FRENCH & PARRELLO ASSOCIATES

Corporate Office
1800 Route 34, Suite 101
Wall, NJ 07719

Regional Offices
Hackettstown, NJ
New York, NY

Date: **September 27, 2018**

Structural Mount Analysis Report

Carrier Designation:	***Sprint***	
	Carrier Site Number:	CT03XC091
	Carrier Site Name:	CT03XC091
Crown Castle Designation:	**Crown Castle BU Number:**	806370
	Crown Castle Site Name:	HRT 099 943226
	Crown Castle JDE Job Number:	531057
	Crown Castle Application Number:	459178 Rev. 0
Engineering Firm Designation:	**French and Parrello Associates Project Number:** 2438B.263	
Site Data:	**570 New Park Avenue, West Hartford, CT - 06110** **Latitude *41° 44' 10.50"*, Longitude *-72° 43' 14.20"*** **150.00 Foot – Monopole**	

French and Parrello Associates is pleased to submit this **"Structural Mount Analysis Report"** to determine the structural integrity of the above mentioned carrier's mounting system. This analysis has been performed in accordance with the Crown Castle Tower Mount Analysis scope of work document "ENG-SOW-10208".

The purpose of the analysis is to determine acceptability of the antenna mount stress level. Based on our analysis, we have determined that the existing platform is structurally adequate to support the proposed antenna configuration and loads.

Mount Analysis Result =	**Sufficient**

We at French and Parrello Associates appreciate the opportunity of providing our continuing professional services to Crown Castle. If you have any questions or need further assistance on this or any other projects please give us a call.

Very truly yours,

STATE OF CONNECTICUT
JOHN B. BOSCO
No. 25605
LICENSED
PROFESSIONAL ENGINEER

John Bosco, PE, Senior Project Manager
CT Professional Engineer Lic. No. 25605

Table of Contents

1.0	Introduction	3
2.0	Analysis Criteria	3
3.0	Analysis Procedure	4
4.0	Assumptions	4
5.0	Analysis Results	5
6.0	Recommendations	5

Attachments

A. Software Model Diagrams

B. Software Input Calculations

C. Software Output Calculations

D. Additional Calculations

1.0 Introduction

The purpose of this structural mount analysis is to assess the structural adequacy of the existing platform at 137' MCL (138' ACL) on the existing 150.0' monopole tower.

2.0 Analysis Criteria

This analysis has been performed in accordance with the 2016 International Building Code based upon an ultimate 3-second gust wind speed converted to a nominal 3-second gust wind speed per section 1609.3.1 as required for use in the TIA-222-H Standard per Exception #5 of Section 1609.1.1. The Design Criteria used in the analyses is summarized as follows:

Site Location:	Hartford County, Connecticut.
Basic Wind Speed:	125 MPH 3-second wind gust wind speed without ice
Wind Speed with Ice:	50 MPH 3-second wind gust with 1.70 in. radial ice
Service Wind Speed:	60 MPH 3-second gust for serviceability
Structure Class:	II
Exposure Category:	C
Topographic Category:	1 with crest height of 0 feet

Table 1 - Proposed Antenna Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Model	Mount Type	Note
137	138	3	RFS / CELWAVE / APXVSPP18-C-A-20	Existing Platform	1
		3	NOKIA / AAHC		
		3	RFS / CELWAVE / IBC1900BB-1		
		3	RFS / CELWAVE / IBC1900HG-2A		
		3	ALCATEL LUCENT/ 800MHZ 2X50W RRH W/FILTER		
		3	ALCATEL LUCENT/ PCS 1900MHZ 4X45W-65MHZ		

Notes:
1) See Appendix B for equipment details.

3.0 Analysis Procedure

Table 3 - Documents Provided

Document	Remarks	Date	Source
CCI Application #459178	Crown Castle	--	CCISITES
Due Diligence Documents	Crown Castle	08/31/2018	CCISITES
CCI Site Photos	Crown Castle	09/14/2018	CCISITES

Dead loads, ice loads, and wind loads are calculated by an excel spreadsheet prepared by FPA, in accordance with the TIA-222-H Standard, as shown in Appendix B. The wind load is applied to the existing mount in 30-degree increments, for 360 degrees around the proposed sector mount. Nominal concentrated man live loads of 500 lbs. (L_V) is applied at each mounting pipe location one at a time, and a nominal concentrated man live loads of 250 lbs. (L_M) is applied at the center of horizontal members one at a time. The following load combinations were utilized in this analysis:

- 1.4D
- $1.2D + 1.6W_o$
- $1.2D + 1.0D_i + 1.0W_i$
- $1.2D + 1.5L_M + 1.0W_M$
- $1.2D + 1.5L_V$

The existing platform was analyzed using Bentley RAM Elements which calculates member forces and stresses based upon user input geometry and loading. Software model diagrams and output results are included in Appendix A and Appendix C.

4.0 Assumptions

1. The proposed installation of the antennas and associated equipment is in accordance with the Due Diligence documents by Crown Castle and site photos on CCI Sites.

2. The dimensional parameters, connection specifications, and member shapes for the existing platform are based upon and site photos on CCI Sites.

3. The proposed antenna and RRH equipment specifications are as provided in the CCI application.

4. It should be noted that the conclusion reached by FPA is expressly related to the antenna support structure and assumes that the structure and components are in good condition and are being maintained and inspected at regular intervals in accordance with industry standards. FPA assumes no responsibility for any failure resulting from installations that do not conform to the design drawings or from hidden defects within the existing support structure resulting from aging or damaged components.

5. Steel Specifications:
   The following steel specifications were assumed for all existing mount components:
   - Pipes – ASTM A53 Gr. B (fy = 35 ksi)
   - HSS – ASTM A500 Gr. B (fy = 46 ksi)

   All structural bolts were assumed to be ASTM A325 steel. All threaded rods and U-Bolts were assumed to be ASTM A307 steel.

This analysis may be affected if any assumptions are not valid or have been made in error. FPA should be notified if any discrepancy is discovered between the actual conditions and the assumptions stated above.

5.0 Analysis Results

Complete analysis results are included in Appendix C. Below is a summary of the member capacity ratings:

Table 4 – Section Capacity

Section Type	Description	% Capacity	Pass/Fail
PIPE 2 x 0.154	Pipe Masts	66.0	Pass
PIPE 3 x 0.216	Horizontal Members	30.4	Pass
PIPE 2 x 0.154	Hand rail	36.3	Pass
HSS4x4x1/4	Platform Supporting Members	41.2	Pass

Mount Rating (max from all components) =	**66.0 %**

6.0 Recommendations

Based upon the Design Criteria and assumptions stated in this report, we have found that the existing platform is structurally sufficient to support the proposed antenna configuration and loads. No additional changes are required at this time.