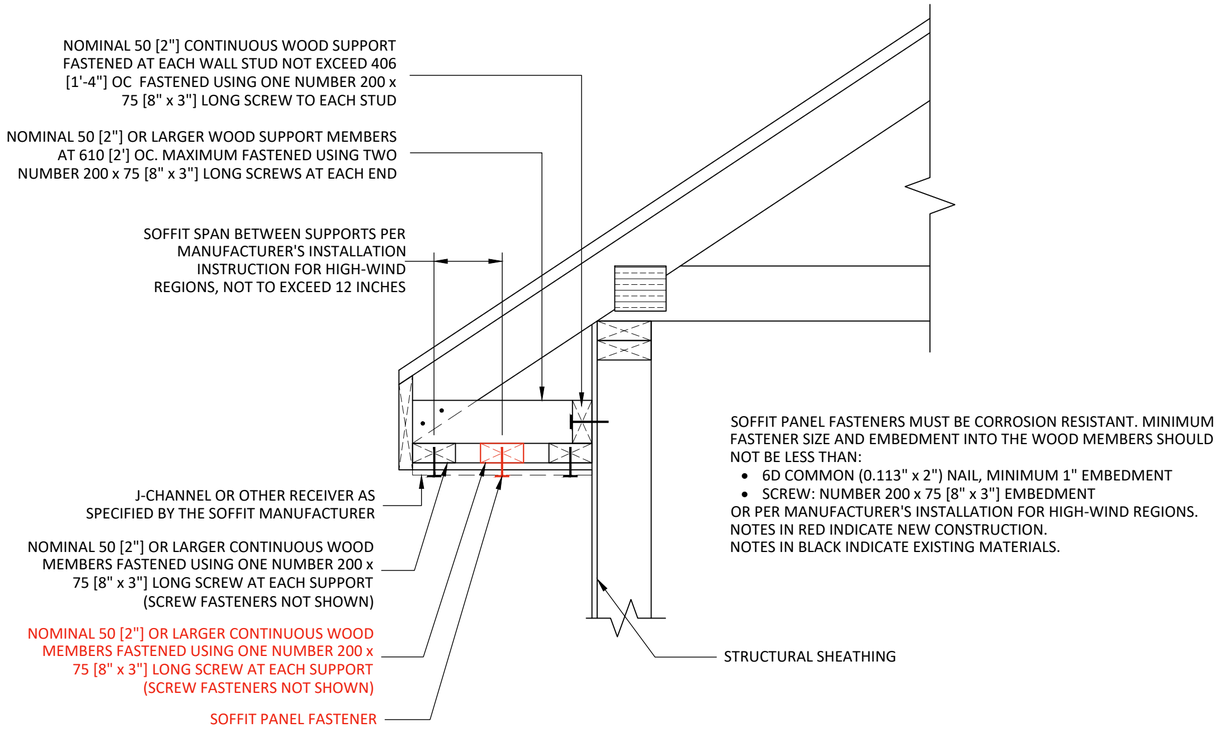
PROJECT: **TECHNICAL ASSISTANCE FOR RESILIENCE TO CLIMATE VARIABILITY IN THE BUILDING SECTOR OF ANTIGUA AND BARBUDA**

TITLE: **HIP ROOF FASTENERS ARRANGEMENT AND GABLE ROOF FRAMING DETAILS**

SCALE: **AS SHOWN** | DRAWN: **H.A.**

DATE: **SEPTEMBER, 2018** | CHECKED: **E. LOUIS** (REG. ENGINEER)

DRAWING #: **18106-S-549** | REV #:



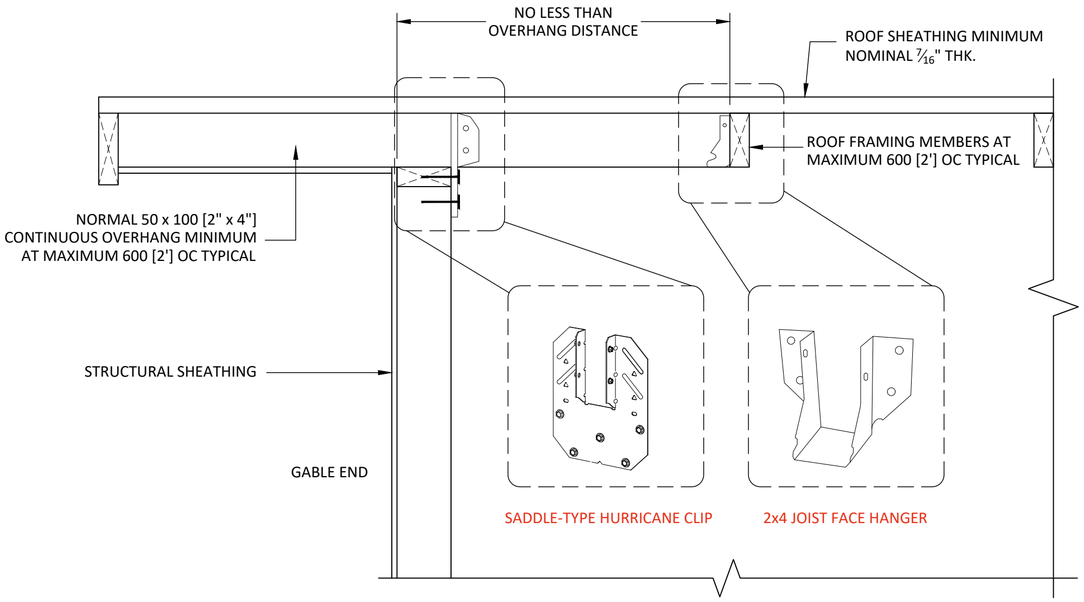
SOFFIT PANEL FASTENERS MUST BE CORROSION RESISTANT. MINIMUM FASTENER SIZE AND EMBEDMENT INTO THE WOOD MEMBERS SHOULD NOT BE LESS THAN:

- 6D COMMON (0.113" x 2") NAIL, MINIMUM 1" EMBEDMENT
- SCREW: NUMBER 200 x 75 [8" x 3"] EMBEDMENT

OR PER MANUFACTURER'S INSTALLATION FOR HIGH-WIND REGIONS.
NOTES IN RED INDICATE NEW CONSTRUCTION.
NOTES IN BLACK INDICATE EXISTING MATERIALS.

1 TYPICAL SOFFIT RETROFIT USING WOOD SUPPORTS

SCALE: NTS



NOTE:
SADDLE-TYPE CLIP MAY BE INSTALLED ON THE EXTERIOR FACE OF GABLE END WALL. REMOVAL OF SOFFIT MAY BE REQUIRED.

NOTES IN RED INDICATE NEW CONSTRUCTION.
NOTES IN BLACK INDICATE EXISTING MATERIALS.

2 BRACING GABLE END OVERHANGS

SCALE: NTS

ENGINEER'S CERTIFICATION/ PROFESSIONAL SEAL

#	DATE	REVISION	BY	CHK

ECMC Ltd
1st flr. Marie-Colette Bldg.; #9Lawjanv Crescent, Rodney Bay Commercial Blvd;
P.O. Box RB2446; Gros Islet, Saint Lucia;
t: 1-758-453-2093; e: ecmc@candw.lc; w: www.ecmcstlucia.com

CLIENT: **CLIMATE TECHNOLOGY CENTRE AND NETWORK**

PROJECT: **TECHNICAL ASSISTANCE FOR RESILIENCE TO CLIMATE VARIABILITY IN THE BUILDING SECTOR OF ANTIGUA AND BARBUDA**

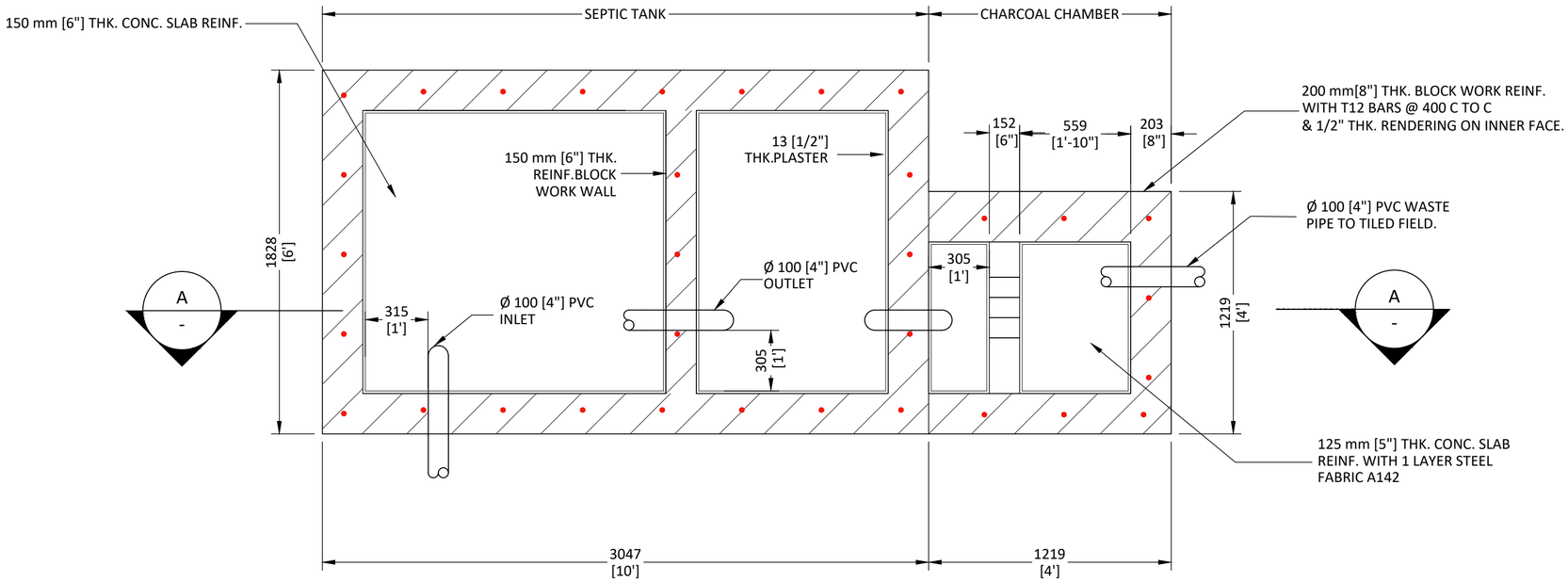
TITLE: **ROOF REPAIR AND RETROFIT MEASURES**

SCALE: **AS SHOWN** | DRAWN: **H.A.**

DATE: **SEPTEMBER, 2018** | CHECKED: **E. LOUIS** (REG. ENGINEER)

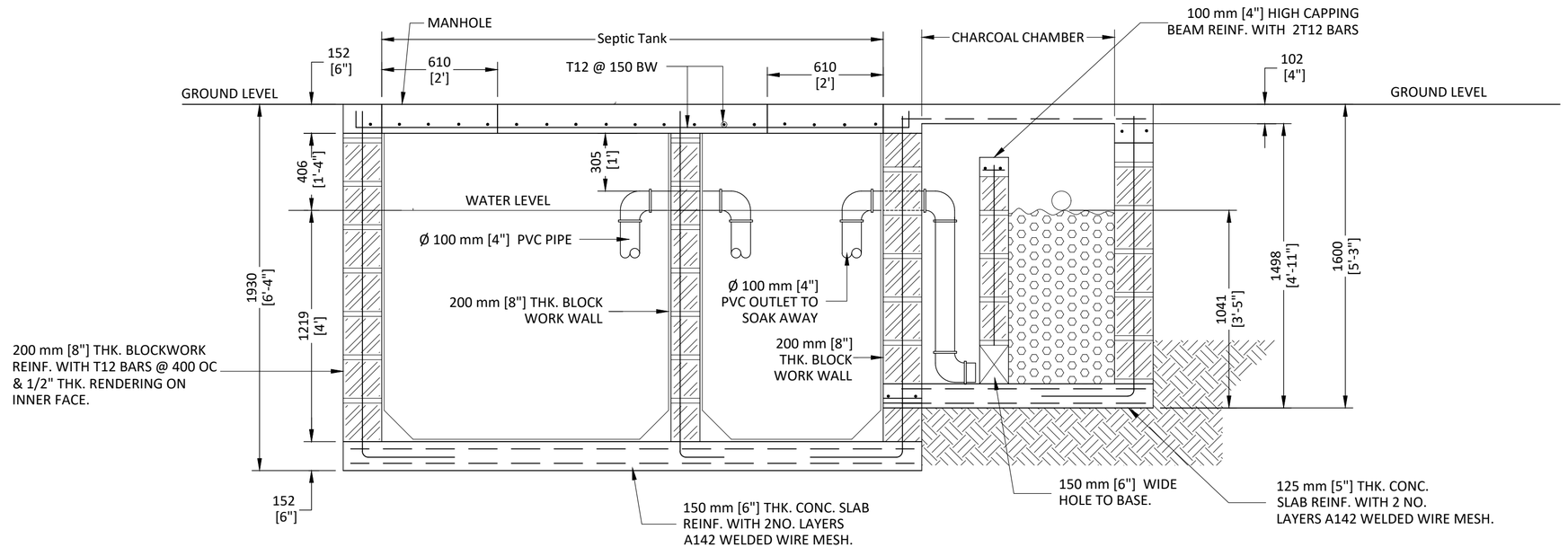
DRAWING #: **18106-S-550** | REV #:

SEPTIC TANK REPAIRS & RETROFIT MEASURES



1 SEPTIC TANK PLAN

SCALE: 1:20



2 SEPTIC TANK SECTION

SCALE: 1:20

ENGINEER'S CERTIFICATION/ PROFESSIONAL SEAL

#	DATE	REVISION	BY	CHK

ECMC Ltd
1st flr. Marie-Colette Bldg.; #9Lawjanv Crescent, Rodney Bay Commercial Blvd;
P.O. Box RB2446; Gros Islet, Saint Lucia;
t: 1-758-453-2093; e: ecmc@candw.lc; w: www.ecmcstlucia.com

CLIENT: **CLIMATE TECHNOLOGY CENTRE AND NETWORK**

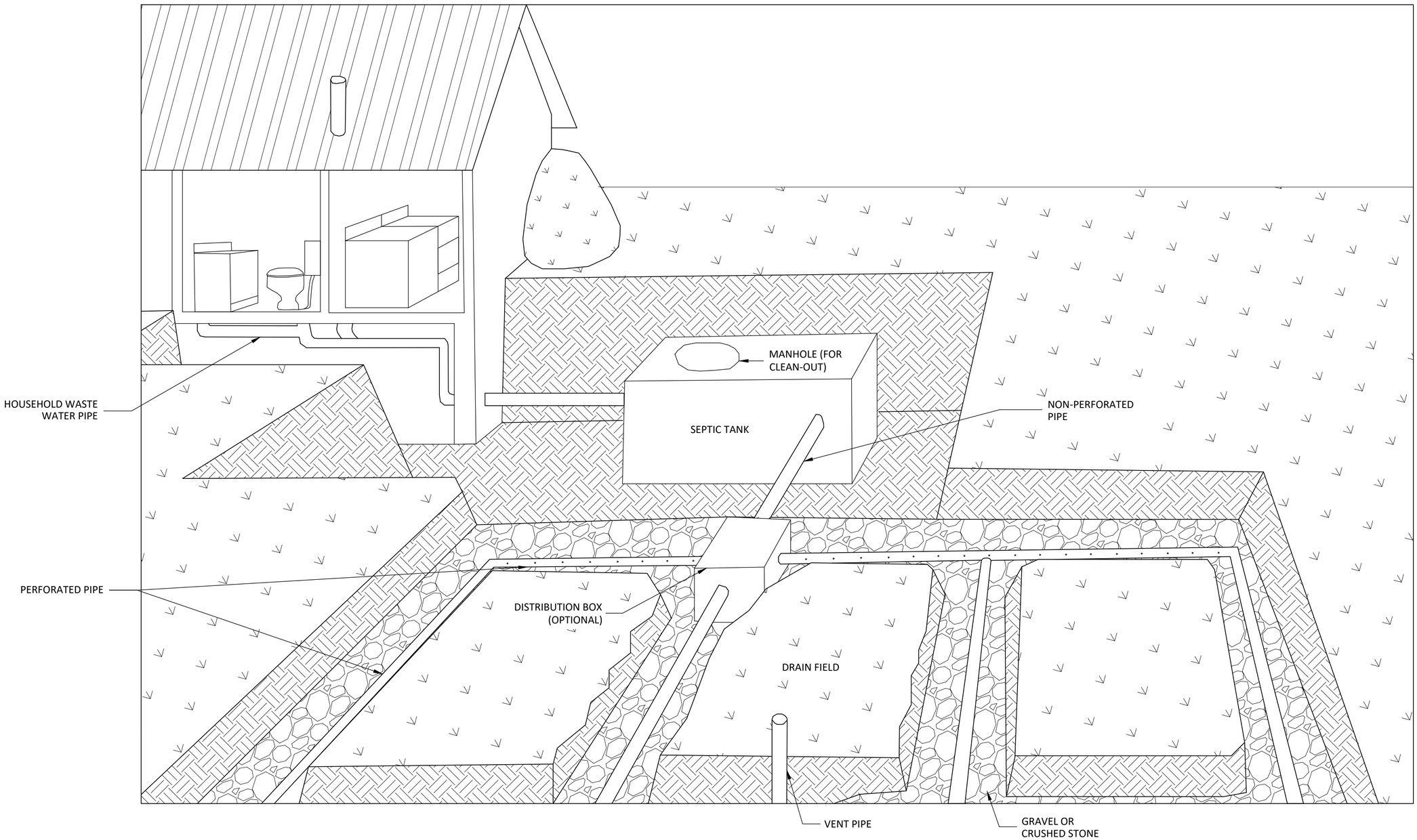
PROJECT: **TECHNICAL ASSISTANCE FOR RESILIENCE TO CLIMATE VARIABILITY IN THE BUILDING SECTOR OF ANTIGUA AND BARBUDA**

TITLE: **TYPICAL SEPTIC TANK PLAN AND SECTION**

SCALE: **AS SHOWN** | DRAWN: **H.A.**

DATE: **SEPTEMBER, 2018** | CHECKED: **E. LOUIS** (REG. ENGINEER)

DRAWING #: **18106-S-556** | REV #:



1 FIELD DRAINS

SCALE: 1:20

ENGINEER'S CERTIFICATION/ PROFESSIONAL SEAL

#	DATE	REVISION	BY	CHK

ECMC Ltd
1st flr. Marie-Colette Bldg.; #9Lawjanv Crescent, Rodney Bay Commercial Blvd;
P.O. Box RB2446; Gros Islet, Saint Lucia;
t: 1-758-453-2093; e: ecmc@candw.lc; w: www.ecmcstlucia.com

CLIENT: **CLIMATE TECHNOLOGY CENTRE AND NETWORK**

PROJECT: **TECHNICAL ASSISTANCE FOR RESILIENCE TO CLIMATE VARIABILITY IN THE BUILDING SECTOR OF ANTIGUA AND BARBUDA**

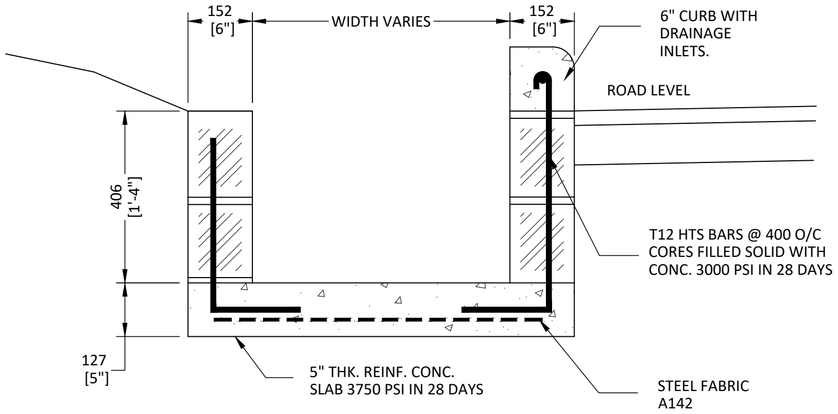
TITLE: **FIELD DRAINS**

SCALE: **AS SHOWN** DRAWN: **H.A.**

DATE: **SEPTEMBER, 2018** CHECKED: **E. LOUIS** (REG. ENGINEER)

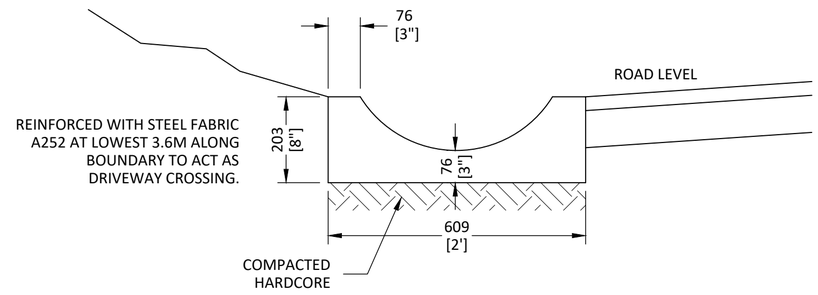
DRAWING #: **18106-S-557** REV #:

EXTERNAL - DRAIN REPAIRS & RETROFIT MEASURES



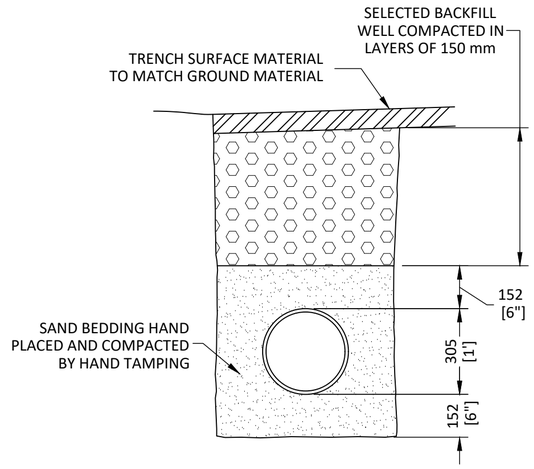
1 BOX DRAIN

SCALE: 1:20



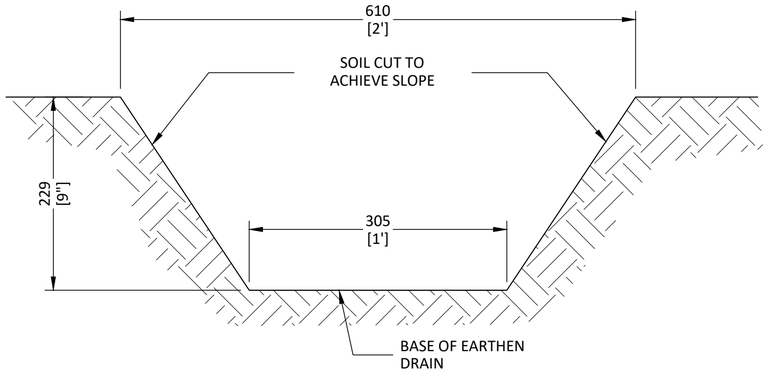
2 INVERT DRAIN

SCALE: 1:20



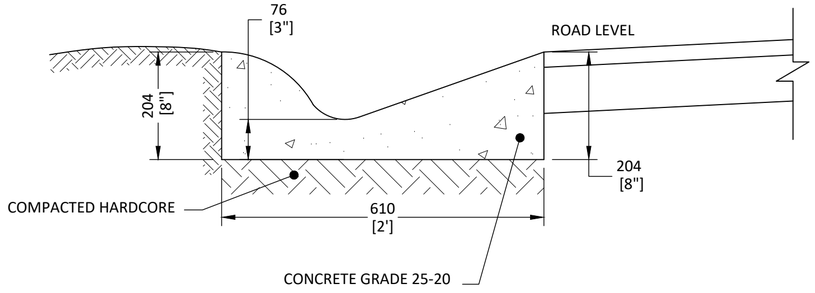
3 TRENCH DETAIL

SCALE: 1:15



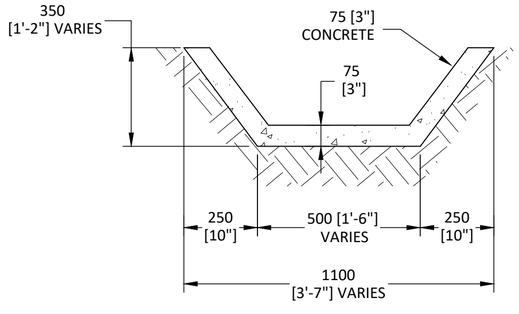
4 EARTHEN DRAIN

SCALE: 1:20



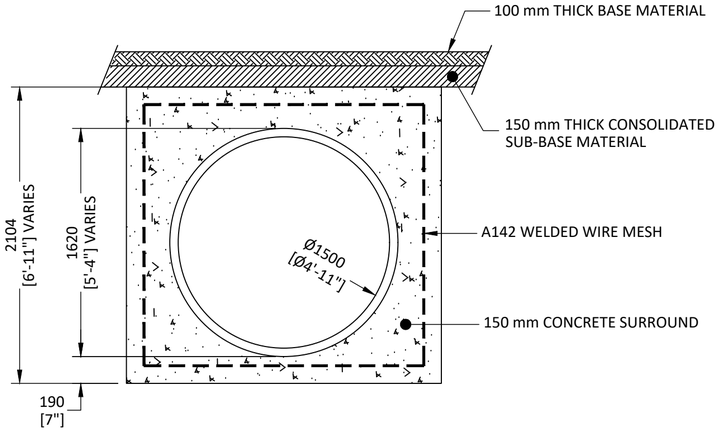
5 CURB AND SLIPPER

SCALE: 1:8



6 EARTHEN / INVERT DRAIN

SCALE: 1:20



7 TYPICAL CIRCULAR CULVERT DETAIL

SCALE: 1:30

8 WING RETAINING WALL

SCALE: 1:15

ENGINEER'S CERTIFICATION/ PROFESSIONAL SEAL

#	DATE	REVISION	BY	CHK

ECMC Ltd
1st flr. Marie-Colette Bldg.; #9Lawjanv Crescent, Rodney Bay Commercial Blvd;
P.O. Box RB2446; Gros Islet, Saint Lucia;
t: 1-758-453-2093; e: ecmc@candw.lc; w: www.ecmcstlucia.com

CLIENT: **CLIMATE TECHNOLOGY CENTRE AND NETWORK**

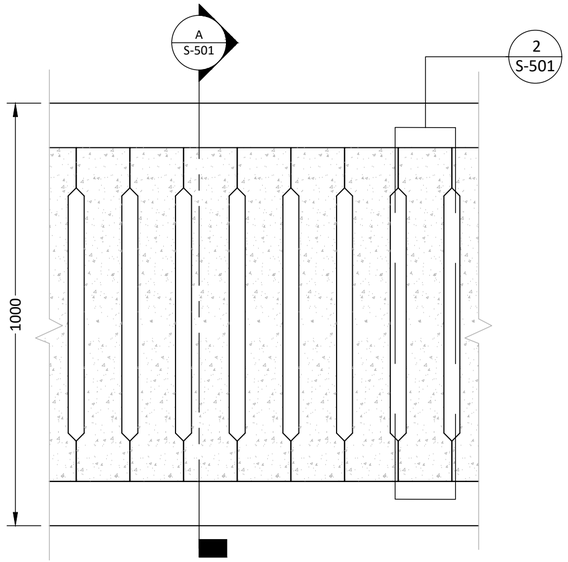
PROJECT: **TECHNICAL ASSISTANCE FOR RESILIENCE TO CLIMATE VARIABILITY IN THE BUILDING SECTOR OF ANTIGUA AND BARBUDA**

TITLE: **TYPICAL DRAINS DETAILS**

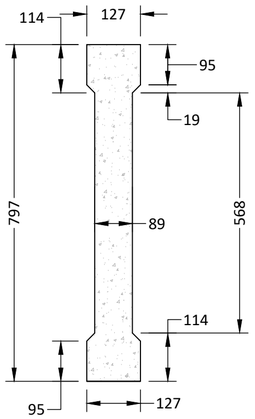
SCALE: **AS SHOWN** | DRAWN: **H.A.**

DATE: **SEPTEMBER, 2018** | CHECKED: **E. LOUIS** (REG. ENGINEER)

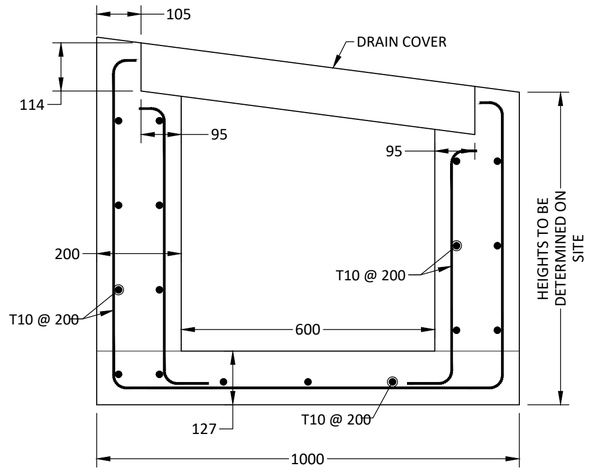
DRAWING #: **18106-S-561** | REV #:



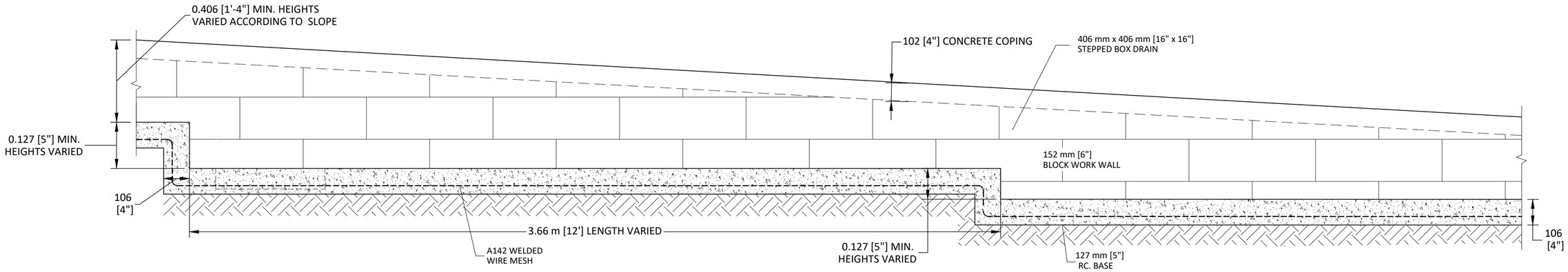
1 DRAIN COVER PLAN
SCALE: 1:8



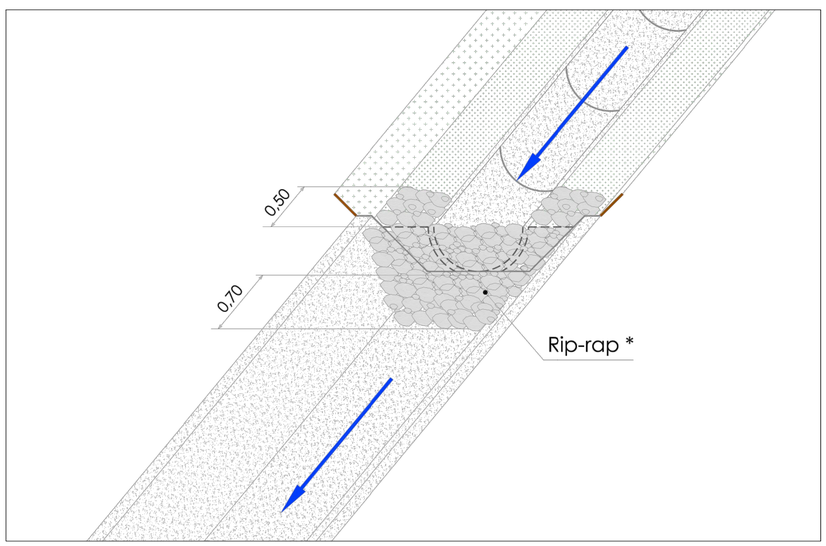
2 DRAIN COVER DETAIL
SCALE: 1:8



3 SECTIONAL ELEVATION
SCALE: 1:8



4 TYPICAL STEPPED DRAIN DETAIL
SCALE: 1:12



5 DRAINAGE DETAIL
SCALE: 1:8

ENGINEER'S CERTIFICATION/ PROFESSIONAL SEAL

#	DATE	REVISION	BY	CHK

ECMC Ltd
1st flr. Marie-Colette Bldg.; #9Lawjanv Crescent, Rodney Bay Commercial Blvd;
P.O. Box RB2446; Gros Islet, Saint Lucia;
t: 1-758-453-2093; e: ecmc@candw.lc; w: www.ecmcstlucia.com

CLIENT: **CLIMATE TECHNOLOGY CENTRE AND NETWORK**

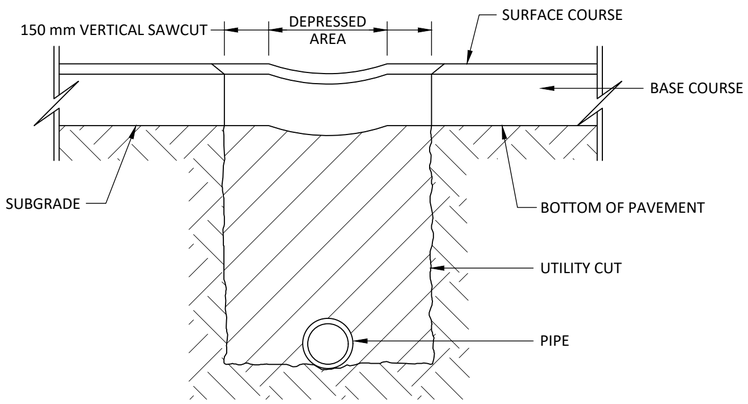
PROJECT: **TECHNICAL ASSISTANCE FOR RESILIENCE TO CLIMATE VARIABILITY IN THE BUILDING SECTOR OF ANTIGUA AND BARBUDA**

TITLE: **STEPPED AND DOG BONE COVER DETAILS**

SCALE: **AS SHOWN** | DRAWN: **H.A.**

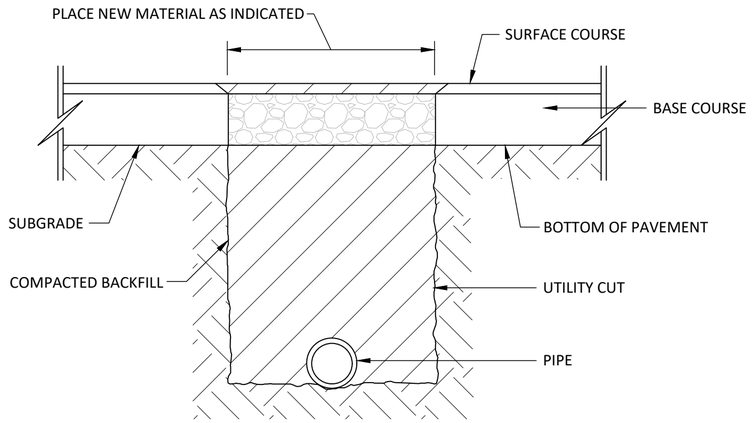
DATE: **SEPTEMBER, 2018** | CHECKED: **E. LOUIS** (REG. ENGINEER)

DRAWING #: **18106-S-562** | REV #:



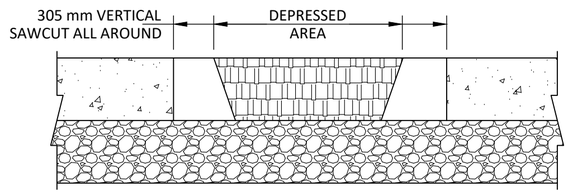
1 REPAIR RANGE TO UTILITY CUT

SCALE: NTS



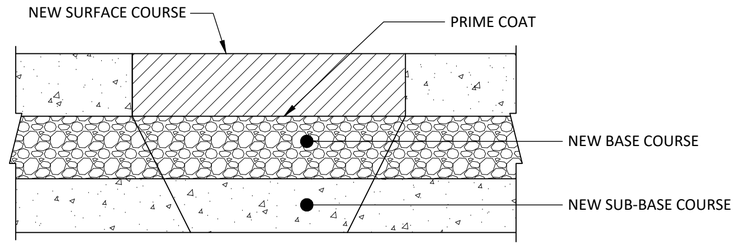
2 REPAIR TO UTILITY CUT

SCALE: NTS



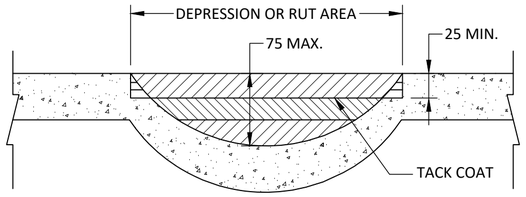
3 REPAIR RANGE

SCALE: NTS



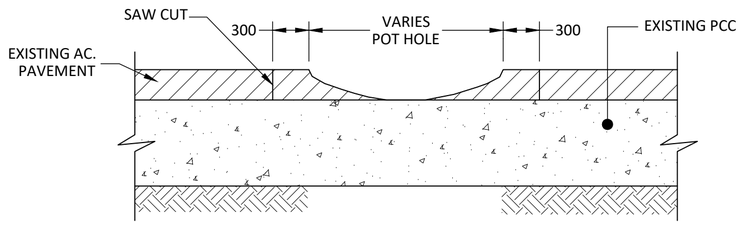
4 FULL - DEPTH REPAIR

SCALE: NTS



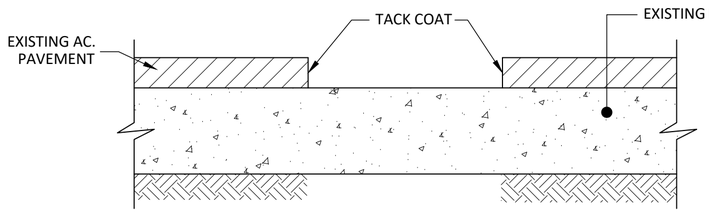
5 FILLING DEPRESSION AND RUTS

SCALE: NTS



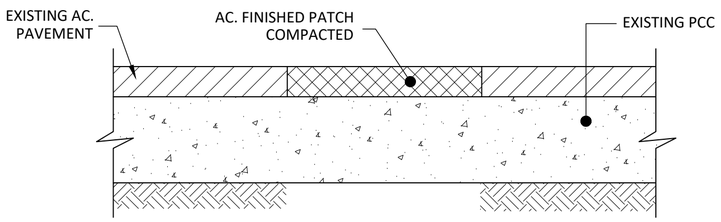
6 UNTREATED POT HOLE

SCALE: NTS



7 SURFACE REMOVED TO FIRM SUPPORT AND TACK COAT APPLIED

SCALE: NTS



5 FULL - DEPTH ASPHALT MIXTURE PLACED W/BEING COMPACTED AND FINISHED PATCH COMPACTED TO LEVEL OF SURROUNDING

SCALE: NTS

ENGINEER'S CERTIFICATION/ PROFESSIONAL SEAL

#	DATE	REVISION	BY	CHK

ECMC Ltd
1st flr. Marie-Colette Bldg.; #9Lawjanv Crescent, Rodney Bay Commercial Blvd;
P.O. Box RB2446; Gros Islet, Saint Lucia;
t: 1-758-453-2093; e: ecmc@candw.lc; w: www.ecmcstlucia.com

CLIENT: **CLIMATE TECHNOLOGY CENTRE AND NETWORK**

PROJECT: **TECHNICAL ASSISTANCE FOR RESILIENCE TO CLIMATE VARIABILITY IN THE BUILDING SECTOR OF ANTIGUA AND BARBUDA**

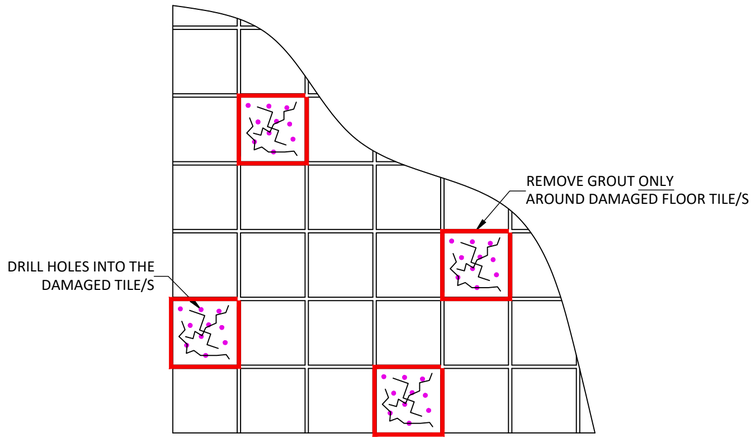
TITLE: **UTILITY AND POT HOLES REPAIR DETAILS**

SCALE: **AS SHOWN** | DRAWN: **H.A.**

DATE: **SEPTEMBER, 2018** | CHECKED: **E. LOUIS** (REG. ENGINEER)

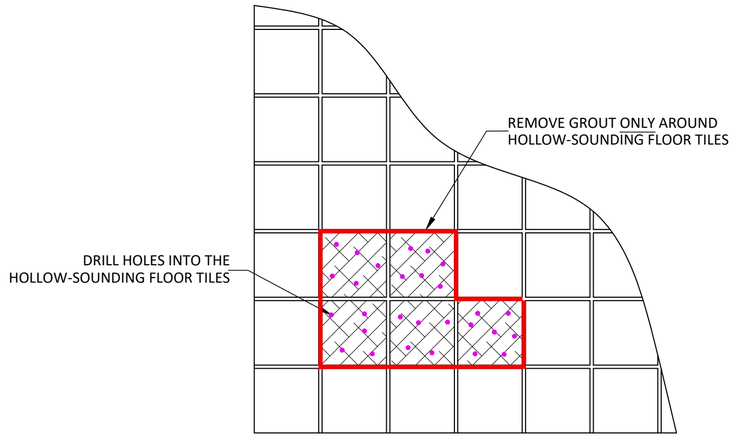
DRAWING #: **18106-S-563** | REV #:

FINISHES REPAIRS & RETROFIT MEASURES



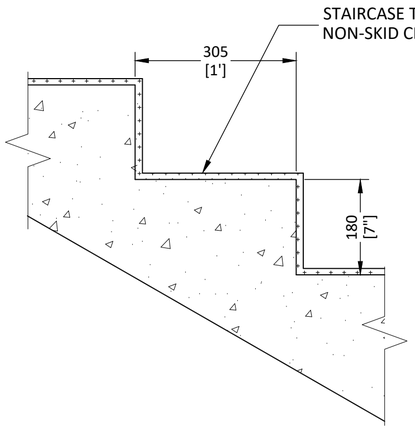
NOTES:
1. REMOVE GROUT ONLY AROUND THE DAMAGED FLOOR TILE/S
2. DRILL HOLES INTO THE DAMAGED TILE/S
3. BREAK OFF THE TILE PIECES AND THEN REMOVE THE THIN SET
4. APPLY A BONDING AGENT AND THEN RE-TILE

1 DAMAGED TILE REPLACEMENT DETAIL
SCALE: 1:20



NOTES:
1. REMOVE GROUT ONLY AROUND THE HOLLOW-SOUNDING FLOOR TILES
2. DRILL HOLES INTO THE HOLLOW-SOUNDING FLOOR TILES
3. BREAK OFF THE TILE PIECES AND THEN REMOVE THE THIN SET
4. APPLY A BONDING AGENT AND THEN RE-TILE

2 HOLLOW-SOUNDING TILE REPLACEMENT DETAIL
SCALE: 1:20



3 STAIRCASE FINISH DETAIL
SCALE: 1:8

ENGINEER'S CERTIFICATION/ PROFESSIONAL SEAL

#	DATE	REVISION	BY	CHK

ECMC Ltd
1st flr. Marie-Colette Bldg.; #9Lawjanv Crescent, Rodney Bay Commercial Blvd;
P.O. Box RB2446; Gros Islet, Saint Lucia;
t: 1-758-453-2093; e: ecmc@candw.lc; w: www.ecmcstlucia.com

CLIENT: **CLIMATE TECHNOLOGY CENTRE AND NETWORK**

PROJECT: **TECHNICAL ASSISTANCE FOR RESILIENCE TO CLIMATE VARIABILITY IN THE BUILDING SECTOR OF ANTIGUA AND BARBUDA**

TITLE: **DAMAGED TILE REPLACEMENT AND STAIRCASE FINISH DETAILS**

SCALE: **AS SHOWN** | DRAWN: **H.A.**

DATE: **SEPTEMBER, 2018** | CHECKED: **E. LOUIS** (REG. ENGINEER)

DRAWING #: **18106-S-571** | REV #: