Taking Care of Porches
or
"You vs. The Rain"

SC Preservation Conference, Columbia
Friday, April 22, 2016

Craig M. Bennett, Jr., PE
and the whole team at……

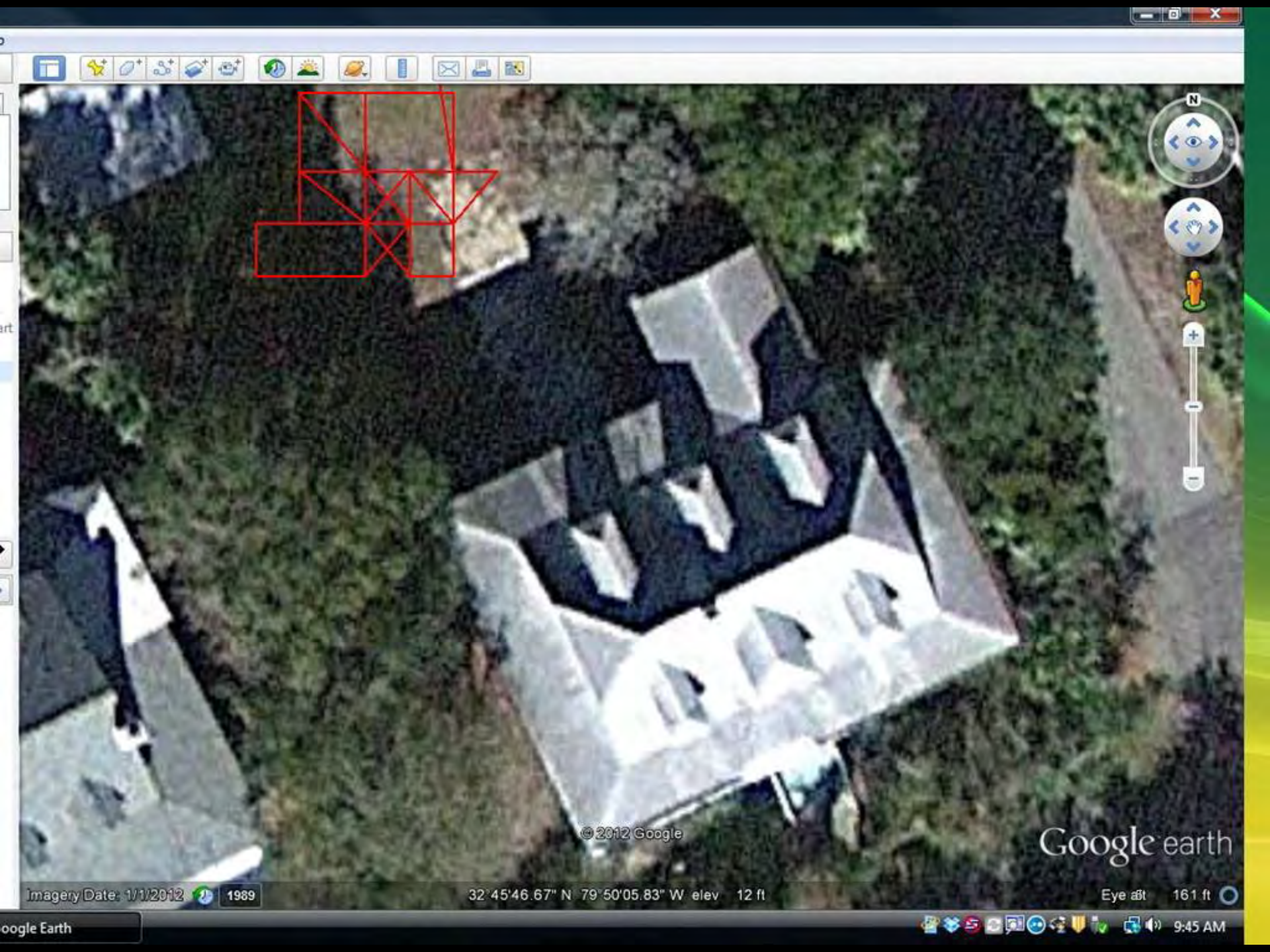
Bennett PRESERVATION ENGINEERING PC

Outline: Taking Care of Porches

- Reasons for porches
- How they are built
- What the problem areas are
- How to strengthen and repair them
- Recommendations on making porches last with minimal deterioration
- An example

Reasons for porches

- Climate
- Orientation to the sun
- The social side of porches

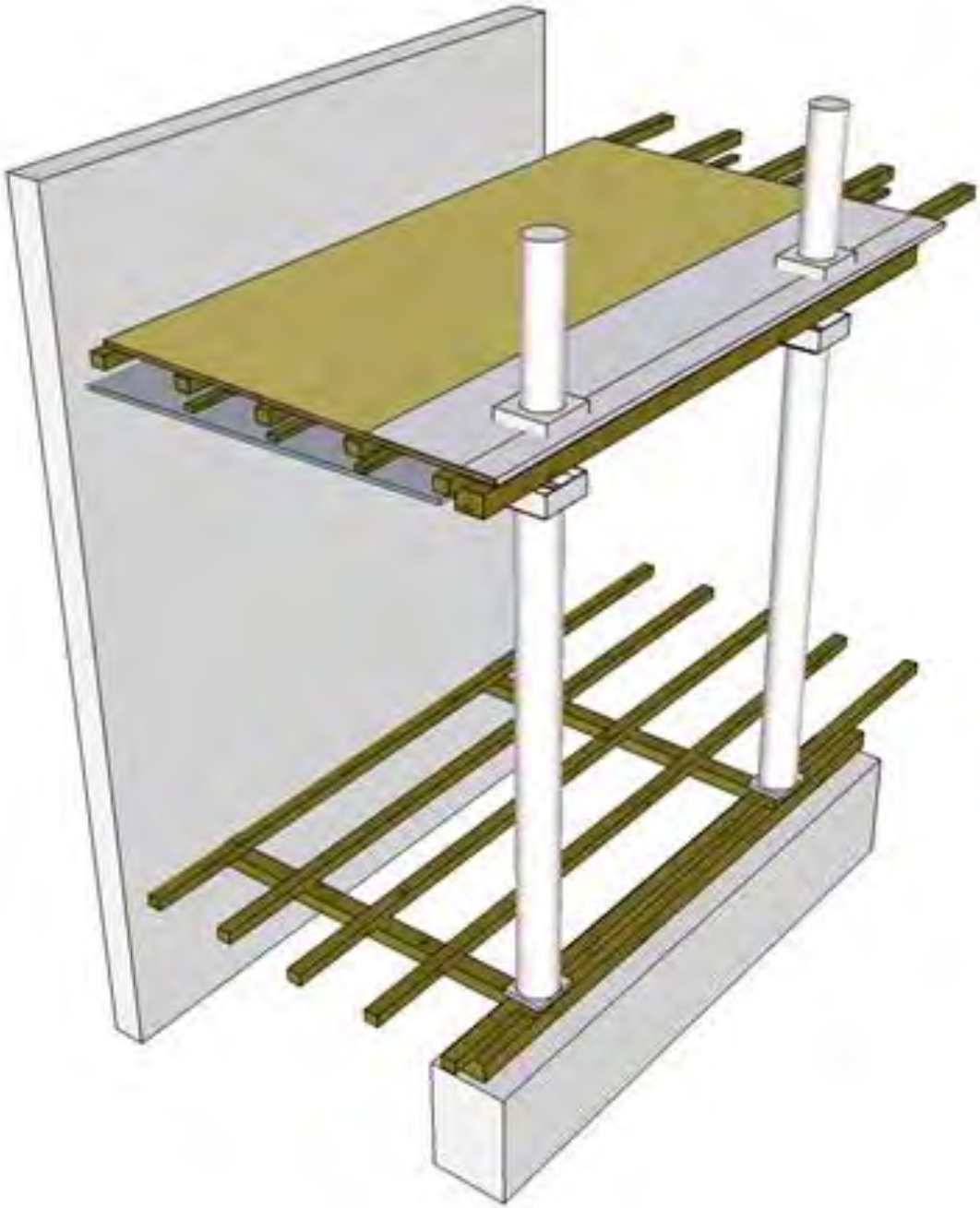

N
© 2012 Google
Google earth
Imagery Date: 1/1/2012
1989
32°45'46.67" N 79°50'05.83" W elev 12 ft
Eye alt 161 ft
9:45 AM

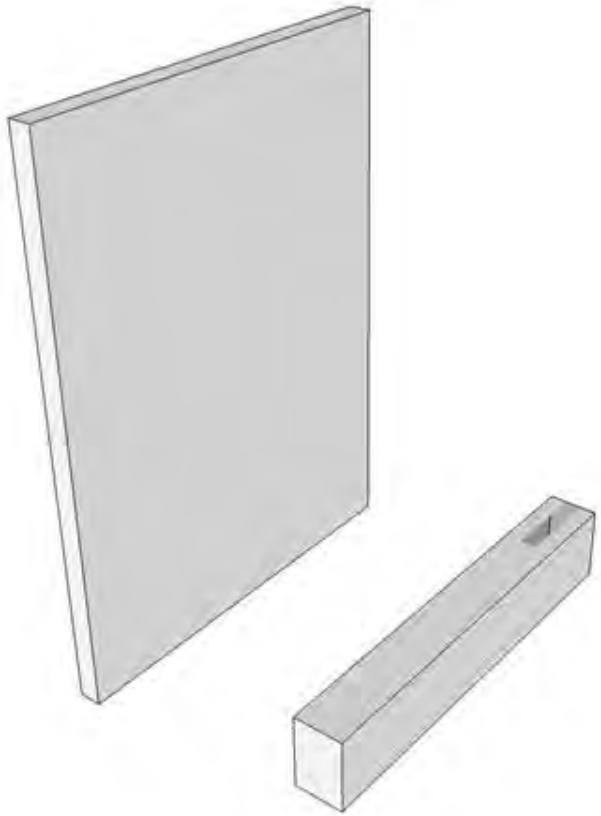
How porches are built

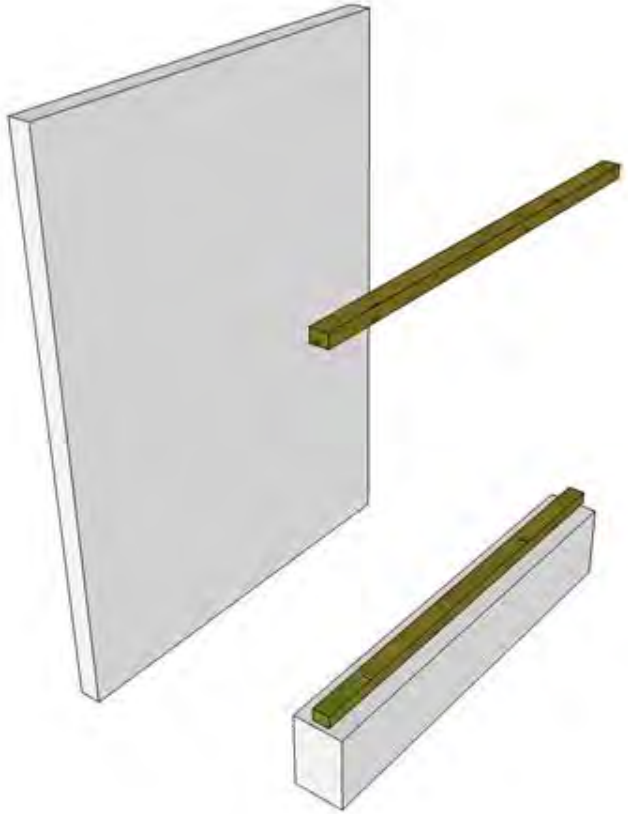
- Flooring carries loads to purlins
- Purlins carry loads to girders
- Girders carry loads to edge beams
- Edge beams carry load to columns
- Columns carry loads to piers
- Piers carry loads to the soil

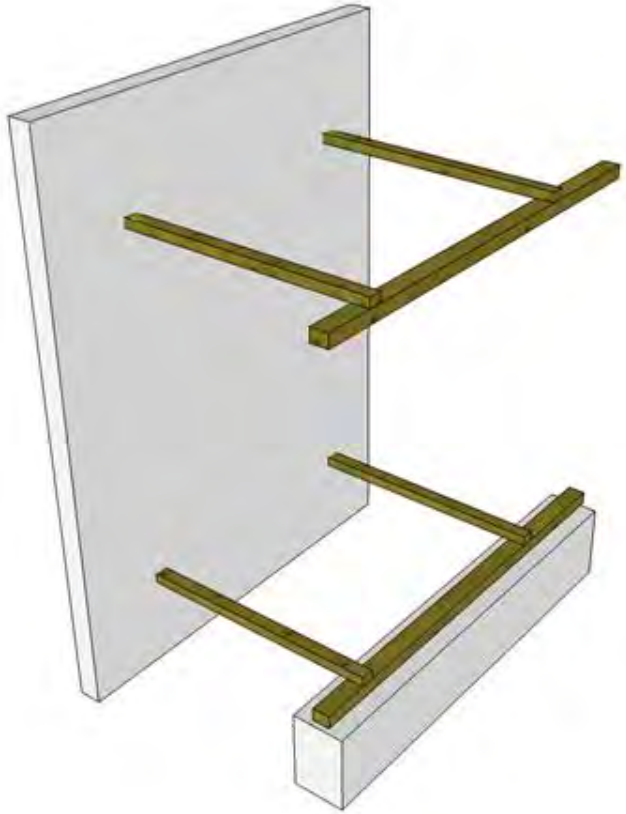
How porches are built

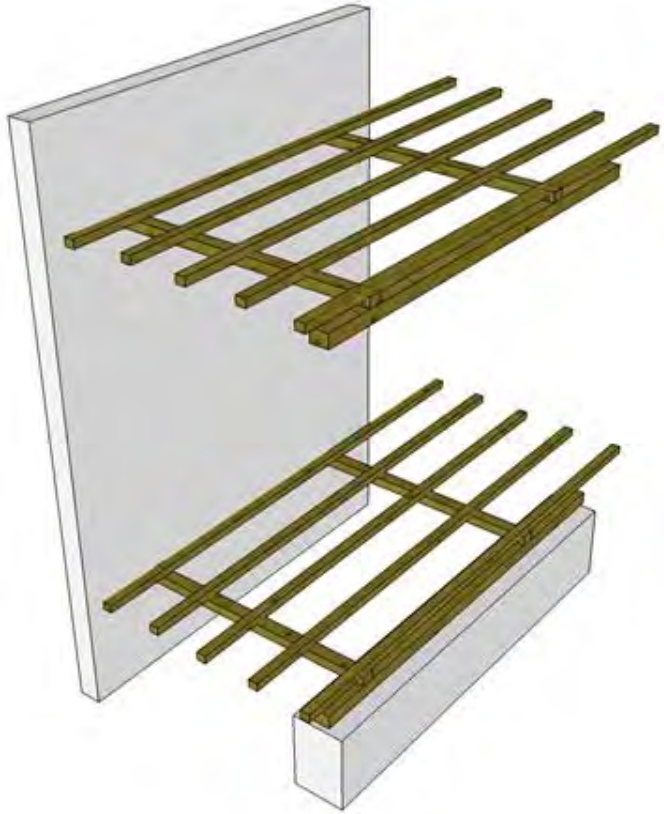
- Overall view

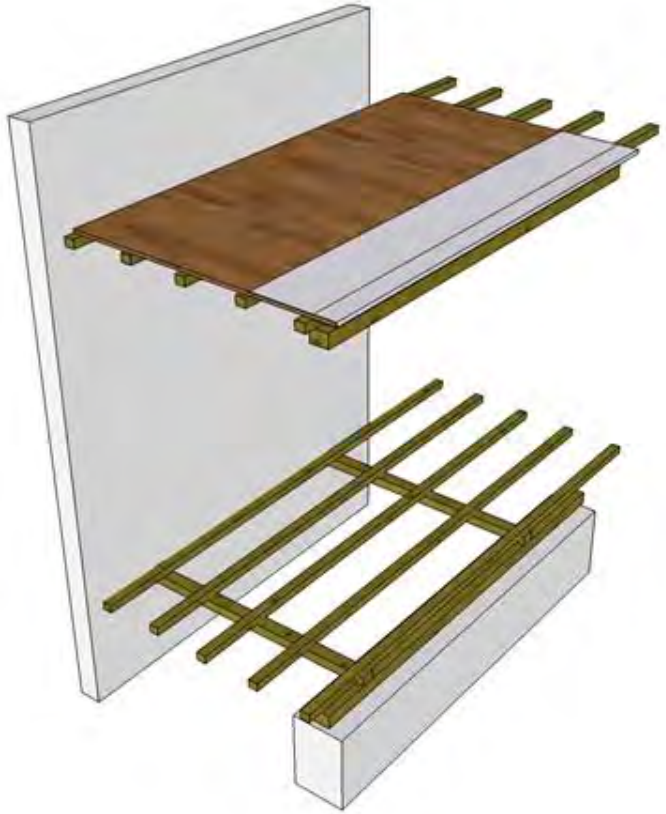


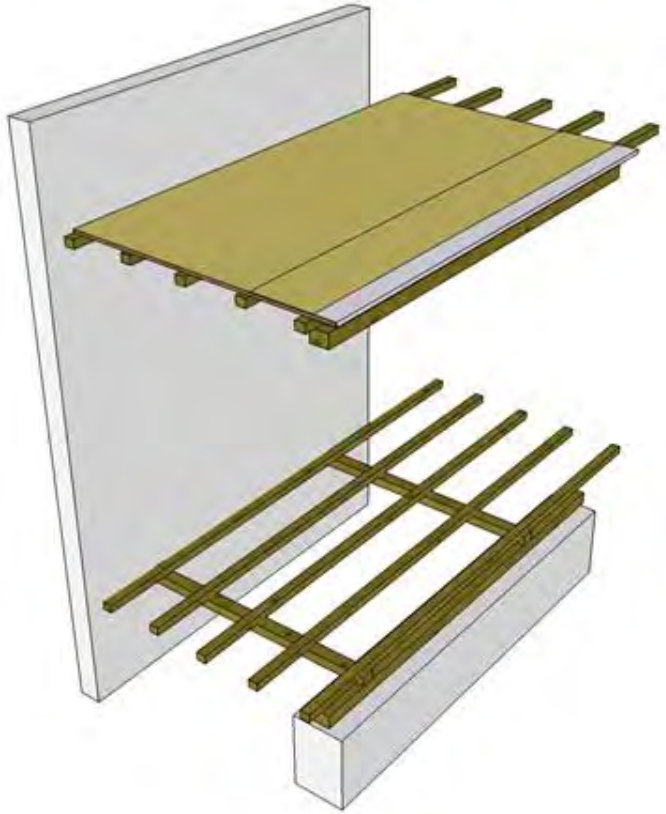


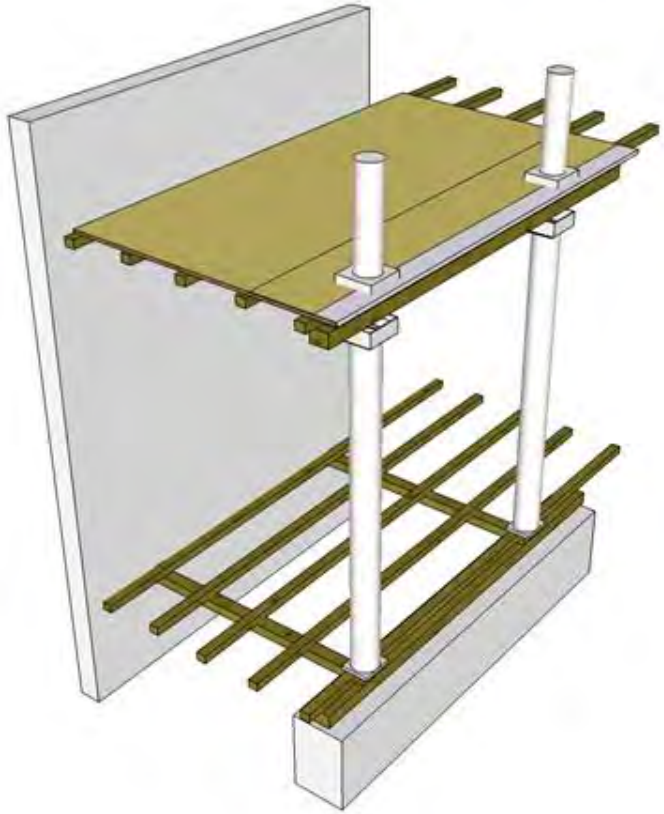


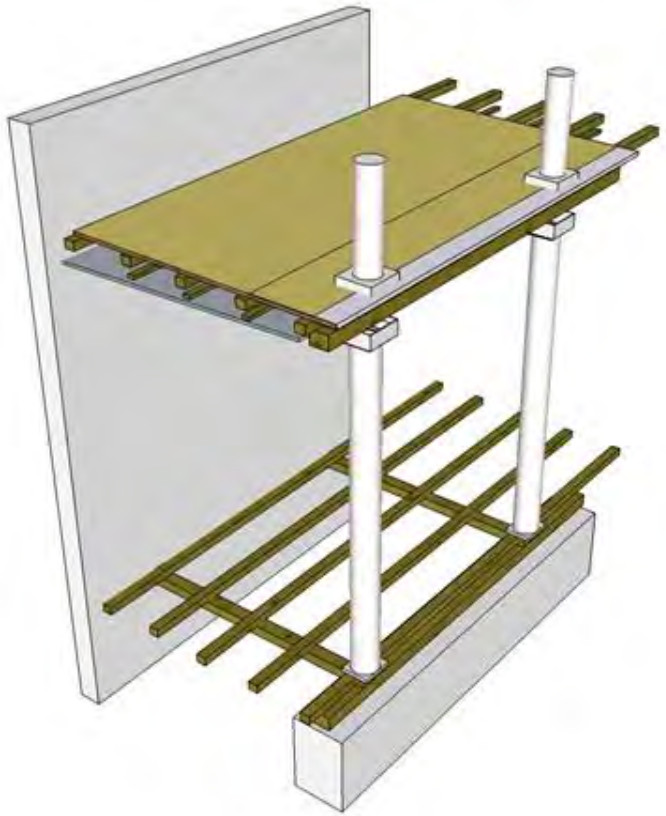






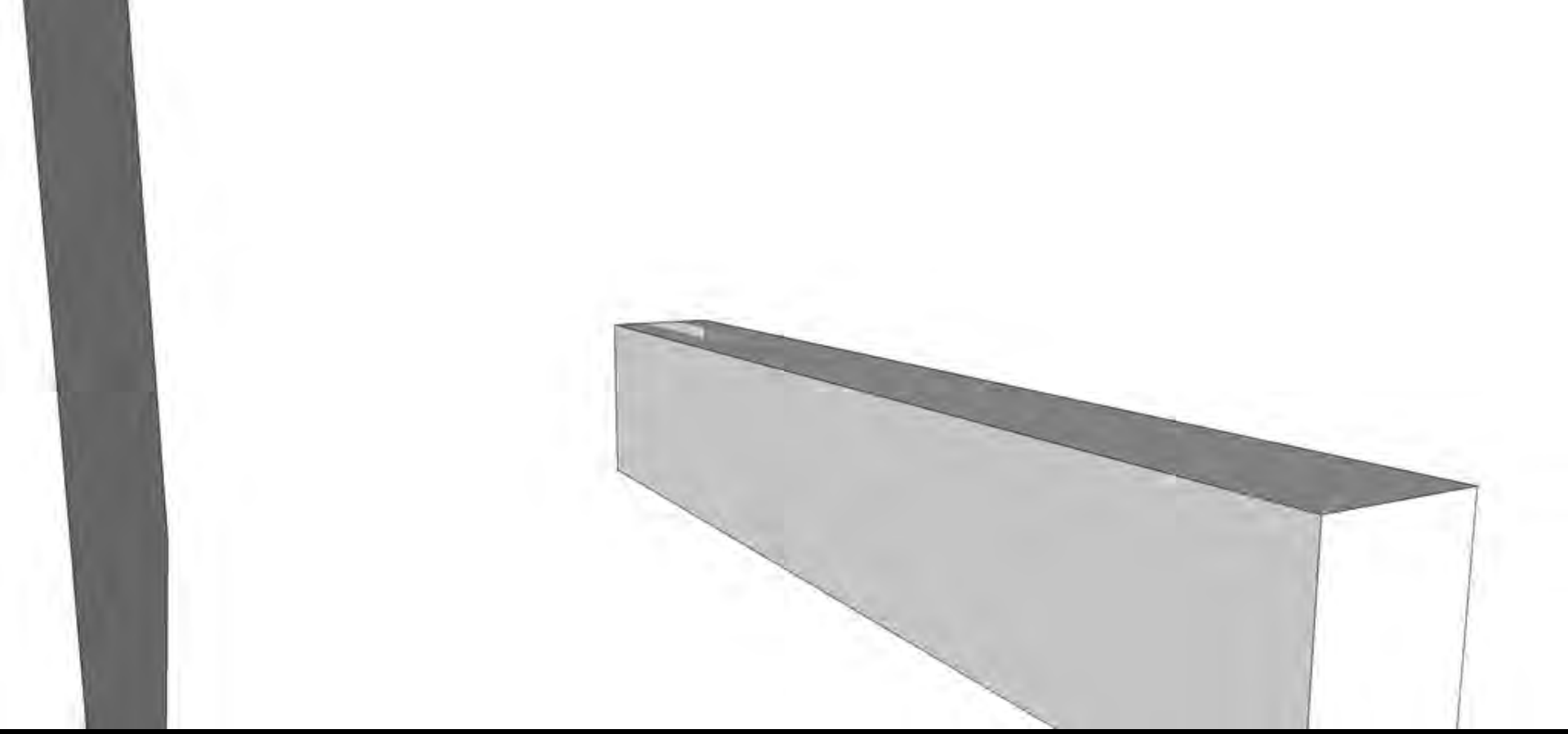


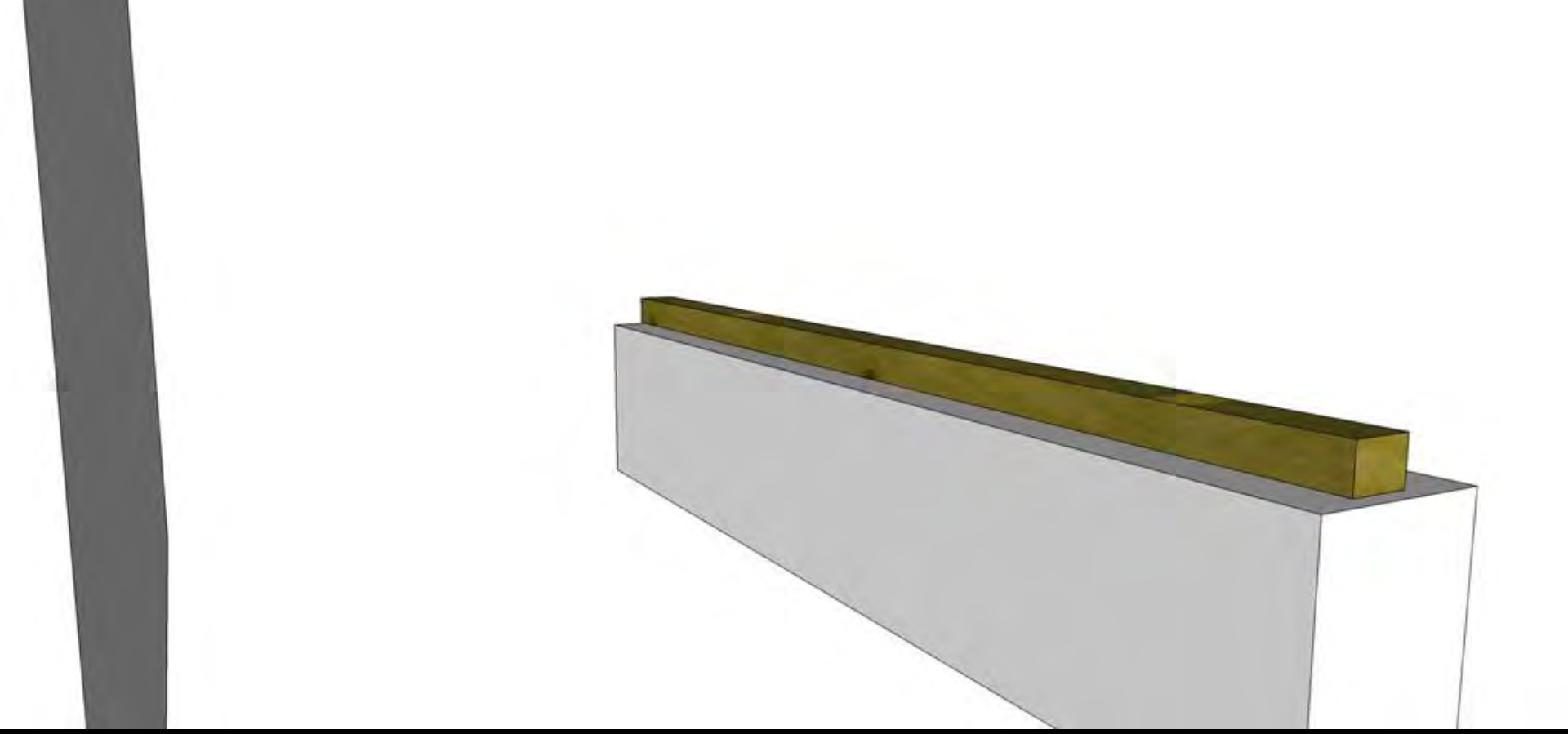


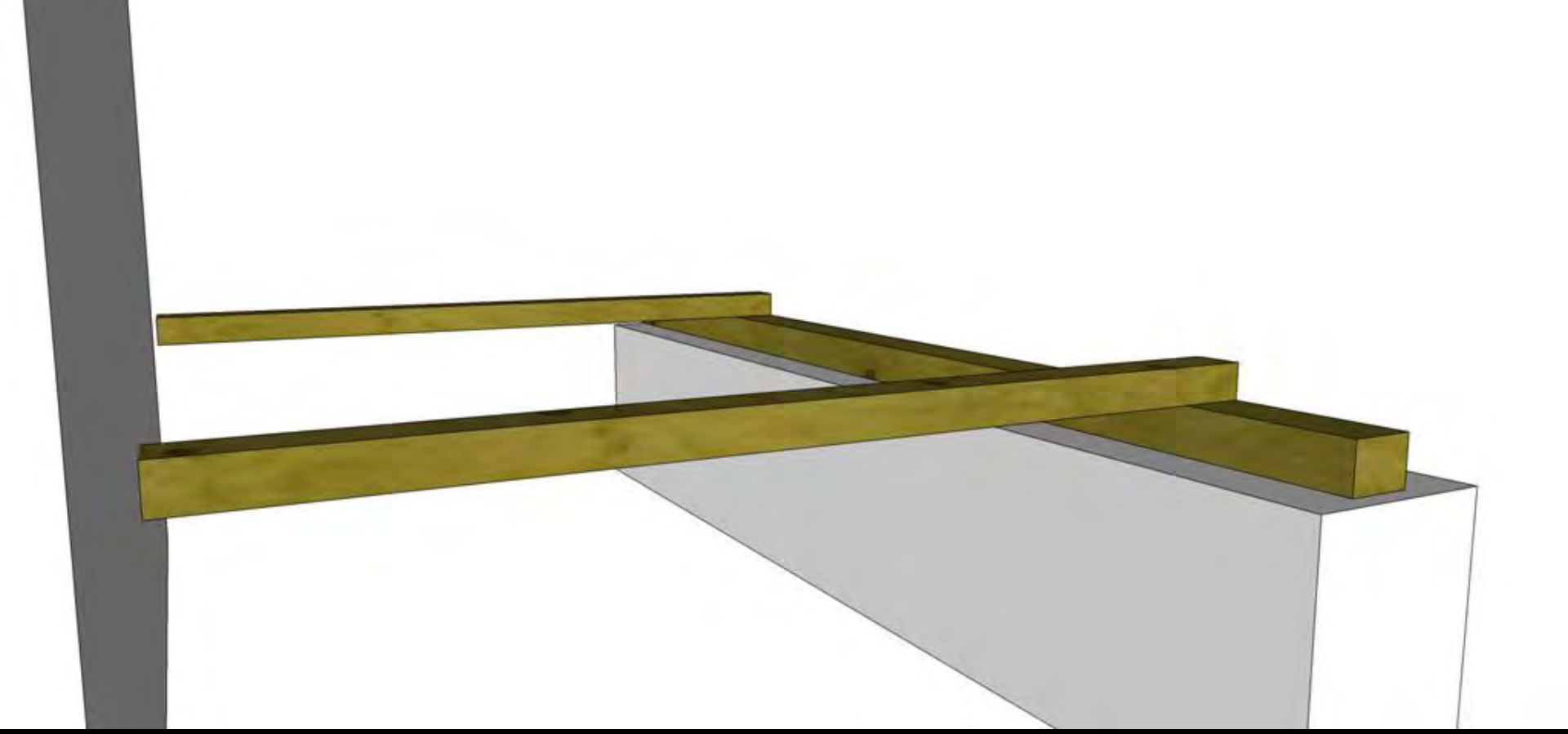


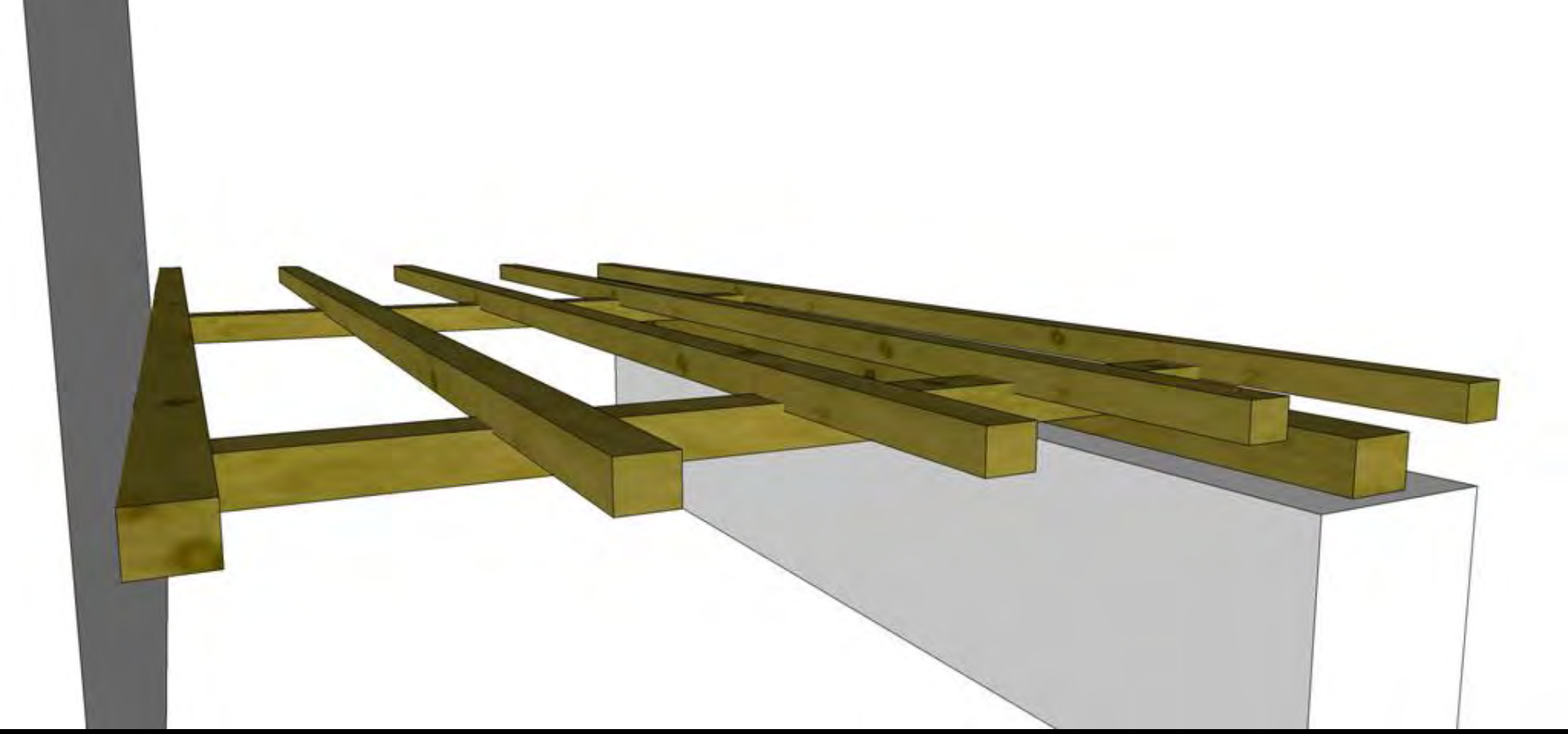
How porches are built

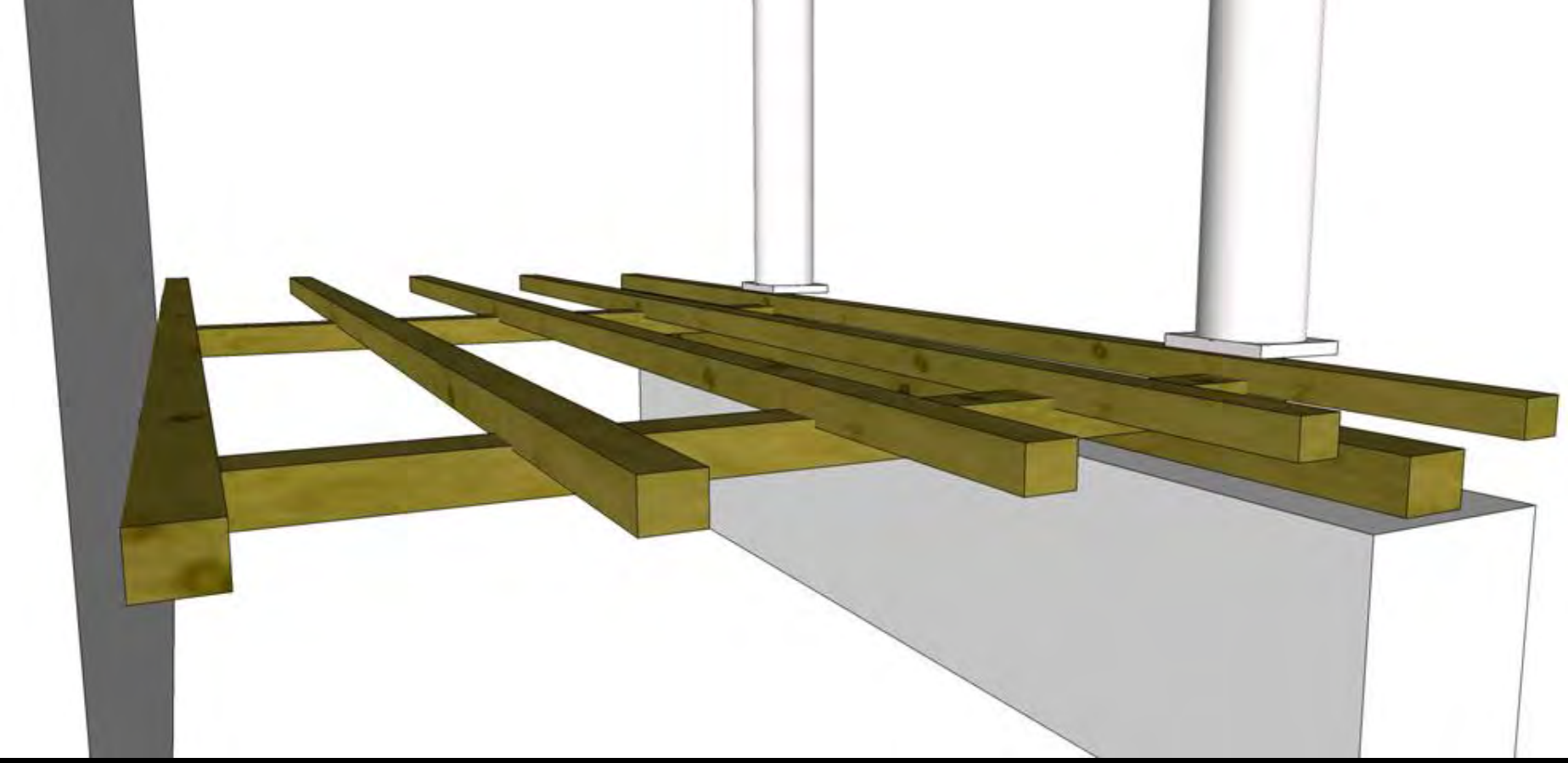
- Lowest level





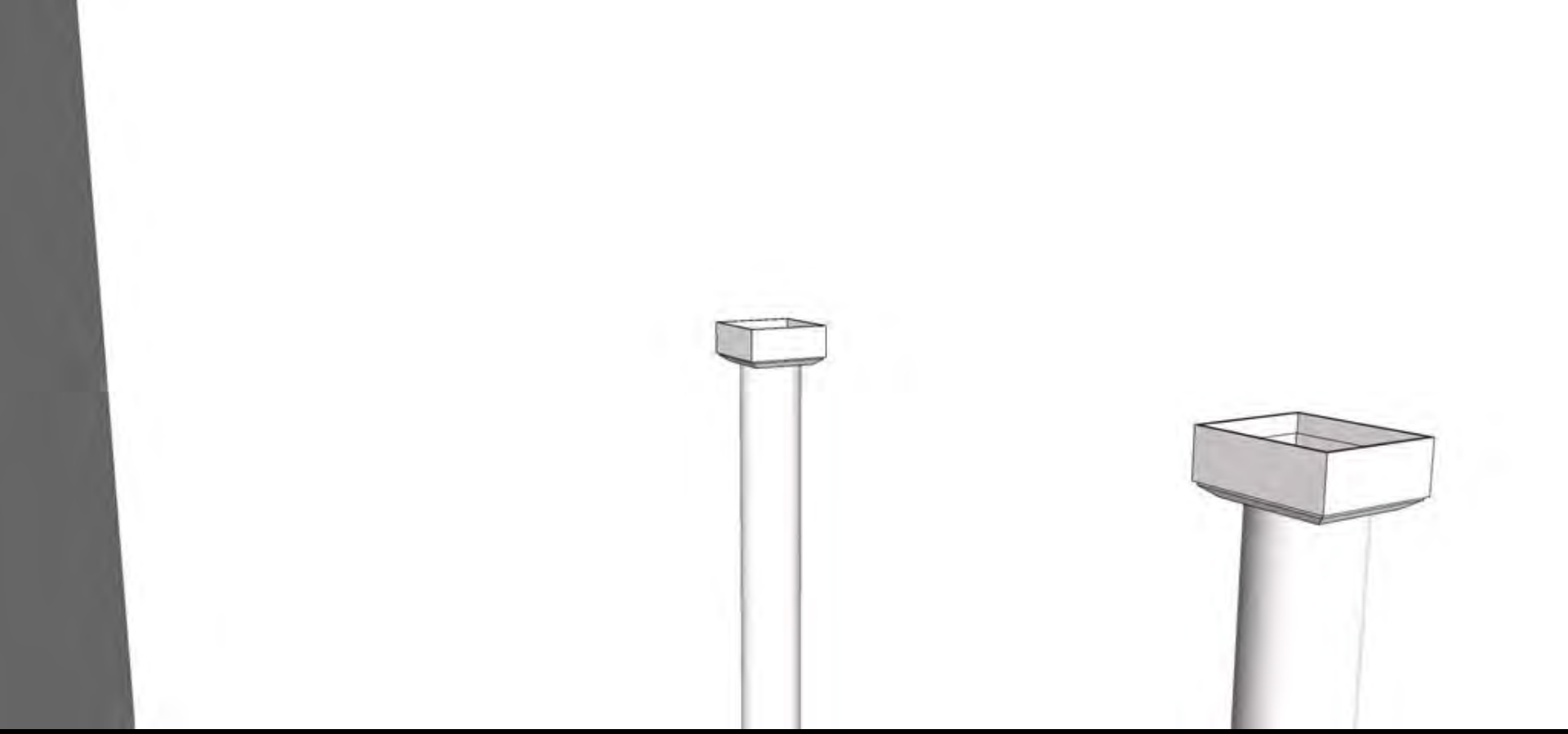


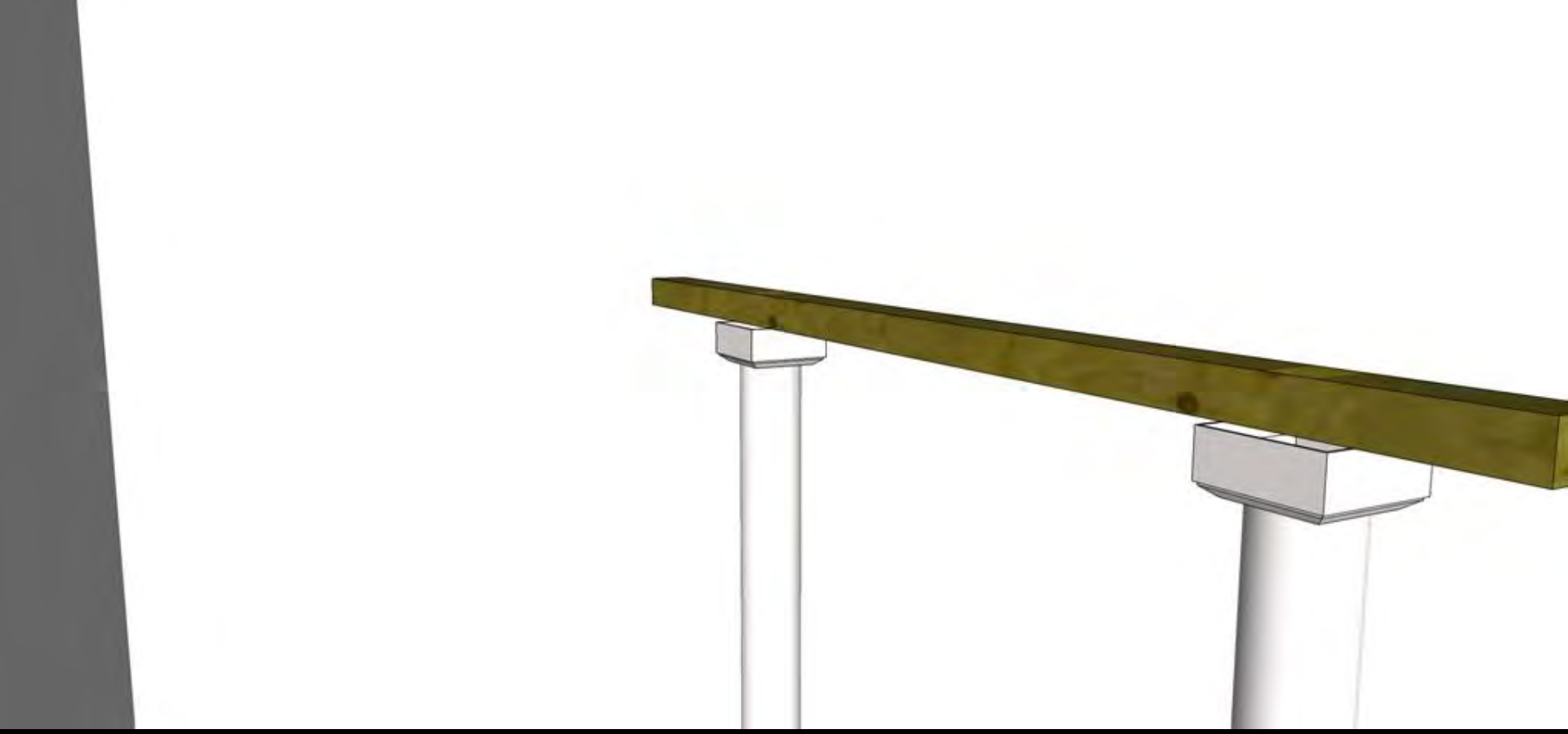


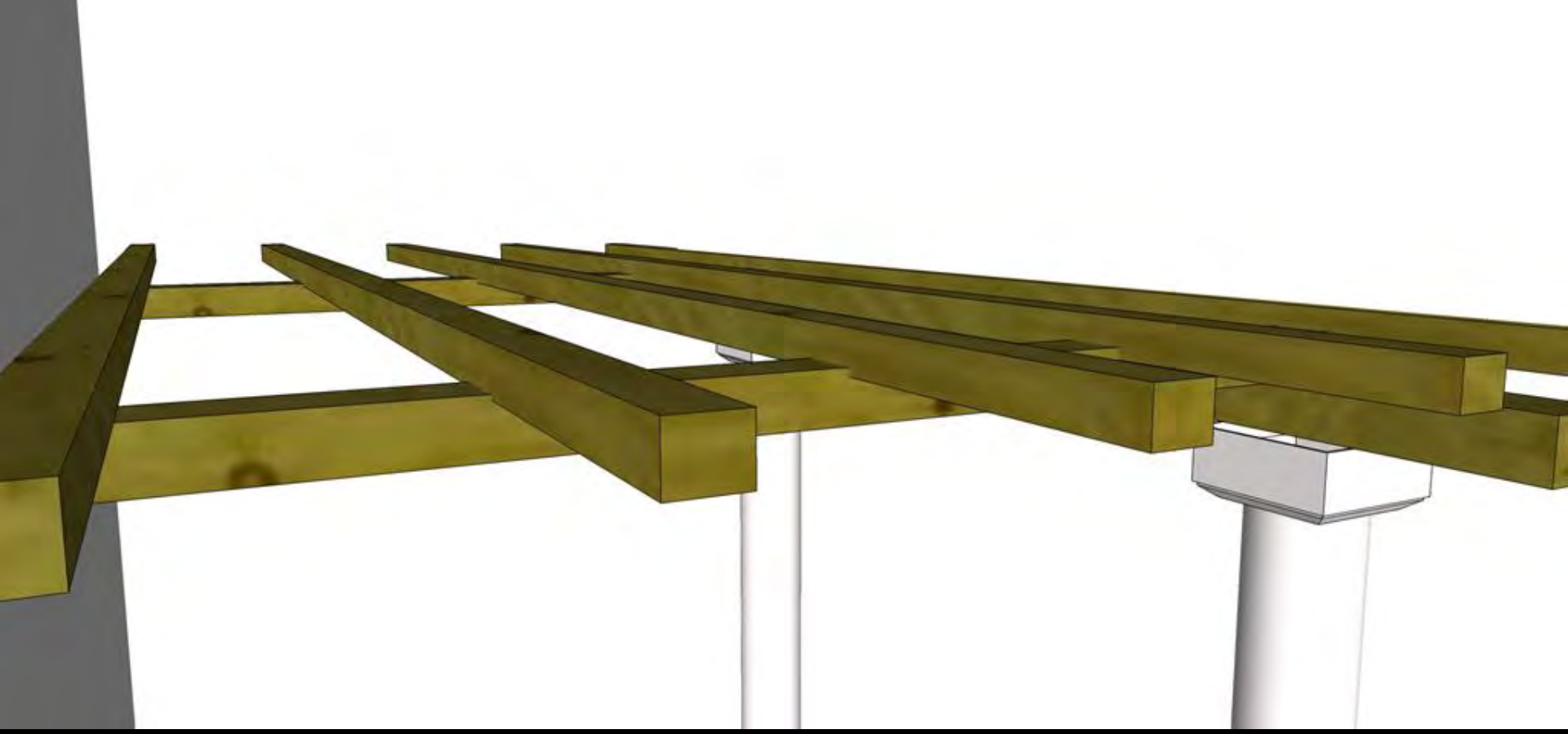


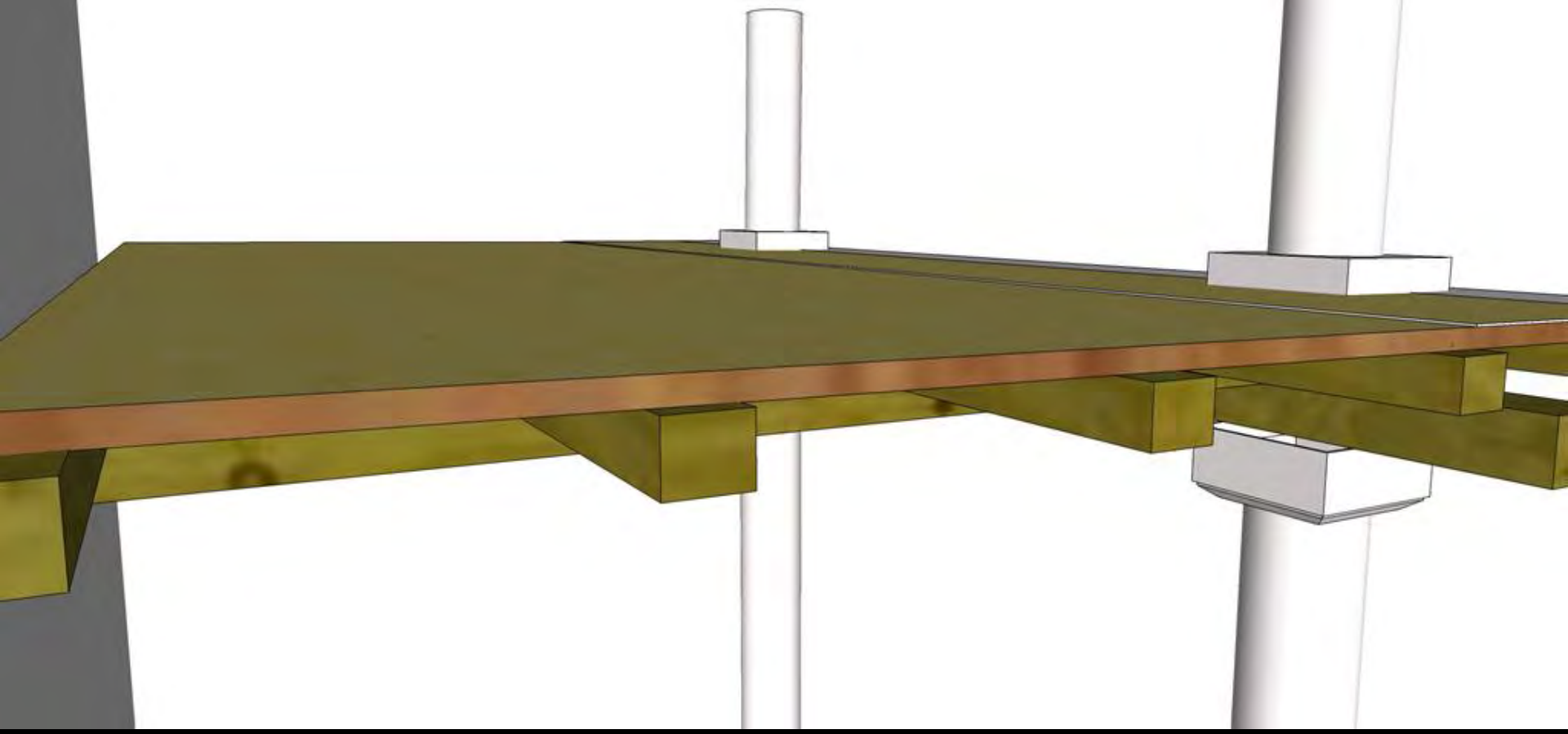
How porches are built

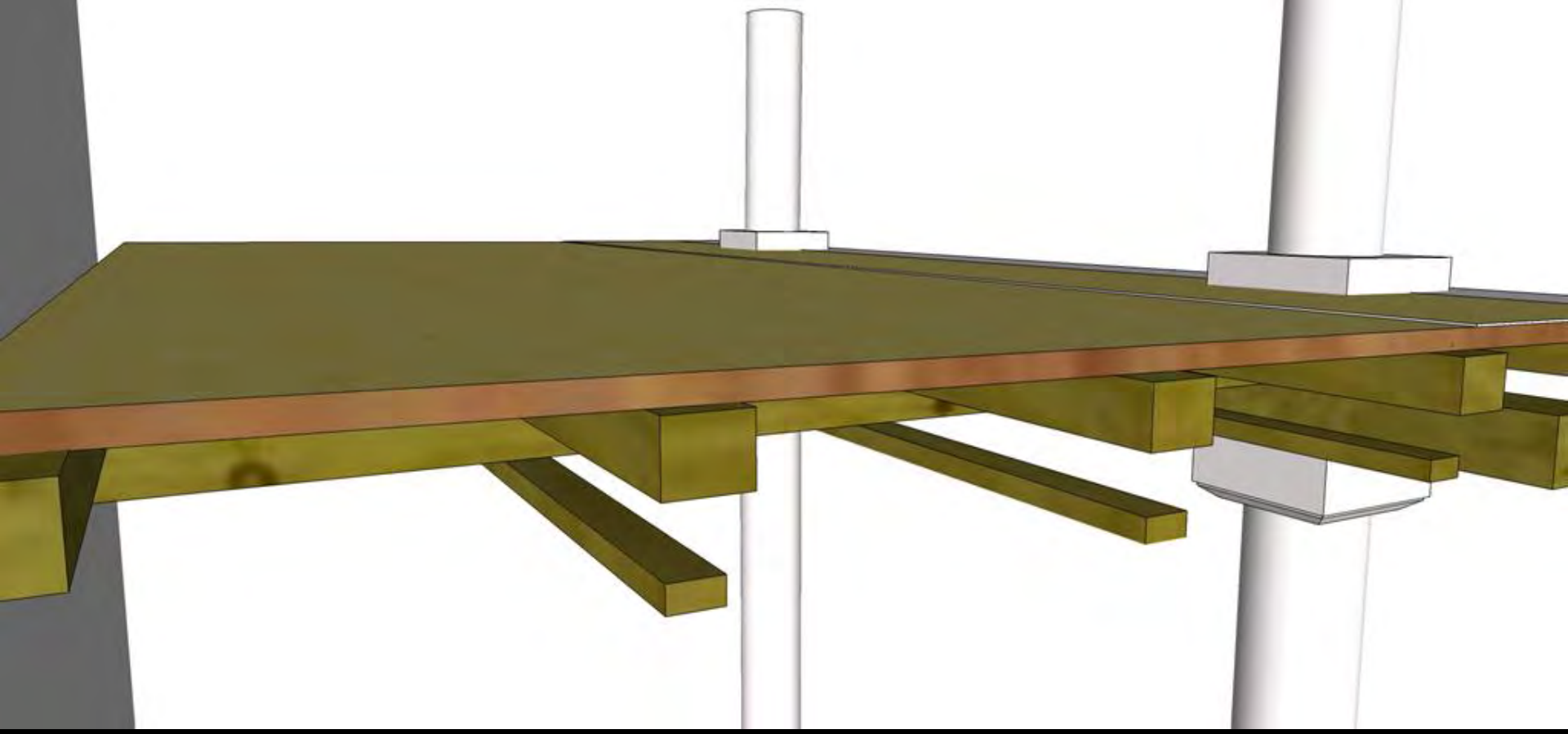
- Upper level

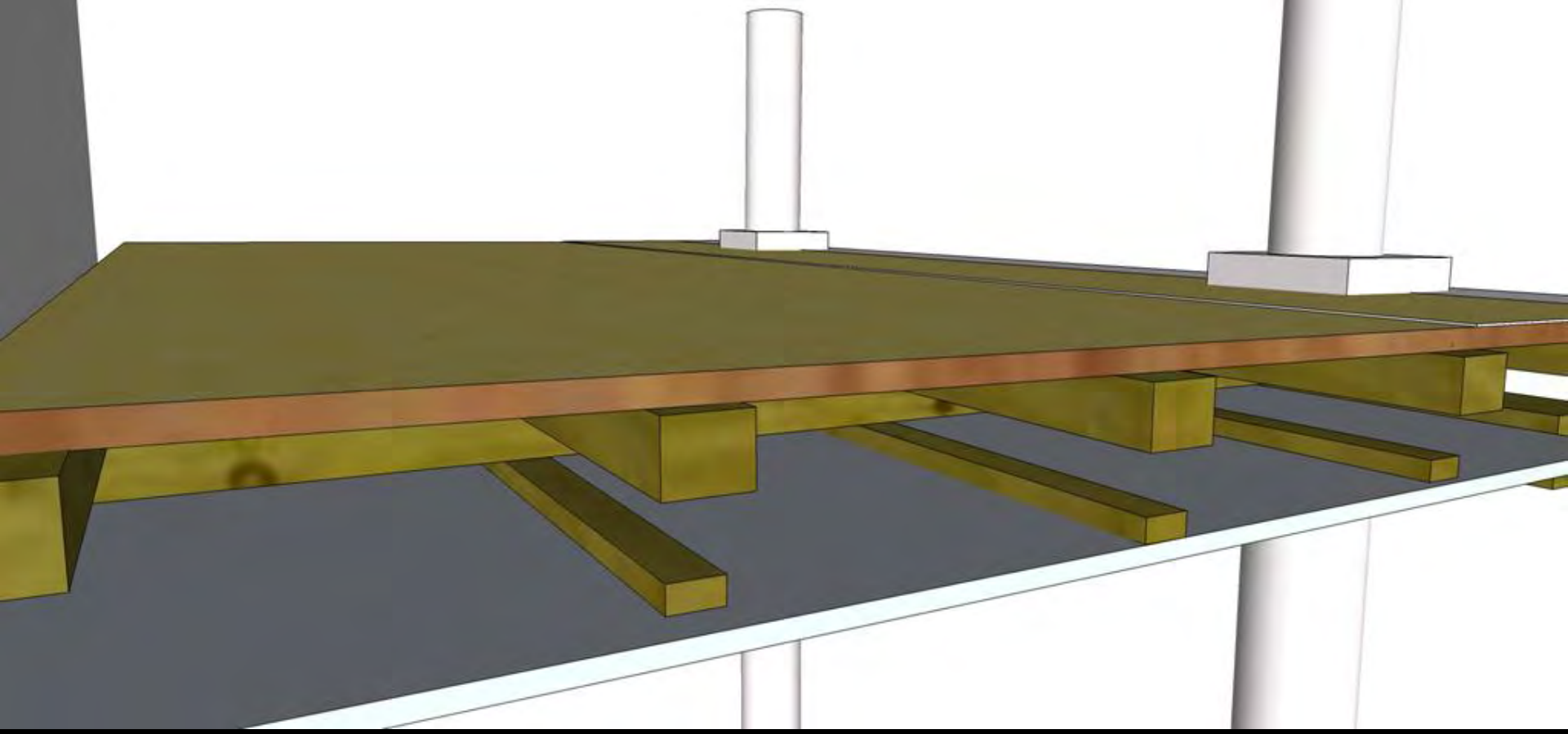






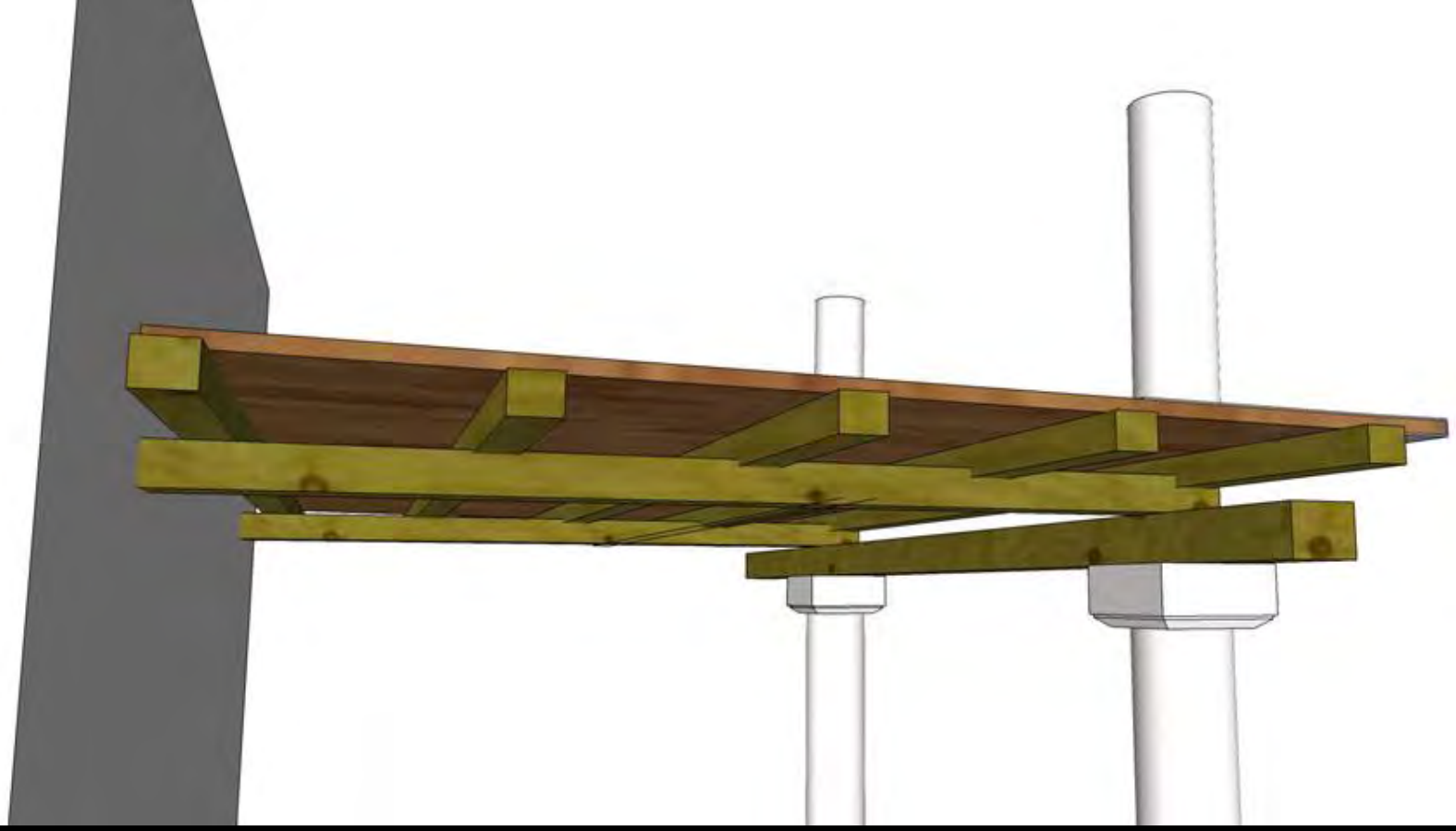


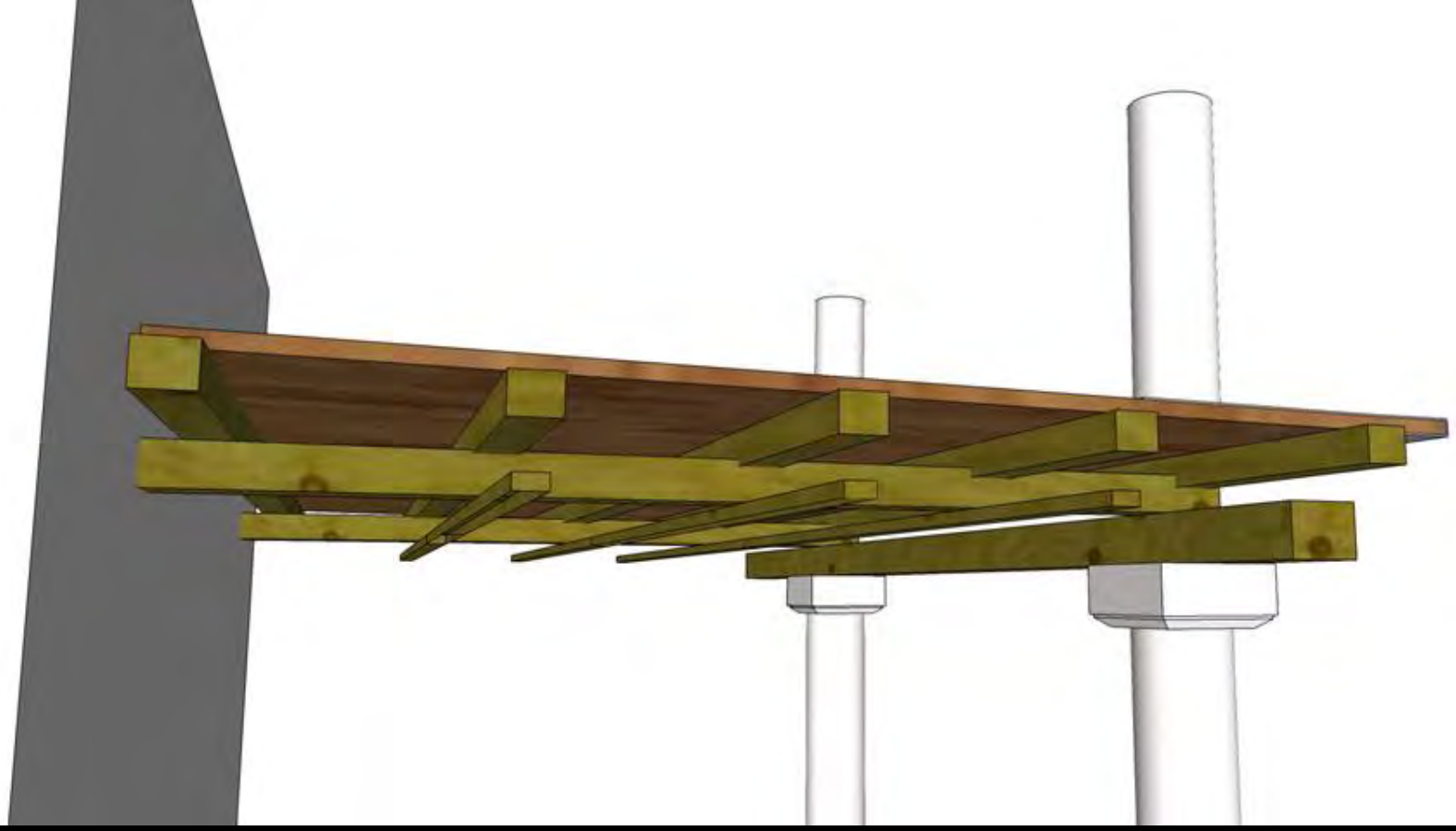


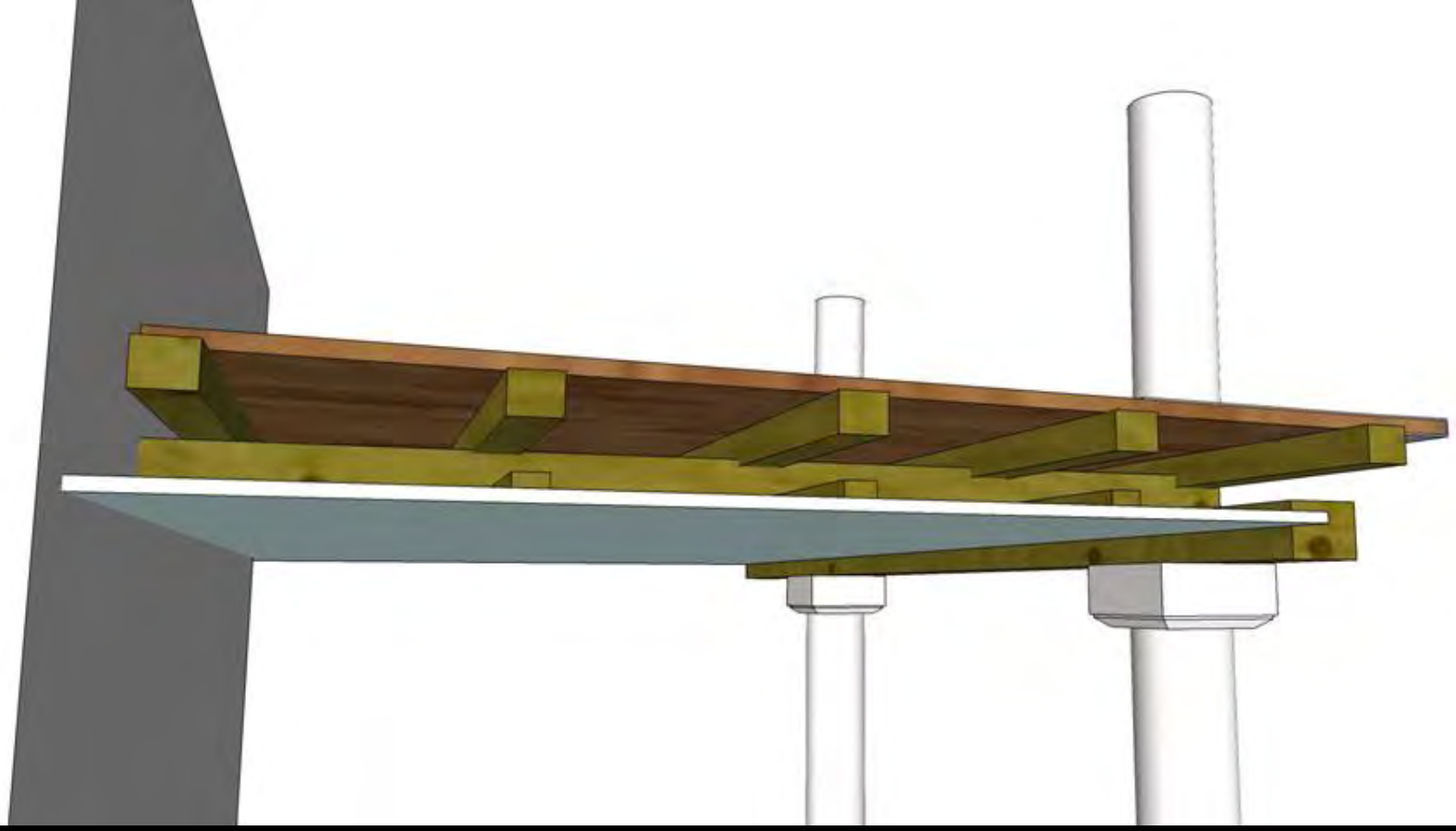


How porches are built

- Ceilings





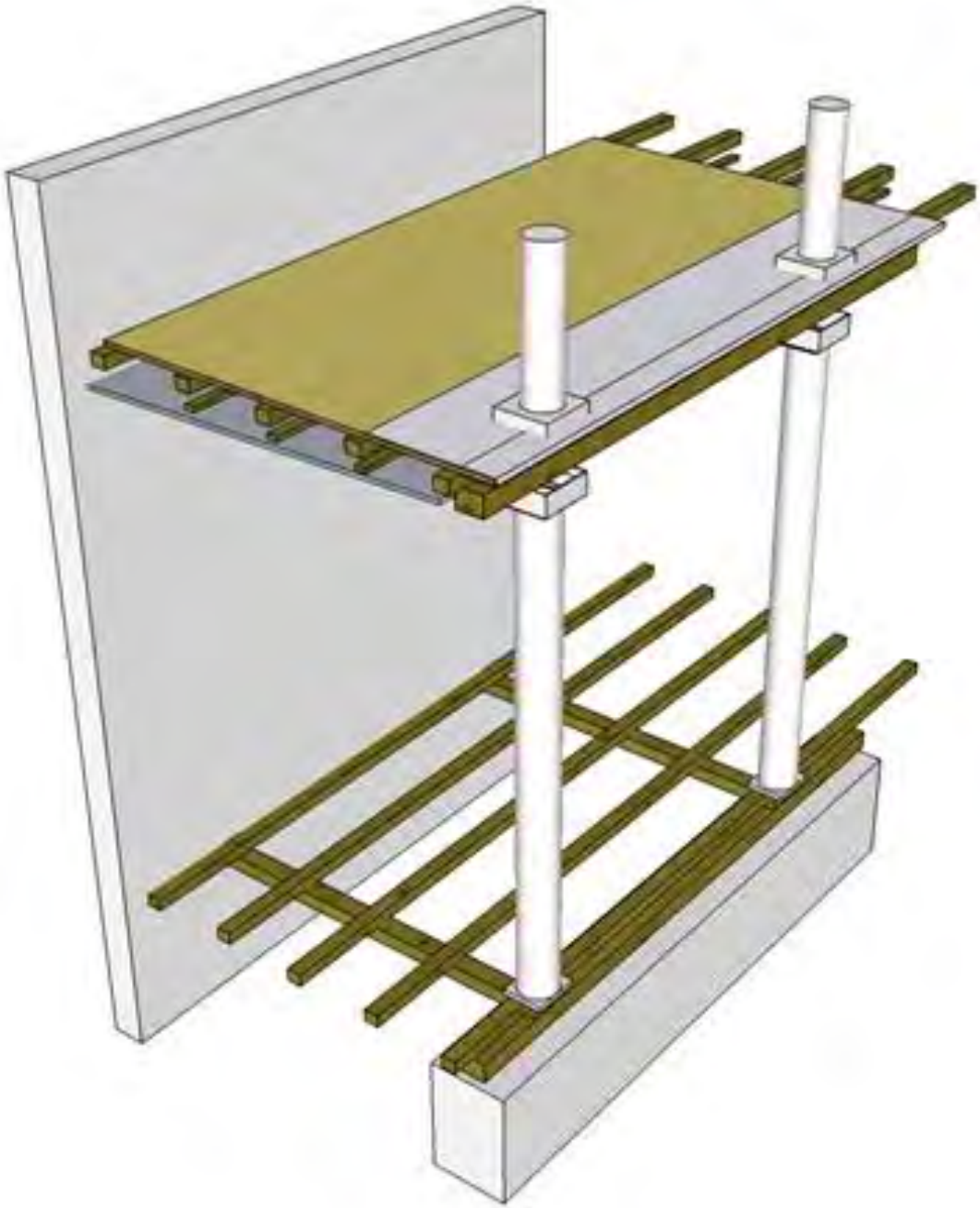


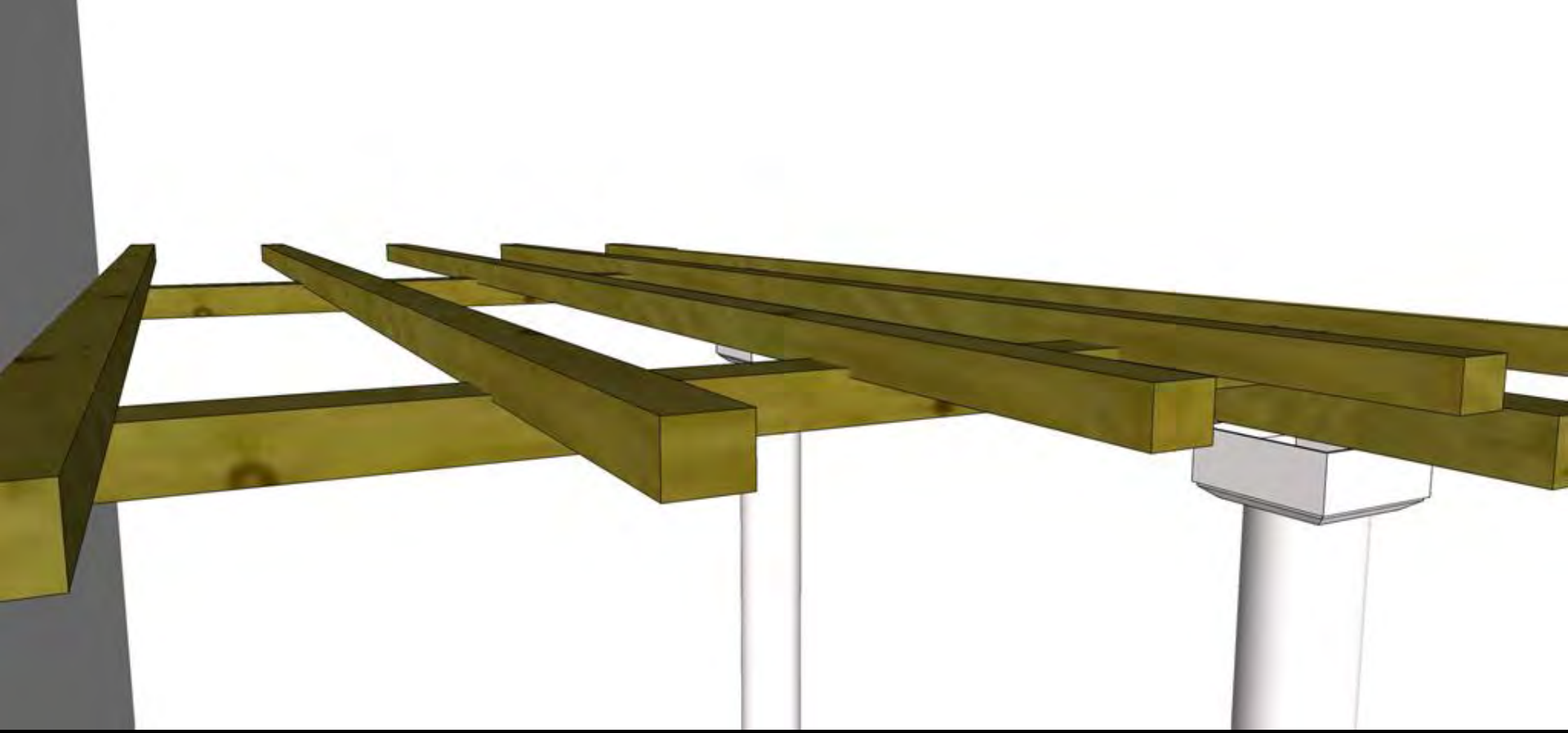
What the problem areas are

- Details of purlins – slope and notches
- Details of girders – rot, notches and supports at the edge beams
- Details of the edge beams – rot and discontinuities
- Deterioration of the columns – rot at the bases and the handrail tie-in
- Details of the piers – loss of mortar and instability
- Details of the handrails – height, spacing, strength and deterioration

What the problem areas are

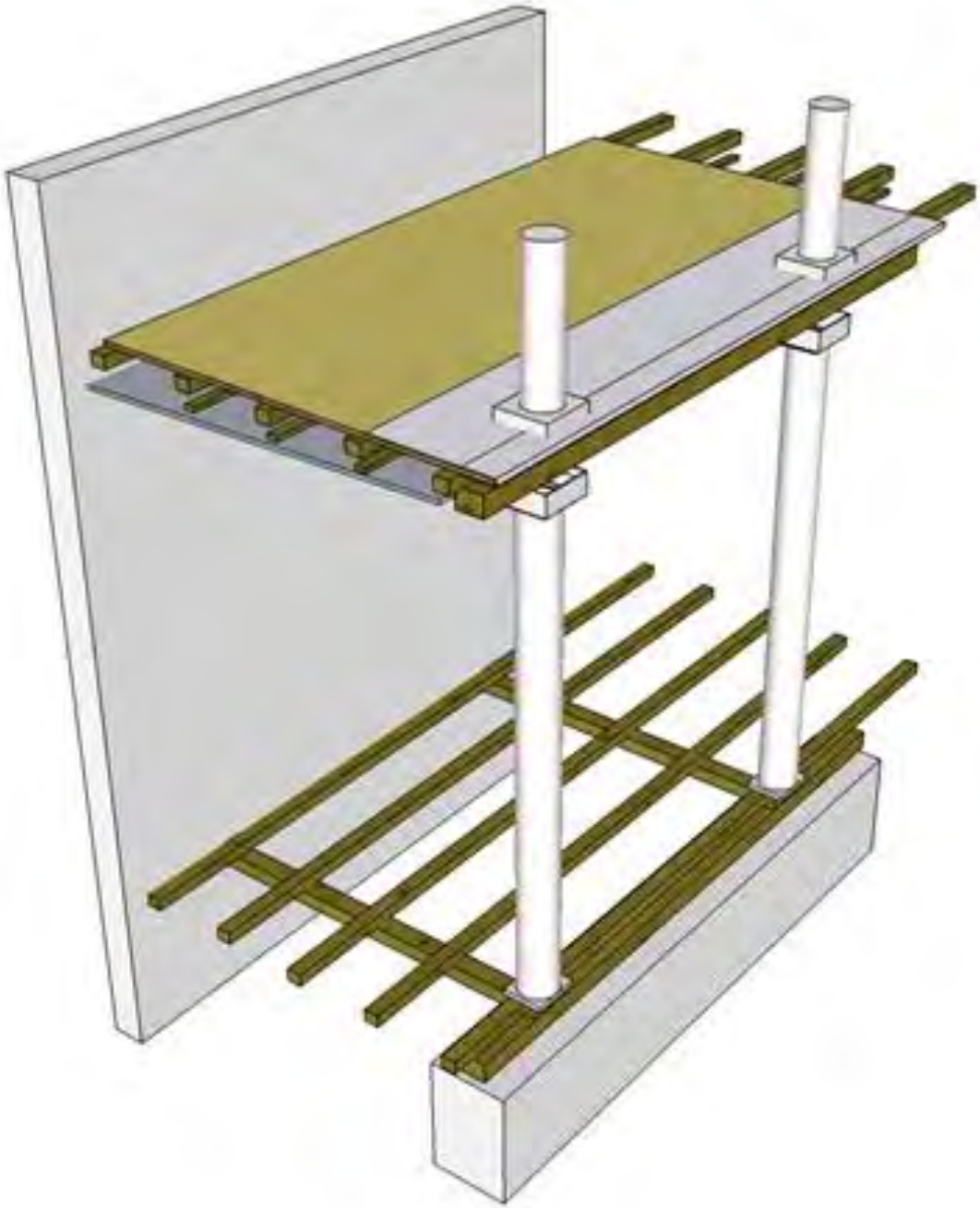
- Details of purlins – slope and notches

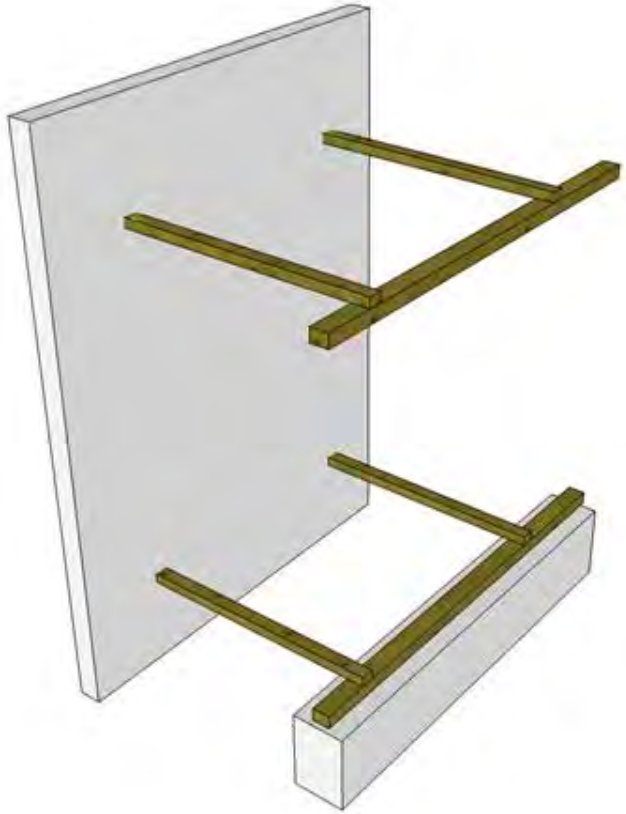




What the problem areas are

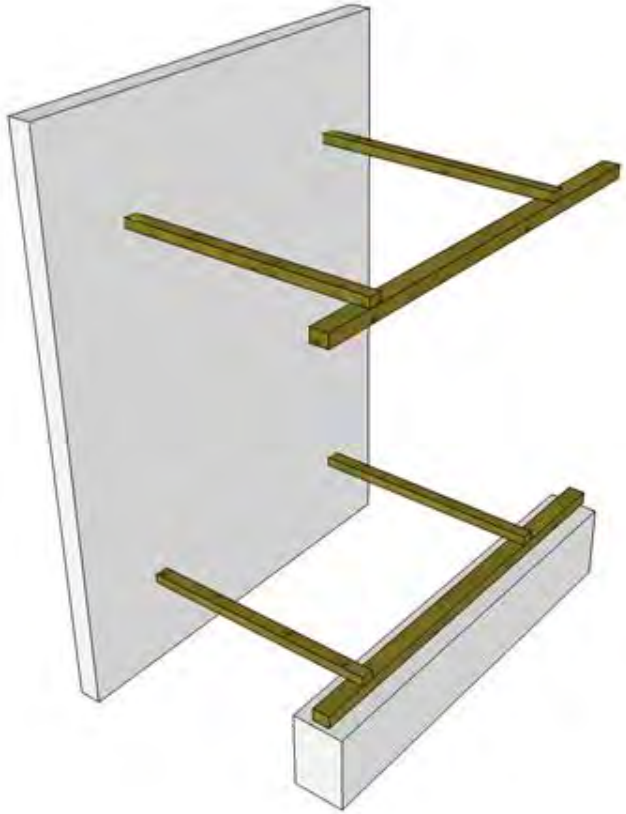
- Details of girders – rot, notches and supports at the edge beams





What the problem areas are

- Details of the edge beams – rot and discontinuities



What the problem areas are

- Deterioration of the columns – rot at the bases and the handrail tie-in

What the problem areas are

- Details of the piers – loss of mortar and instability

What the problem areas are

- Details of the handrails – height, spacing, strength and deterioration

What the problem areas are

- Details of girders – rot, notches and supports at the edge beams
- Details of the edge beams – rot and discontinuities
- Deterioration of the columns – rot at the bases and the handrail tie-in

So the real problem is ….

Water!!!

Let’s look…


FDC


CITY
OF
CHARLESTON

How to strengthen and repair them

- Flooring – rot repair and replacement
- Purlins – sistering and new connections
- Girders – sistering and new connections
- Edge beams – replacement and new connections
- Columns – filling, partial or complete replacement
- Handrails – end connections, supplementing the railings

A couple of success stories…

- First: 90 Wentworth Street at
  The College of Charleston

A more in depth example:

- 12 Bull Street, Charleston
- Preservation School at
  The College of Charleston

12 BULL EXTERIOR REPAIRS

12 BULL STREET, CHARLESTON, SC 29401

STATE PROJECT NUMBER: H15-9653-PG

1 Location Plan

DRAWING LIST

SHEET TITLE	SHEET #
GENERAL NOTES & LOCATION PLAN	S001
TABLES	S002
FOUNDATION PLAN	S101
FIRST FLOOR FRAMING PLAN	S102
FIRST FLOOR PLAN	S103
SECOND FLOOR FRAMING PLAN	S104
SECOND FLOOR PLAN	S105
ATTIC FRAMING PLAN	S106
ROOF FRAMING PLAN	S107
ATTIC PLAN	S108
SOUTH ELEVATION	S201
EAST ELEVATION	S202
NORTH ELEVATION	S203
WEST ELEVATION	S204
SECTION	S301
DETAILS	S401
DETAILS	S402
DETAILS	S403
DETAILS	S404
DETAILS	S405
DETAILS	S406
DETAILS	S407
DETAILS	S408
SOUTH PORCH EXISTING DETAILS	S409
SOUTH PORCH DETAILS	S410
SOUTH PORCH DETAILS	S411
NORTH PORCH EXISTING DETAILS	S412
NORTH PORCH DETAILS	S413
NORTH PORCH DETAILS	S414
DETAILS	S415
DETAILS	S416
DETAILS	S417
DETAILS	S418
FIRST FLOOR PLAN	S101
SECOND FLOOR PLAN	S102
FIRST FLOOR REFLECTED	S103
CEILING PLAN	
SECOND FLOOR REFLECTED	S104
CEILING PLAN	
ROOF PLAN	S105
SOUTH ELEVATION	S201
EAST ELEVATION	S202
NORTH ELEVATION	S203
WEST ELEVATION	S204
ROOF DETAILS	S301
EXISTING TOPOGRAPHIC SURVEY	C100
SITE DEMOLITION PLAN	C200
ROOF DRAINAGE PLAN	C201
PROFILE AND DETAILS	C300

REVISIONS
1 2 3 4 5 6 7 8
4.7
5.1 6.7
5.7
5.4 5.5
5.7
5.8
5.9
5.9 V
6.0
5.8
5.9
6
7.0
7.1
7.2
7.3
7.4
7.5
7.6
7.7
7.8
7.9
7.10
7.11
7.12
7.13
7.14
7.15
7.16
7.17
7.18
7.19
7.20
7.21
7.22
7.23
7.24
7.25
7.26
7.27
7.28
7.29
7.30
7.31
7.32
7.33
7.34
7.35
7.36
7.37
7.38
7.39
7.40
7.41
7.42
7.43
7.44
7.45
7.46
7.47
7.48
7.49
7.50
7.51
7.52
7.53
7.54
7.55
7.56
7.57
7.58
7.59
7.60
7.61
7.62
7.63
7.64
7.65
7.66
7.67
7.68
7.69
7.70
7.71
7.72
7.73
7.74
7.75
7.76
7.77
7.78
7.79
7.80
7.81
7.82
7.83
7.84
7.85
7.86
7.87
7.88
7.89
7.90
7.91
7.92
7.93
7.94
7.95
7.96
7.97
7.98
7.99
7.100
7.101
7.102
7.103
7.104
7.105
7.106
7.107
7.108
7.109
7.110
7.111
7.112
7.113
7.114
7.115
7.116
7.117
7.118
7.119
7.120
7.121
7.122
7.123
7.124
7.125
7.126
7.127
7.128
7.129
7.130
7.131
7.132
7.133
7.134
7.135
7.136
7.137
7.138
7.139
7.140
7.141
7.142
7.143
7.144
7.145
7.146
7.147
7.148
7.149
7.150
7.151
7.152
7.153
7.154
7.155
7.156
7.157
7.158
7.159
7.160
7.161
7.162
7.163
7.164
7.165
7.166
7.167
7.168
7.169
7.170
7.171
7.172
7.173
7.174
7.175
7.176
7.177
7.178
7.179
7.180
7.181
7.182
7.183
7.184
7.185
7.186
7.187
7.188
7.189
7.190
7.191
7.192
7.193
7.194
7.195
7.196
7.197
7.198
7.199
7.200
7.201
7.202
7.203
7.204
7.205
7.206
7.207
7.208
7.209
7.210
7.211
7.212
7.213
7.214
7.215
7.216
7.217
7.218
7.219
7.220
7.221
7.222
7.223
7.224
7.225
7.226
7.227
7.228
7.229
7.230
7.231
7.232
7.233
7.234
7.235
7.236
7.237
7.238
7.239
7.240
7.241
7.242
7.243
7.244
7.245
7.246
7.247
7.248
7.249
7.250
7.251
7.252
7.253
7.254
7.255
7.256
7.257
7.258
7.259
7.260
7.261
7.262
7.263
7.264
7.265
7.266
7.267
7.268
7.269
7.270
7.271
7.272
7.273
7.274
7.275
7.276
7.277
7.278
7.279
7.280
7.281
7.282
7.283
7.284
7.285
7.286
7.287
7.288
7.289
7.290
7.291
7.292
7.293
7.294
7.295
7.296
7.297
7.298
7.299
7.300
7.301
7.302
7.303
7.304
7.305
7.306
7.307
7.308
7.309
7.310
7.311
7.312
7.313
7.314
7.315
7.316
7.317
7.318
7.319
7.320
7.321
7.322
7.323
7.324
7.325
7.326
7.327
7.328
7.329
7.330
7.331
7.332
7.333
7.334
7.335
7.336
7.337
7.338
7.339
7.340
7.341
7.342
7.343
7.344
7.345
7.346
7.347
7.348
7.349
7.350
7.351
7.352
7.353
7.354
7.355
7.356
7.357
7.358
7.359
7.360
7.361
7.362
7.363
7.364
7.365
7.366
7.367
7.368
7.369
7.370
7.371
7.372
7.373
7.374
7.375
7.376
7.377
7.378
7.379
7.380
7.381
7.382
7.383
7.384
7.385
7.386
7.387
7.388
7.389
7.390
7.391
7.392
7.393
7.394
7.395
7.396
7.397
7.398
7.399
7.400
7.401
7.402
7.403
7.404
7.405
7.406
7.407
7.408
7.409
7.410
7.411
7.412
7.413
7.414
7.415
7.416
7.417
7.418
7.419
7.420
7.421
7.422
7.423
7.424
7.425
7.426
7.427
7.428
7.429
7.430
7.431
7.432
7.433
7.434
7.435
7.436
7.437
7.438
7.439
7.440
7.441
7.442
7.443
7.444
7.445
7.446
7.447
7.448
7.449
7.450
7.451
7.452
7.453
7.454
7.455
7.456
7.457
7.458
7.459
7.460
7.461
7.462
7.463
7.464
7.465
7.466
7.467
7.468
7.469
7.470
7.471
7.472
7.473
7.474
7.475
7.476
7.477
7.478
7.479
7.480
7.481
7.482
7.483
7.484
7.485
7.486
7.487
7.488
7.489
7.490
7.491
7.492
7.493
7.494
7.495
7.496
7.497
7.498
7.499
7.500
7.501
7.502
7.503
7.504
7.505
7.506
7.507
7.508
7.509
7.510
7.511
7.512
7.513
7.514
7.515
7.516
7.517
7.518
7.519
7.520
7.521
7.522
7.523
7.524
7.525
7.526
7.527
7.528
7.529
7.530
7.531
7.532
7.533
7.534
7.535
7.536
7.537
7.538
7.539
7.540
7.541
7.542
7.543
7.544
7.545
7.546
7.547
7.548
7.549
7.550
7.551
7.552
7.553
7.554
7.555
7.556
7.557
7.558
7.559
7.560
7.561
7.562
7.563
7.564
7.565
7.566
7.567
7.568
7.569
7.570
7.571
7.572
7.573
7.574
7.575
7.576
7.577
7.578
7.579
7.580
7.581
7.582
7.583
7.584
7.585
7.586
7.587
7.588
7.589
7.590
7.591
7.592
7.593
7.594
7.595
7.596
7.597
7.598
7.599
7.600
7.601
7.602
7.603
7.604
7.605
7.606
7.607
7.608
7.609
7.610
7.611
7.612
7.613
7.614
7.615
7.616
7.617
7.618
7.619
7.620
7.621
7.622
7.623
7.624
7.625
7.626
7.627
7.628
7.629
7.630
7.631
7.632
7.633
7.634
7.635
7.636
7.637
7.638
7.639
7.640
7.641
7.642
7.643
7.644
7.645
7.646
7.647
7.648
7.649
7.650
7.651
7.652
7.653
7.654
7.655
7.656
7.657
7.658
7.659
7.660
7.661
7.662
7.663
7.664
7.665
7.666
7.667
7.668
7.669
7.670
7.671
7.672
7.673
7.674
7.675
7.676
7.677
7.678
7.679
7.680
7.681
7.682
7.683
7.684
7.685
7.686
7.687
7.688
7.689
7.690
7.691
7.692
7.693
7.694
7.695
7.696
7.697
7.698
7.699
7.700
7.701
7.702
7.703
7.704
7.705
7.706
7.707
7.708
7.709
7.710
7.711
7.712
7.713
7.714
7.715
7.716
7.717
7.718
7.719
7.720
7.721
7.722
7.723
7.724
7.725
7.726
7.727
7.728
7.729
7.730
7.731
7.732
7.733
7.734
7.735
7.736
7.737
7.738
7.739
7.740
7.741
7.742
7.743
7.744
7.745
7.746
7.747
7.748
7.749
7.750
7.751
7.752
7.753
7.754
7.755
7.756
7.757
7.758
7.759
7.760
7.761
7.762
7.763
7.764
7.765
7.766
7.767
7.768
7.769
7.770
7.771
7.772
7.773
7.774
7.775
7.776
7.777
7.778
7.779
7.780
7.781
7.782
7.783
7.784
7.785
7.786
7.787
7.788
7.789
7.790
7.791
7.792
7.793
7.794
7.795
7.796
7.797
7.798
7.799
7.800
7.801
7.802
7.803
7.804
7.805
7.806
7.807
7.808
7.809
7.810
7.811
7.812
7.813
7.814
7.815
7.816
7.817
7.818
7.819
7.820
7.821
7.822
7.823
7.824
7.825
7.826
7.827
7.828
7.829
7.830
7.831
7.832
7.833
7.834
7.835
7.836
7.837
7.838
7.839
7.840
7.841
7.842
7.843
7.844
7.845
7.846
7.847
7.848
7.849
7.850
7.851
7.852
7.853
7.854
7.855
7.856
7.857
7.858
7.859
7.860
7.861
7.862
7.863
7.864
7.865
7.866
7.867
7.868
7.869
7.870
7.871
7.872
7.873
7.874
7.875
7.876
7.877
7.878
7.879
7.880
7.881
7.882
7.883
7.884
7.885
7.886
7.887
7.888
7.889
7.890
7.891
7.892
7.893
7.894
7.895
7.896
7.897
7.898
7.899
7.900
7.901
7.902
7.903
7.904
7.905
7.906
7.907
7.908
7.909
7.910
7.911
7.912
7.913
7.914
7.915
7.916
7.917
7.918
7.919
7.920
7.921
7.922
7.923
7.924
7.925
7.926
7.927
7.928
7.929
7.930
7.931
7.932
7.933
7.934
7.935
7.936
7.937
7.938
7.939
7.940
7.941
7.942
7.943
7.944
7.945
7.946
7.947
7.948
7.949
7.950
7.951
7.952
7.953
7.954
7.955
7.956
7.957
7.958
7.959
7.960
7.961
7.962
7.963
7.964
7.965
7.966
7.967
7.968
7.969
7.970
7.971
7.972
7.973
7.974
7.975
7.976
7.977
7.978
7.979
7.980
7.981
7.982
7.983
7.984
7.985
7.986
7.987
7.988
7.989
7.990
7.991
7.992
7.993
7.994
7.995
7.996
7.997
7.998
7.999
7.1000

GENERAL NOTES

SCOPE OF WORK:

THE WORK OF THIS PROJECT INCLUDES, BUT IS NOT LIMITED TO:
- REMEDIATE ALL MULTI CANOPY CITY SYSTEM.
- REPAIRING AND REPLACING PLASTERWORK AROUND THE CHIMNEYS
- INSTALLING NEW CHIMNEY CAPS.
- LIMITED ROOF WORK INCLUDING REMOVAL AND REPLACEMENT OF BROKEN OR MISSING SLATE.
- MASONRY REPAIRS, INCLUDING REPOINTING, REMOVAL AND REPLACEMENT OF BROKEN BRICK MASONRY UNITS IN IDENTIFIED LOCATIONS, REINFORCING STRUCTURAL CRACKS IN BRICK MASONRY WALLS, AND LIMITED MASONRY CLEANING.
- INSTALLING STAINLESS STEEL BIRDS LINER/REPAIR FLASHING, JACK ARCHES AND REPAIRING THE BRICK MASONRY.
- ADDING MASONRY STEPS UNDERNEATH THE HOUSE DOORS OF THE FIRST FLOOR.
- TYING THE MASONRY WALLS TOGETHER BY INSTALLING STRUCTURAL STEEL RODS AND RATTICED PLATES.
- FRAMING REPAIRS, INCLUDING SISTERING DETERIORATED AND/OR DETERIORATED WOODEN MEMBERS, REPLACING DETERIORATED WOODEN MEMBERS, AND STRAIGHTENING INADEQUATE CONNECTIONS.
- INSTALLING 'K' METER BRACKETS.
- REPAIRING THE NORTH AND SOUTH PORTICO.
- REPAIRING INTERIOR FINISHES DAMAGED DURING THE STRUCTURAL WORK.
- REPAIRING WINDOWS, INCLUDING REGLAZING, REPAINTING, AND POSSIBLE REPLACEMENT OF ELEMENTS.
- SHORING, REPAIRING, AND REPAINTING ALL EXTERIOR MILLWORK.
- CLEANING OF THE BASEMENT AND CRAWL SPACES, INCLUDING REMOVING ALL ABANDONED WIRING AND CLUTTER, TYING UP ALL FUNCTIONING WIRING IN BASEMENT, REMOVING ALL LOOSE AND FALLEN INSULATION, REPLACING AS NECESSARY, AND RE-INSULATING CRAWL SPACE.
- INSTALLING NEW SUMP/VAPOR BARRIER DRAINAGE
- REPAIRING THE BRICK WALL.
- REPAINTING THE EAST GARDEN WALL.
- REPAINTING THE SOUTH GARDEN WALL AND GATE POSTS.

GENERAL:
WORK ON THIS HISTORIC BUILDING REQUIRES EXTRAORDINARY CARE. DURING ALL PHASES OF STRUCTURAL WORK, PRESERVE AND PROTECT ALL OF THE CONSTRUCTION THAT SPECIFICALLY CALLED OUT FOR PRESERVE. THE BUILDING ELEMENTS INCLUDE, BUT ARE NOT LIMITED TO: EXISTING MASONRY STRUCTURAL WORK, MASONRY CLASS, AND DECORATIVE FINISHES. STRUCTURAL WORK MAY REQUIRE DISASSEMBLY OF ADDITIONAL BUILDING ELEMENTS INCLUDING, BUT NOT LIMITED TO: MECHANICAL SYSTEMS, ELECTRICAL SYSTEMS, MASONRY, MILLWORK, PLASTER, PLUMBING, SECURITY SYSTEMS, IT SYSTEMS, AND FIRE SUPPRESSING ETC. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO DETERMINE WHAT MUST BE REMOVED OR TEMPORARILY RELOCATED AND WHAT MUST BE MAINTAINED IN SERVICE. IT IS ALSO THE RESPONSIBILITY OF THE CONTRACTOR TO RESTORE THESE SYSTEMS OR BUILDING ELEMENTS AS PART OF THIS PROJECT.

THIS BUILDING WILL REMAIN IN USE DURING ENTIRE CONSTRUCTION PERIOD. IT IS POSSIBLE THAT SIGNIFICANT PORTIONS OF THE BUILDING CAN BE TURNED OVER TO THE OWNER/USER AT TIMES DURING THE CONSTRUCTION. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO COORDINATE ALL WORK WITH THE BUILDING OCCUPANTS AND TO MAINTAIN ALL LIFE SAFETY SYSTEMS INCLUDING MEANS OF EGRESS.

NOTE THAT ALL SURVEY AND ELEVATIONS ARE APPROXIMATE. CONTRACTOR SHALL VERIFY ALL DIMENSIONS, SLOPES, AND ELEVATIONS PRIOR TO ANY FABRICATION.

THE CONTRACTOR IS REQUIRED TO HAVE A FULL SET OF CONSTRUCTION DOCUMENTS ON SITE AND READILY AVAILABLE AT ALL TIMES. BOTH DRAWINGS AND SPECIFICATIONS.

IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO THOROUGHLY CLEAN ALL ELEMENTS OF THE BUILDING UPON COMPLETION OF THE STRUCTURAL WORK OF SAID PROJECT. CLEAN AND RETURN TO ORIGINAL CONDITION ALL AREAS USED FOR LAY DOWN, STORAGE, AND CONSTRUCTION OPERATIONS DURING THE STRUCTURAL WORK. SEE ARCHITECTURAL DRAWINGS AND SPECIFICATIONS FOR SPECIFIC REQUIREMENTS.

IT IS THE RESPONSIBILITY OF THE OWNER TO DETERMINE WHETHER OR NOT ANY HAZARDOUS MATERIALS ARE PRESENT IN THE AREAS IN WHICH WORK IS CONDUCTED.

ALL PAINT IS TO BE TREATED WITH THE ASSUMPTION THAT IT CONTAINS LEAD UNLESS TESTED AND OTHERWISE. THE CONTRACTOR SHALL IMPLEMENT CONTROL OF ALL HAZARDOUS MATERIALS WHICH BECOME EXPOSED DURING ANY PORTION OF CONSTRUCTION, COMPLYING WITH ALL APPLICABLE REGULATIONS AND LAWS.

REQUIRED SUBMITTALS:
THE FOLLOWING SUBMITTALS ARE REQUIRE BY THE OWNER'S OF RECORD:
- CONSTRUCTION SEQUENCING.
- WORK DESCRIPTIONS.
- QUALIFICATION REQUIREMENTS.
- SHORING AND SHORING SEQUENCE. (DETAILS BY A PE REGISTERED IN SC)
- SHOP DRAWINGS.
- MASONRY MATERIALS.
- SEE SPECIFICATIONS FOR ADDITIONAL SUBMITTAL REQUIREMENTS.

CONSTRUCTION SEQUENCING:
CONTRACTOR SHALL SUBMIT CONSTRUCTION SPECIFICATIONS TO OWNER/ENGINEER FOR REVIEW.

EXCAVATION, BRACING, AND SHORING:
CONTRACTOR IS REQUIRED TO HIRE A BRACING AND SHORING ENGINEER TO DESIGN ALL EXCAVATION, BRACING AND SHORING FOR THIS PROJECT. DESIGN CALCULATIONS AND WORKING DRAWINGS OF ALL PROPOSED SHORING OF THE STRUCTURE SHALL BE PREPARED, STAMPED, AND SIGNED BY A PE REGISTERED IN SC. THE ENGINEER OF RECORD SHALL OBSERVE ALL BRACING AND SHORING AND APPROVE PRIOR TO ANY SELECTIVE DEMOLITION OF CONSTRUCTION. SEE REQUIREMENTS FOR NOTIFYING OWNER PRIOR TO STARTING OBSERVATIONS. SEE SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.

CONCRETE:
ALL CONCRETE CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF ACI 301 AND ACI 117 WITH ACCEPTED ADMIXTURES AND PERMITTED WITH APPROVAL BUT NOT REQUIRED. APPROPRIATE HOT AND COLD WEATHER CONCRETE PROCEDURES MUST BE FOLLOWED, IF APPLICABLE.

CONCRETE FOR FOUNDATION WALLS, FOOTINGS, AND SLABS SHALL HAVE A MINIMUM 28 DAY COMPRESSIVE STRENGTH OF 4,000 PSI AND SHALL BE NORMAL WEIGHT UNLESS NOTED OTHERWISE. ALL REINFORCING SHALL COMPLY WITH ASTM SPECIFICATION A615, GRADE 60, DEFORMED. EXPOSED TO SPECIAL REQUIREMENTS INDICATED IN THE SPECIFICATIONS.

MINIMUM LAP SPLICE LENGTHS FOR ALL CONCRETE REINFORCING SHALL BE AS FOLLOWS:
1) #3 – 18 INCHES
2) #4 – 25 INCHES
3) #5 – 31 INCHES
4) #6 – 37 INCHES
5) #7 – 53 INCHES
6) #8 – 61 INCHES
7) #9 – 84 INCHES
8) #10 – 96 INCHES
9) #11 – 85 INCHES

MINIMUM CONCRETE CLEAR COVER SHALL BE AS FOLLOWS:
1) CONCRETE CAST AGAINST EARTH: 3 INCHES.
2) CONCRETE CAST AGAINST FORMS BUT EXPOSED TO WEATHER OR EARTH: 2 INCHES.
3) INTERIOR SLABS, WALLS, AND JOISTS: ¾ INCHES.
4) ALL OTHER INTERIOR CONCRETE COLUMNS, BEAMS, ETC: 1 ½ INCHES.

SEE SPECIFICATION SECTION 033000 "CAST-IN-PLACE CONCRETE" FOR ADDITIONAL REQUIREMENTS, FIELD QUALITY CONTROL REQUIREMENTS, AND SPECIAL INSPECTION REQUIREMENTS.

MASONRY:
SEE SPECIFICATION SECTION 042000 "UNIT MASONRY" AND SECTION 042200 "REPOINTING, REMOVING, AND REPLACING BRICK MASONRY" FOR ALL MASONRY MASONRY WORK THAT MAY BE REQUIRED TO COMPLETE STRUCTURAL REPAIRS AS INDICATED.

SEE SECTION 042000 UNIT MASONRY ASSEMBLIES FOR NEW MASONRY CONSTRUCTION IN CRAWL SPACE.

STEEL:
ALL NEW STRUCTURAL STEEL, UNLESS OTHERWISE NOTED, SHALL COMPLY WITH THE REQUIREMENTS OF ASTM SPECIFICATION A36 OR A572, GRADE 50, AND SHALL BE HOT-DIP GALVANIZED AFTER FABRICATION, COMPLYING WITH ASTM A123/A123M AND TOUCHED UP AFTER INSTALLATION AND FULLY COATED WITH THE SPECIFIED COATING SYSTEM. ALL WELDS, WHERE IN CONTACT WITH BRICK MASONRY, ALL WORK MUST COMPLY WITH THE REQUIREMENTS OF THE AISC MANUAL OF STEEL CONSTRUCTION, 14TH EDITION, AND WITH AWS D1.1.

ALL STRUCTURAL STEEL UNLESS EMBEDDED IN MASONRY SHALL BE STAINLESS STEEL, TYPE 304, SHAL 316 OR 316L, UNLESS OTHERWISE INDICATED.

ALL STEEL IN CONTACT WITH PRESSURE TREATED WOOD SHALL BE STAINLESS STEEL TYPE 304, SHAL 316 OR 316L, UNLESS OTHERWISE INDICATED.

ALL NEW CAST IRON PATTRESS PLATES SHALL COMPLY WITH THE REQUIREMENTS OF ASTM A48 AND SHALL BE TOUGH, OR ALL ASSTS SEE SPECIFICATIONS.

ALL ANY LOCATION WHERE ANY OF GALVANIZED STEEL IS IN CONTACT WITH STAINLESS STEEL, CAST IRON, OR ANY OTHER DISSIMILAR METAL, METALS MUST BE ELECTRICALLY ISOLATED WITH A TEFLON PAD OR SIMILAR.

BOLTS FOR STEEL TO STEEL CONNECTIONS SHALL COMPLY WITH REQUIREMENTS OF ASTM A325 AND SHALL BE HOT DIP GALVANIZED.

BOLTS AND NUTS, OTHER THAN HEXAGON-HEAD BOLTS, ASTM A307, GRADE A, WITH HEX NUTS, ASTM A563, AND WASHERS, FLAT WASHERS AND SHALL BE HOT DIP GALVANIZED.

SEE SPECIFICATION SECTION 055000 "METAL FABRICATIONS" FOR ADDITIONAL REQUIREMENTS, INCLUDING SURFACE PREPARATION STANDARDS FOR HOT DIP GALVANIZING AND REQUIRED TOUCH-UP AFTER INSTALLATION. SEE ALSO SPECIFICATION SECTION 099600 "METAL COATINGS" FOR COATING SYSTEM REQUIRED ON ALL HOT DIP GALVANIZED STEEL AND CAST IRON.

WELDING SHALL COMPLY WITH AWS D1.1 AND SHALL BE PERFORMED BY CERTIFIED WELDERS. NO FIELD WELDING OR CUTTING SHALL BE PERMITTED.

CONFIRM ALL REBAR AND PLATE LOCATIONS WITH ENGINEER OF RECORD BEFORE DRILLING ANY MASONRY DRILLING, REMOVAL, OR DEMOLITION.

WOOD:
ALL STRUCTURAL WOOD MEMBERS SHALL MEET THE REQUIREMENTS OF SPIB NO. 1 SOUTHERN PINE OR BETTER UNLESS OTHERWISE IDENTIFIED.

ALL WOOD IN CONTACT WITH MASONRY, BRYAN AS SHOWN ON THE DRAWING, OR OTHERWISE NOTED, SHALL BE PRESSURE TREATED, KILN DRIED AFTER TREATMENT, WITH A MAXIMUM MOISTURE CONTENT OF 19 PERCENT. SEE "PRIOR EXPERIENCE" SPECIFICATION FOR REPEATED AND REPETITIVE CONTENT. ALL FASTENERS AND HARDWARE IN CONTACT WITH PRESSURE TREATED WOOD SHALL BE STAINLESS STEEL, TYPE 304, 316, OR 316L, UNLESS OTHERWISE INDICATED.

ALL WOOD FASTENERS SHALL BE PER IBC TABLE 2304.9.1 "FASTENING SCHEDULE" UNLESS OTHERWISE NOTED.

SEE ARCHITECTURAL FOR INTERIOR AND EXTERIOR MILLWORK.

METAL COATINGS:
COATINGS ARE REQUIRED FOR ALL CAST IRON PATTRESS PLATES AND ALL HOT DIP GALVANIZED STEEL. ALL ITEMS MUST BE COATED ON ALL SIDES. SEE SPECIFICATION SECTION 099600 "METAL COATINGS" FOR REQUIREMENTS.

PAINTING:
SEE SECTION 099000 "EXCEPT FOR EXPOSED BRICKWORK.

FOUNDATIONS:
CONTRACTOR SHALL PHOTOMAP SITE AS SPECIFIED IN SECTION 312000 "EARTH MOVING." SEE SPECIFICATIONS FOR SUBSURFACE EXPLORATION, TESTING, AND SPECIAL INSPECTION REQUIREMENTS.

MONITORING:
MONITORING AND RECORDING DURING ALL UNDERPINNING IS REQUIRED. CONTACT EOR FOR REQUIREMENTS FOR ELEVATION SURVEY, CRACK GAUGES, ETC. AT LIFTING.

CODE ANALYSIS:
ALTERATION WORK TO THIS EXISTING STRUCTURE FALLS WITHIN THE REQUIREMENTS OF IBC 2012 CHAPTER 34 FOR EXISTING BUILDINGS. PLEASE REFER TO ARCHITECTURAL DRAWINGS FOR ADDITIONAL INFORMATION.

DESIGN CRITERIA:
2012 INTERNATIONAL BUILDING CODE
ROOF LIVE LOAD: 20 PSF
FLOOR LIVE LOAD: 40 PSF CLASSROOMS
60 PSF 1ST FLOOR PORCH
100 PSF STAIRS (NOT)
ALL OTHERS UNCHANGED

WIND: ULTIMATE DESIGN WIND SPEED 150 MPH
NOMINAL DESIGN WIND SPEED 116 MPH
RISK CATEGORY: II
EXPOSURE: B
APPLICABLE PRESSURE COEFFICIENT

TABLE 5-1 FLOOD HAZARD INFORMATION & FLOOD LOADS

FLOOD HAZARD AREA

Flood Hazard Area: Not any - Existing

ADMIN CERTIFICATION

Not applicable

TABLE 5-3 BASIC BUILDING CODE INFORMATION

Not applicable, existing building in use, No change in occupancy.

TABLE 5-4 BUILDING DESIGN OCCUPANT LOAD

Not applicable

TABLE 5-7 GENERAL FIRE PROTECTION REQUIREMENTS

Not applicable

TABLE 5-8 FIRE RESISTANCE RATING OF BUILDING ELEMENTS

BUILDING ELEMENT	Rating As Required (or None)	Rating As Designed (or None)	Existing, Quality & Design (or F.R. Yes or)	Designed With Protection (or Unp.)
Structural Frame (see OBC Table 601)				
Bearing Walls Exterior Interior (see OBC Table 601)				
Nonbearing Walls & Partitions Exterior Interior (see OBC Table 601 & 602) Note [number] a, [number] apply				
Floor Construction including supporting beams & joists (see OBC Table 601)				
Roof Construction including supporting beams & joists (see OBC Table 601)				
Fire Wall (see OBC Article 3.1.10.1)				
Fire Barrier (see OBC Article 3.1.8.1)				
Shaft Enclosure (see OBC Article 3.2.5.1)				
Fire Partitions (see OBC Article 3.1.8.1)				
Smoking & Protective Cavity for Loadbearing Walls, Arches, etc. (see OBC Article 3.1.8.1)				
Others (as required by Designer)				

Bennett PRESERVATION ENGINEERING

Construction Documents

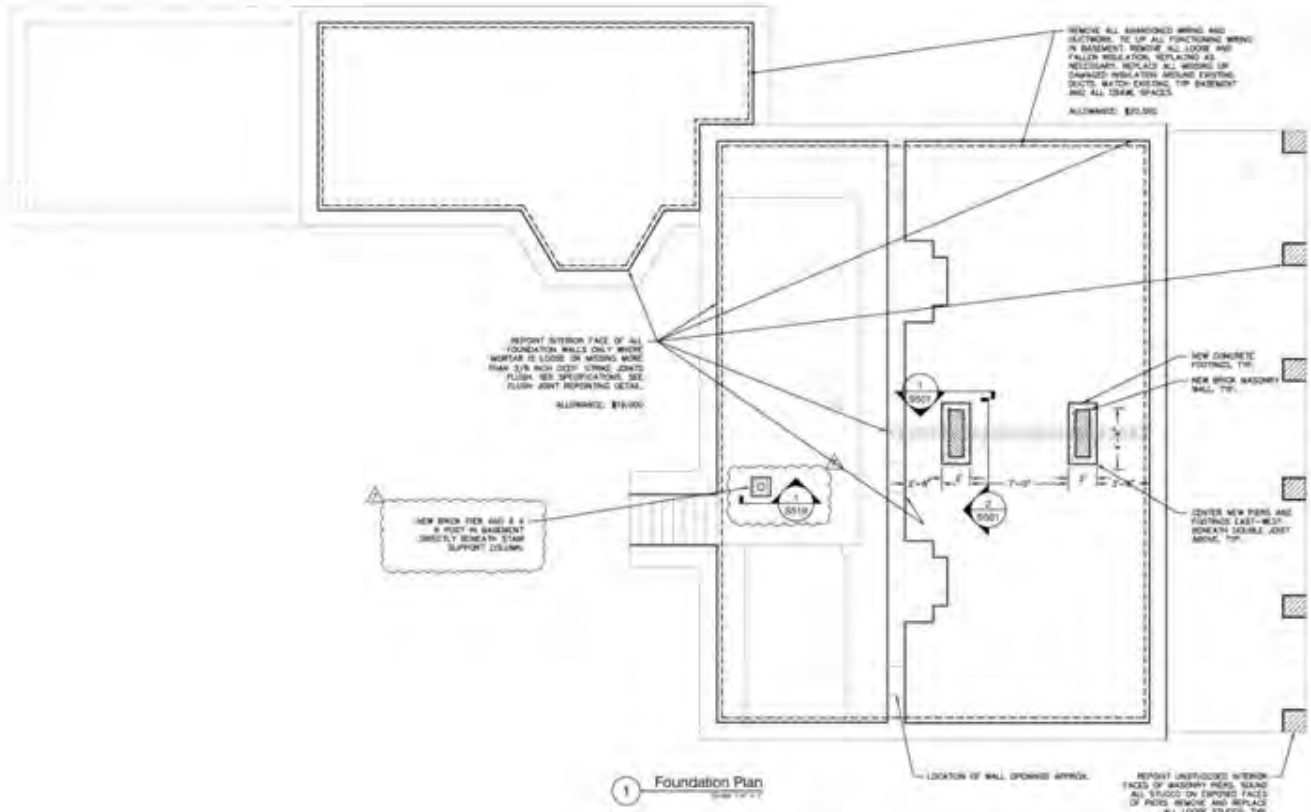
12 Bull Exterior Repairs

Tables

14 May 2015

14-026

S002



1 Foundation Plan

N
PROJECT NORTH

3	JULY 17, 2015
2	OCT 14, 2015

Bennett PRESERVATION ENGINEERING PC

Construction Documents

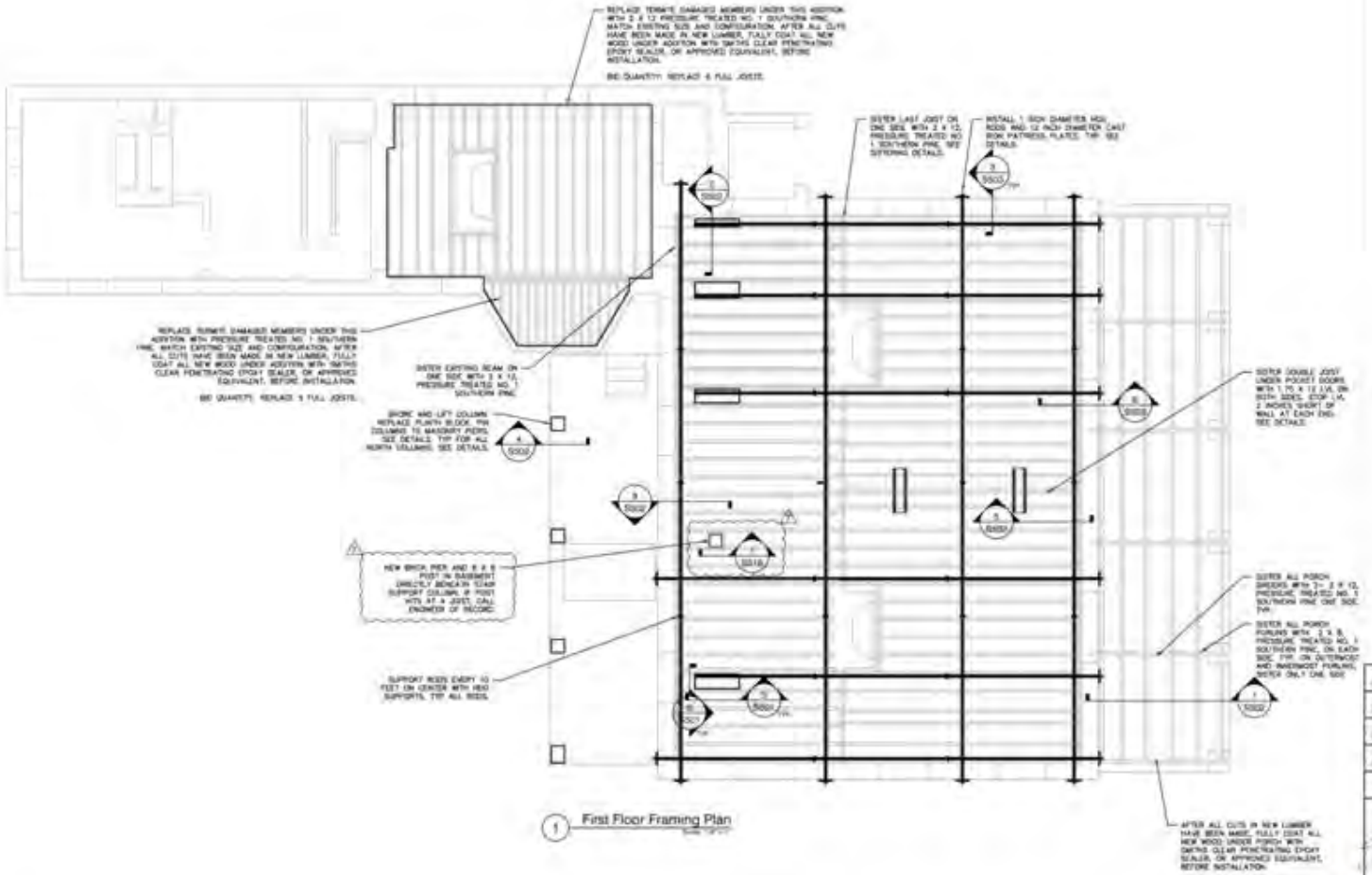
12 Bull Exterior Repairs

Basement Plan

14 May 2015

14-026

S101



Bennett PRESERVATION ENGINEERING PC

1	JULY 8, 2015
2	JULY 17, 2015
3	OCT 1, 2015
4	OCT 14, 2015

Construction Document

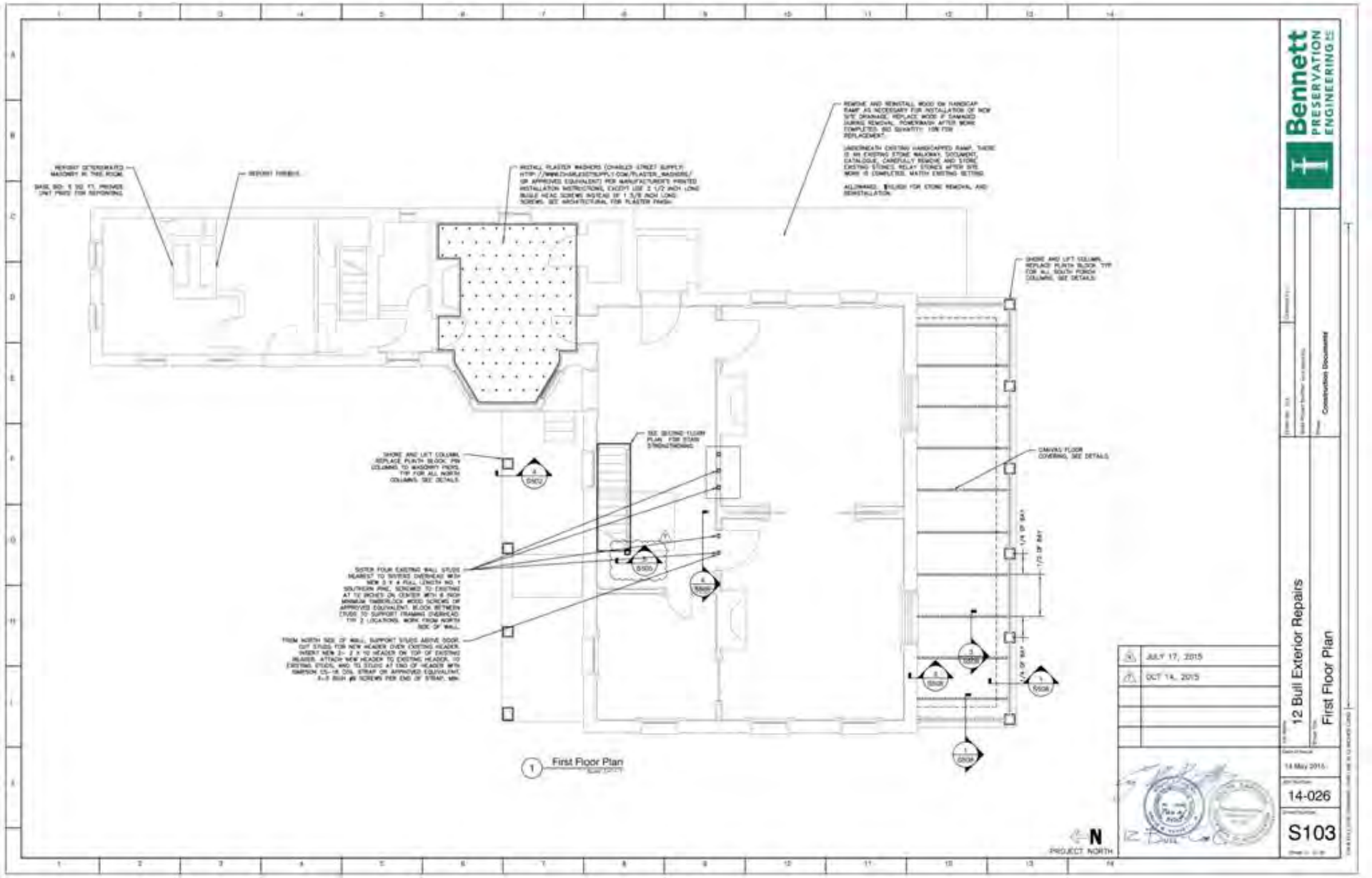
12 Bull Exterior Repairs

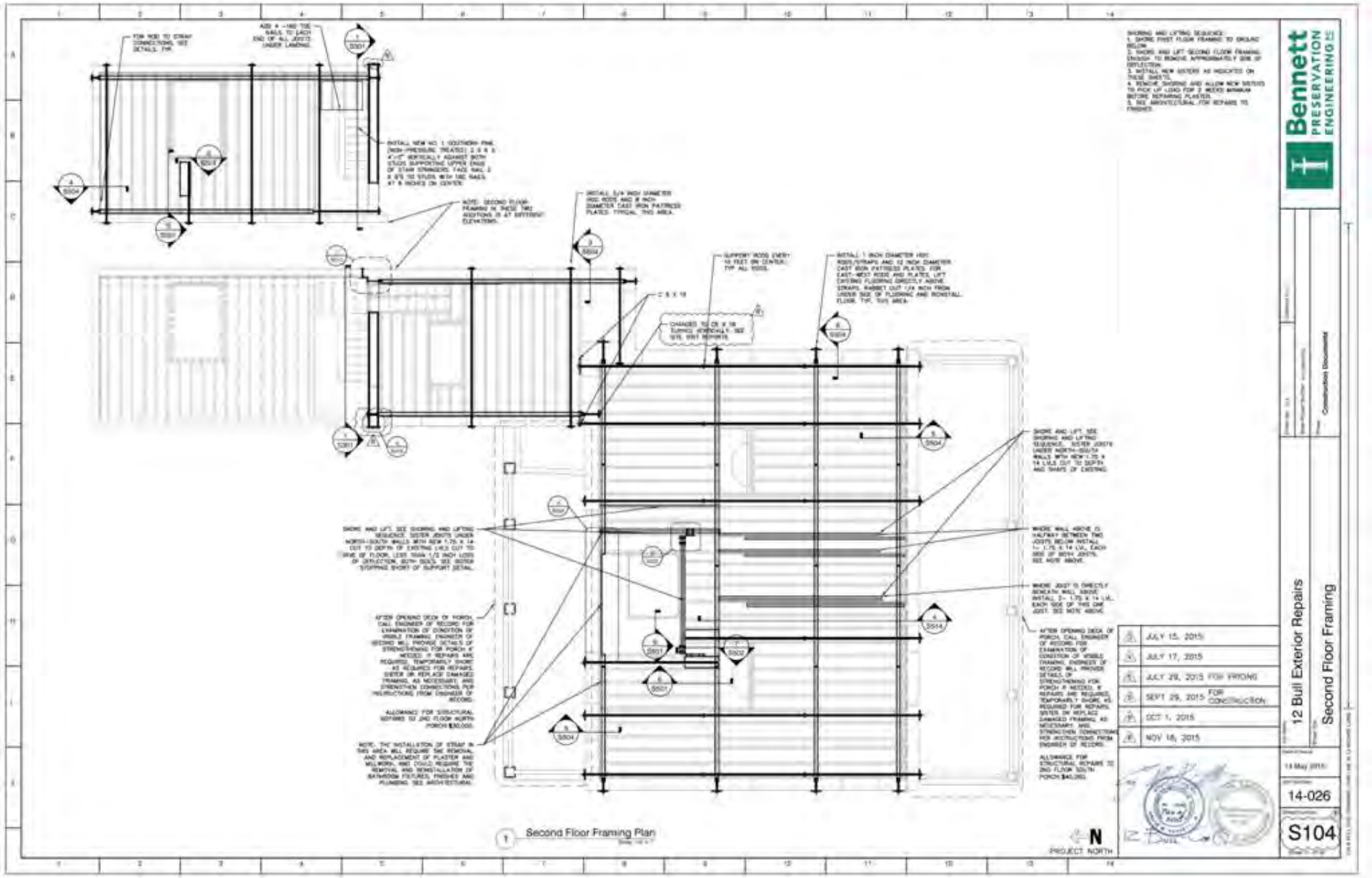
First Floor Framing

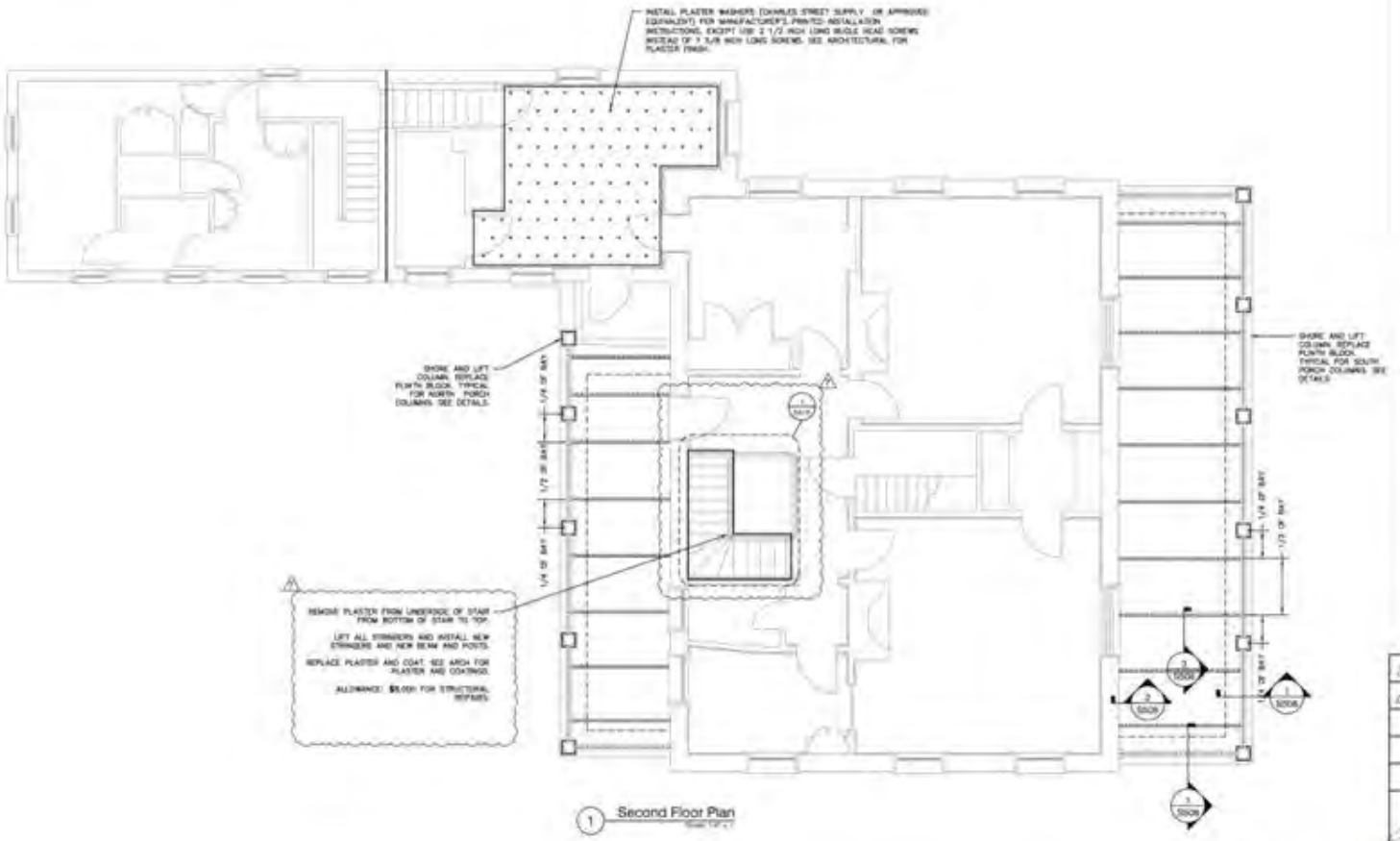
14 May 2015

14-026

S102


Bennett
PRESERVATION ENGINEERING
Construction Document
12 Bull Exterior Repairs
First Floor Plan
JULY 17, 2015
OCT 14, 2015
14 May 2015
14-026
S103
N
PROJECT NORTH
1 First Floor Plan


Second Floor Framing Plan
N
PROJECT NORTH
Bennett PRESERVATION ENGINEERING
12 Bull Exterior Repairs
Second Floor Framing
Construction Document
A JULY 15, 2015
B JULY 17, 2015
C JULY 29, 2015 FOR PRICING
D SEPT 29, 2015 FOR CONSTRUCTION
E OCT 1, 2015
F NOV 18, 2015
14 May 2015
14-026
S104



Bennett PRESERVATION ENGINEERING PLLC

A	JULY 17, 2015
A	OCT 14, 2015

12 Bull Exterior Repairs

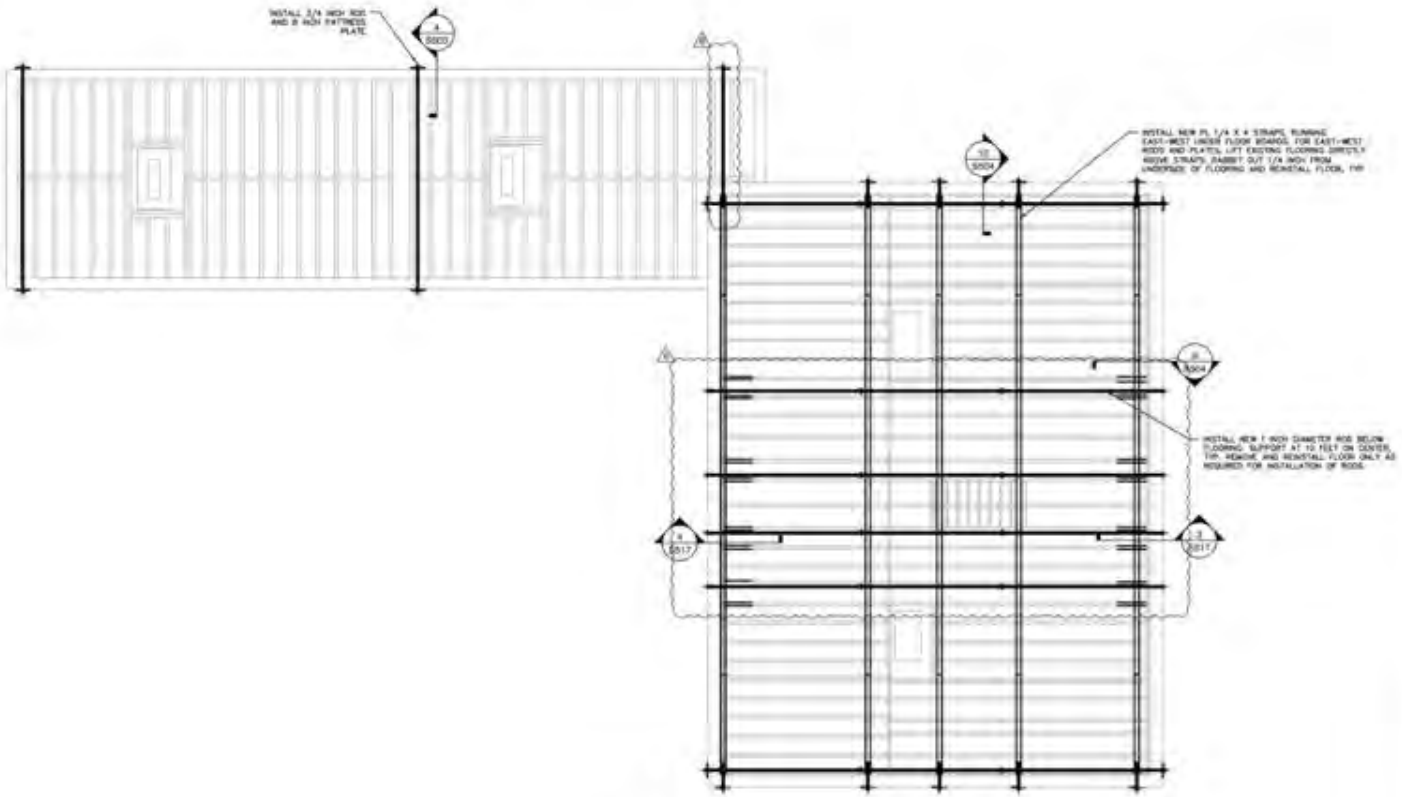
Second Floor Plan

Construction Documents

14 May 2015

14-026

S105



1 Attic Framing Plan

N
PROJECT NORTH

A	July 8, 2015
B	OCT 1, 2015

Bennett PRESERVATION ENGINEERING PC

Construction Documents

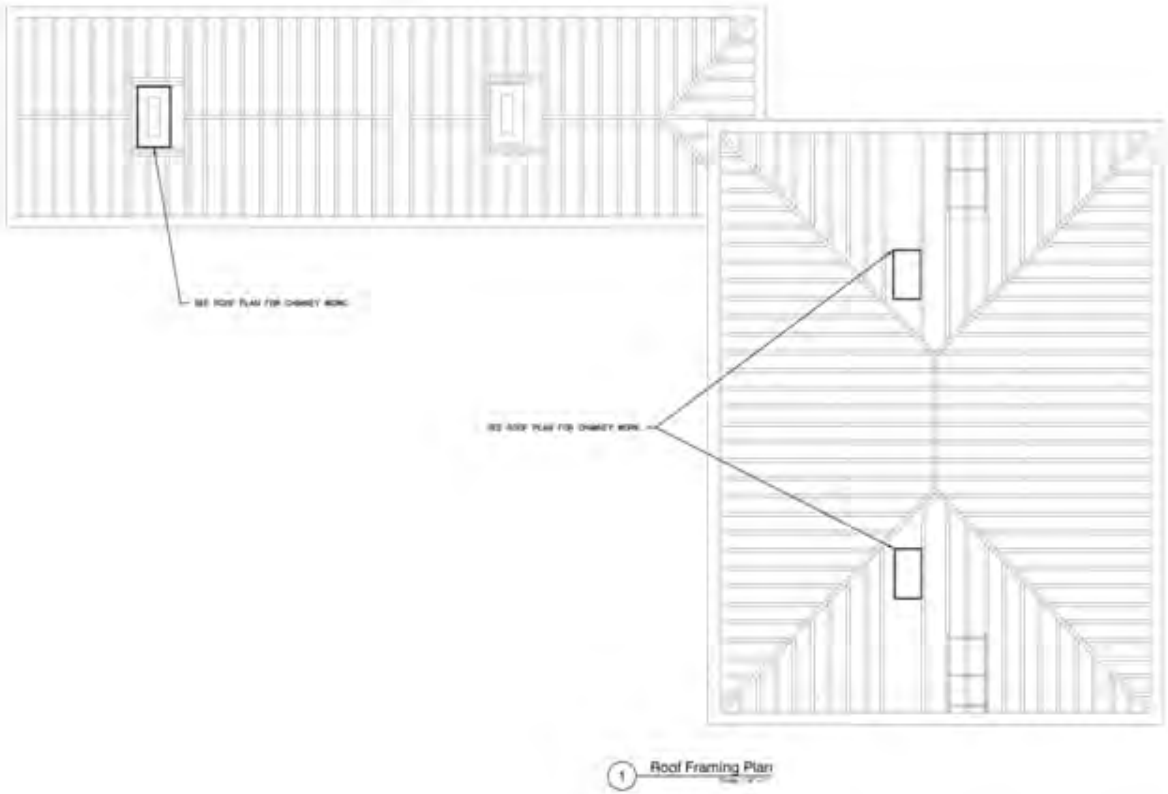
12 Bull Exterior Repairs

Attic Plan

14 May 2015

14-026

S106



1 Roof Framing Plan

N
PROJECT NORTH

Bennett
PRESERVATION ENGINEERING

Construction Documents

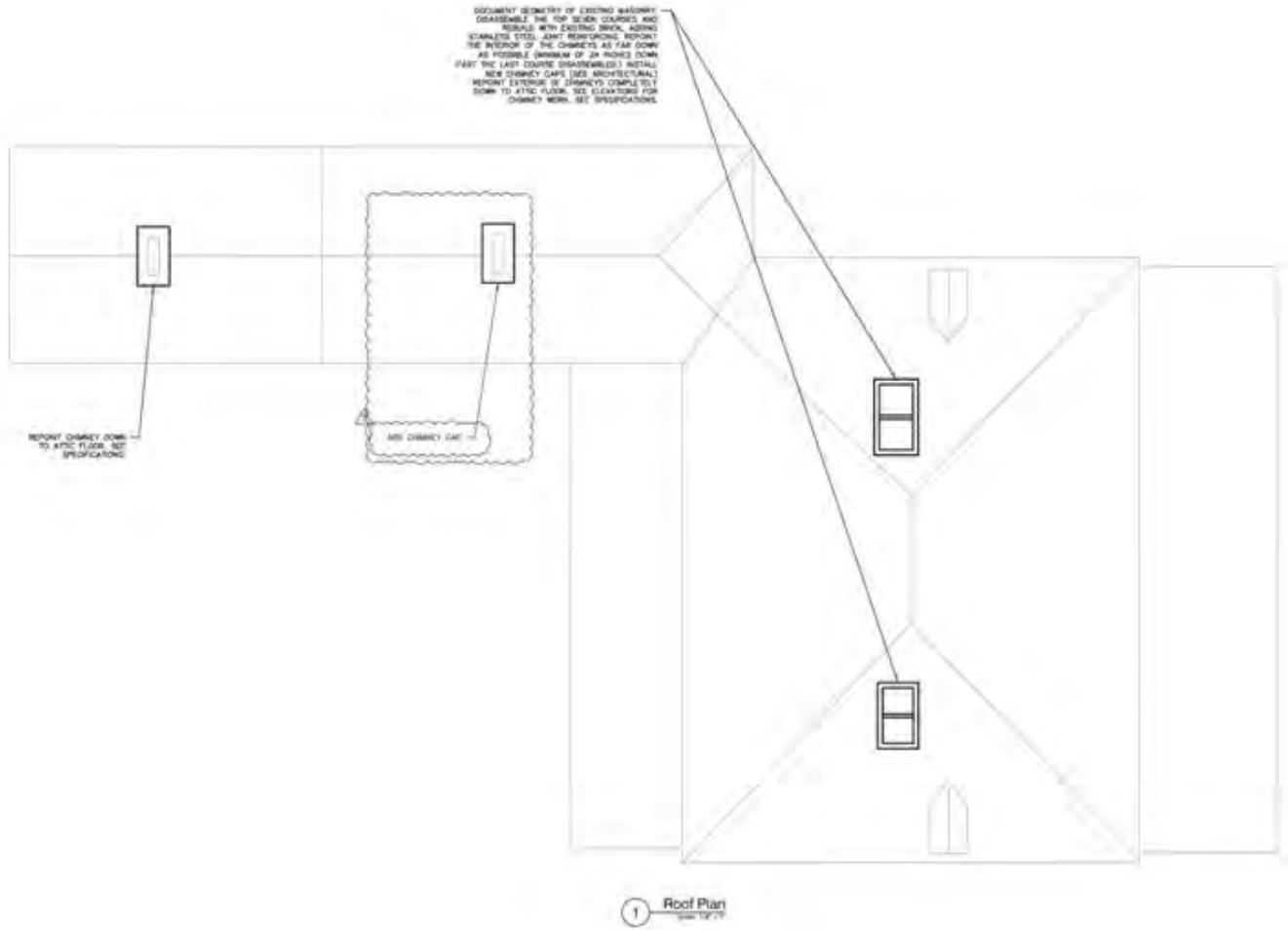
12 Bull Exterior Repairs

Roof Framing Plan

14 May 2015

14-026

S107



1 Roof Plan

Bennett PRESERVATION ENGINEERING

Construction Document

12 Bull Exterior Repairs

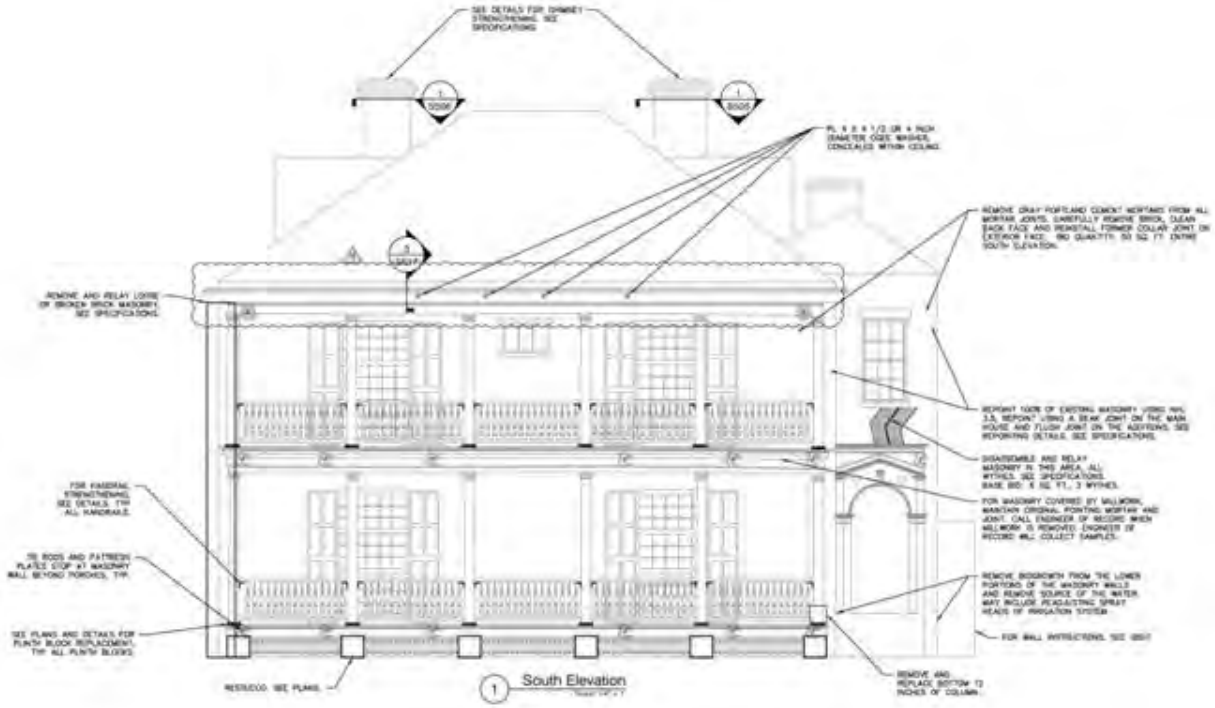
Roof Plan

OCT 1, 2015

14 May 2015

14-026

S108



Bennett PRESERVATION ENGINEERING PC

Construction Document

OCT 1, 2015

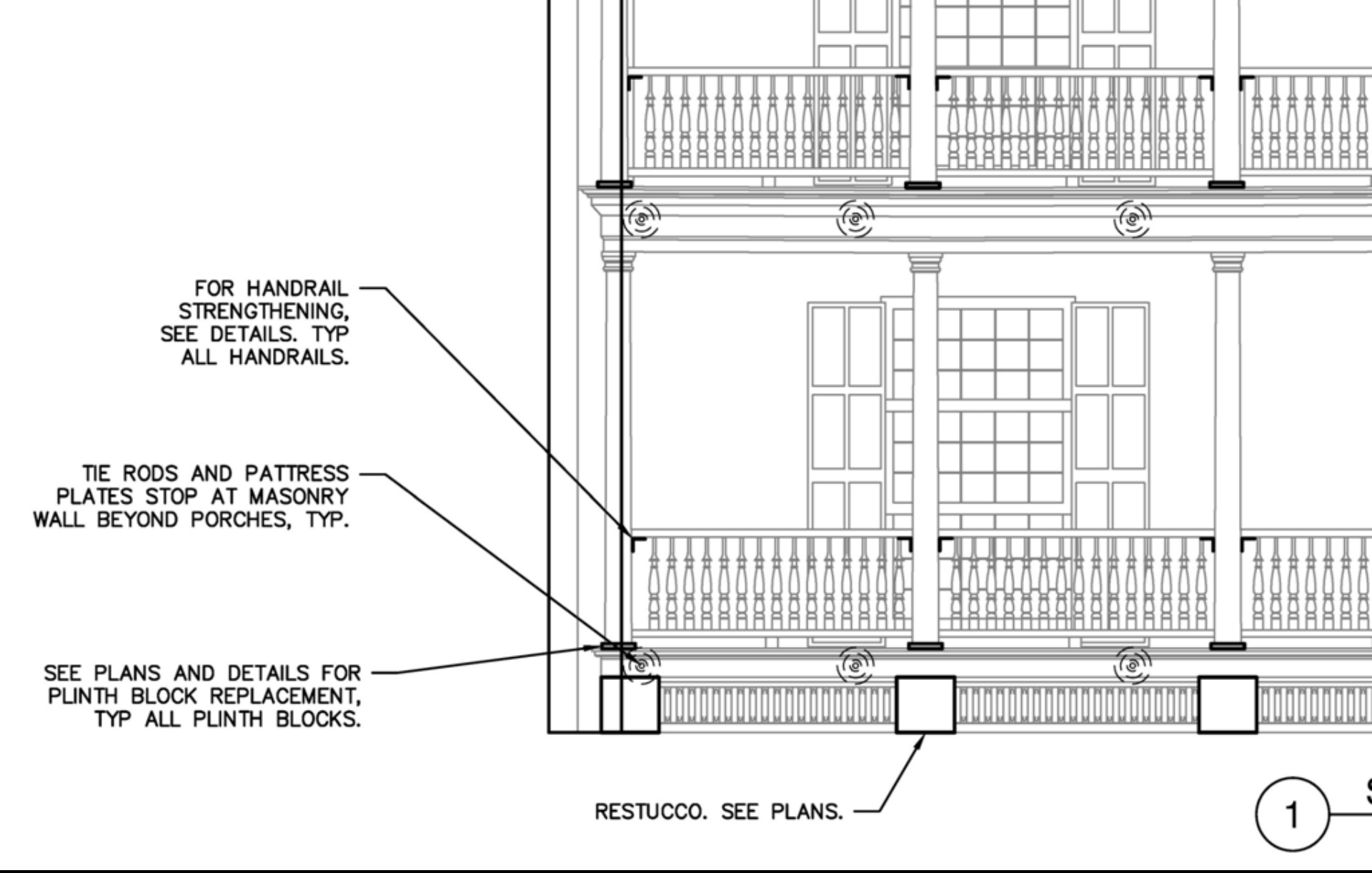
12 Bull Exterior Repairs

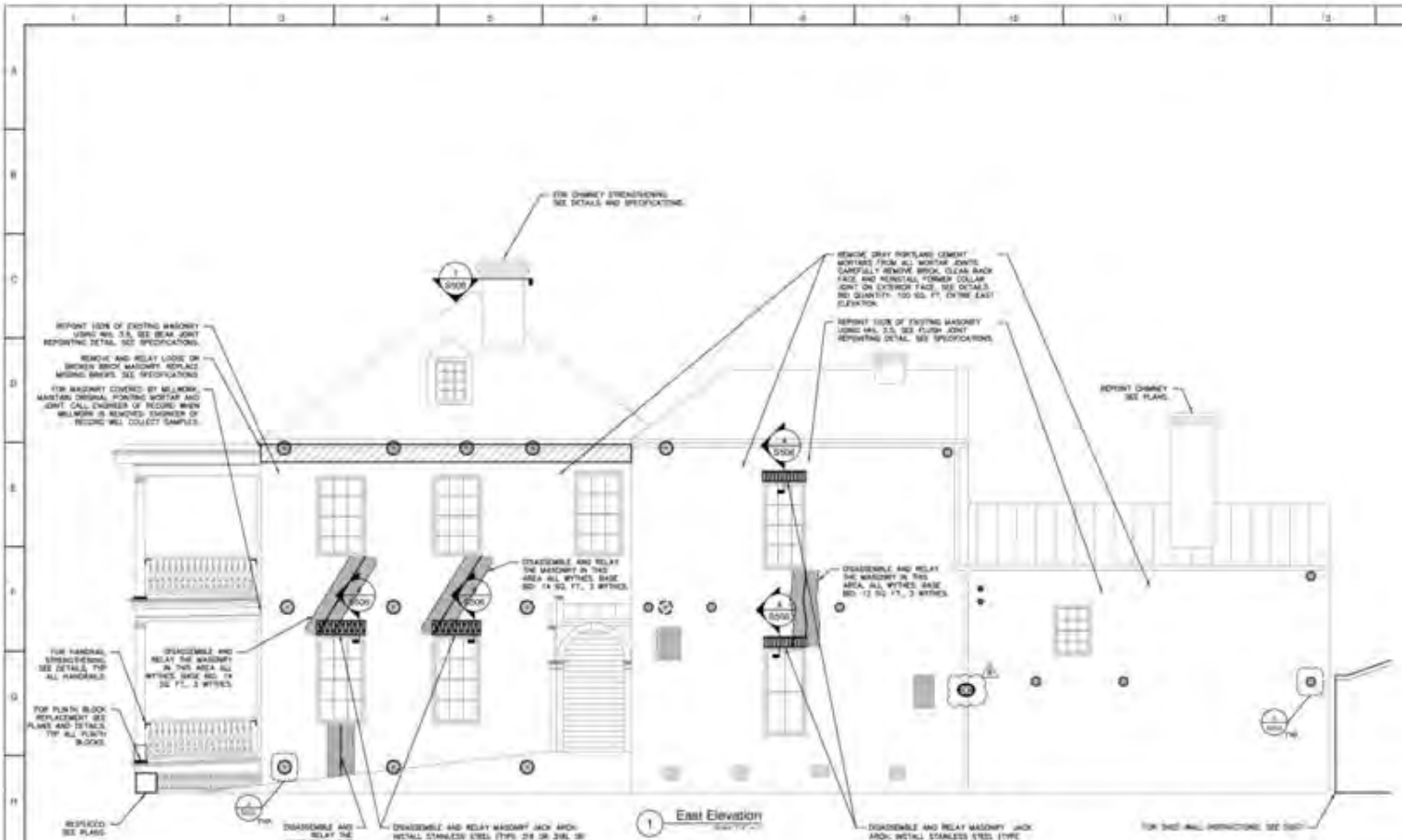
South Elevation

14 May 2015

14-026

S201


FOR HANDRAIL STRENGTHENING, SEE DETAILS. TYP ALL HANDRAILS.
TIE RODS AND PATTRESS PLATES STOP AT MASONRY WALL BEYOND PORCHES, TYP.
SEE PLANS AND DETAILS FOR PLINTH BLOCK REPLACEMENT, TYP ALL PLINTH BLOCKS.
RESTUCCO. SEE PLANS.
1



1	JULY 29, 2015 FOR PRICING
2	SEPT 29, 2015 FOR CONSTRUCTION
3	OCT 1, 2015
4	NOV 16, 2015

Bennett PRESERVATION ENGINEERING

Construction Document

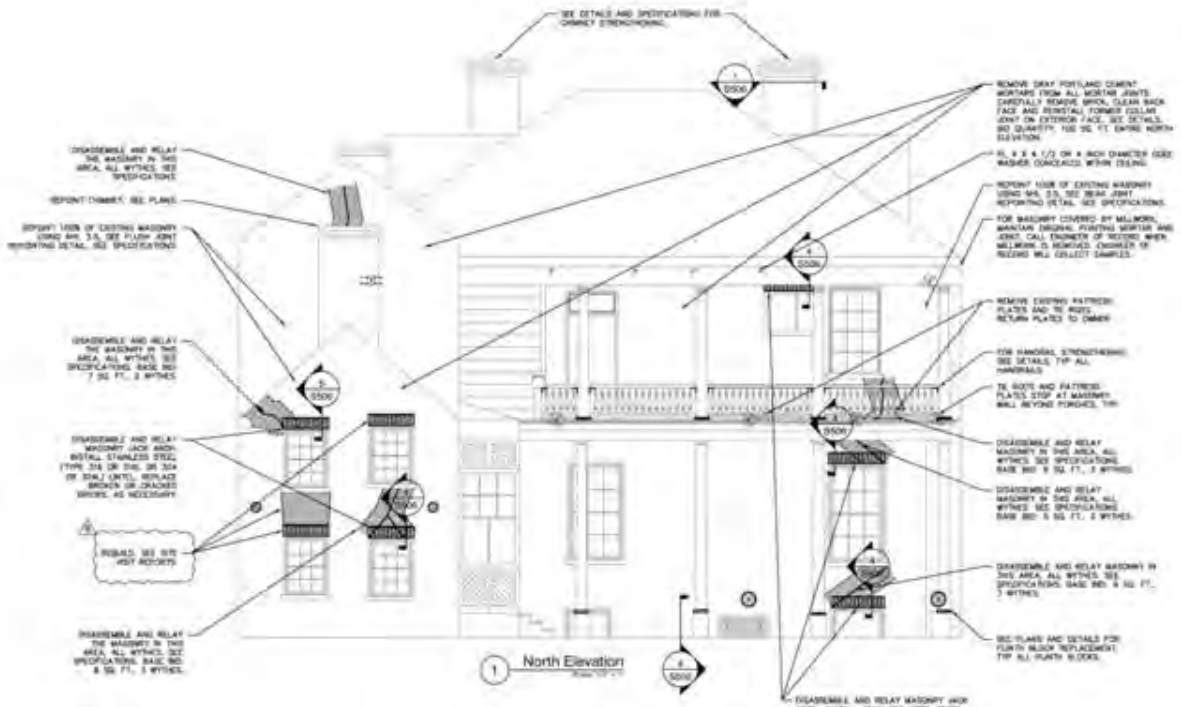
12 Bull Exterior Repairs

East Elevation

14 May 2015

14-026

S202



1	OCT 1, 2015
2	NOV 18, 2015

Bennett PRESERVATION ENGINEERING

Construction Document

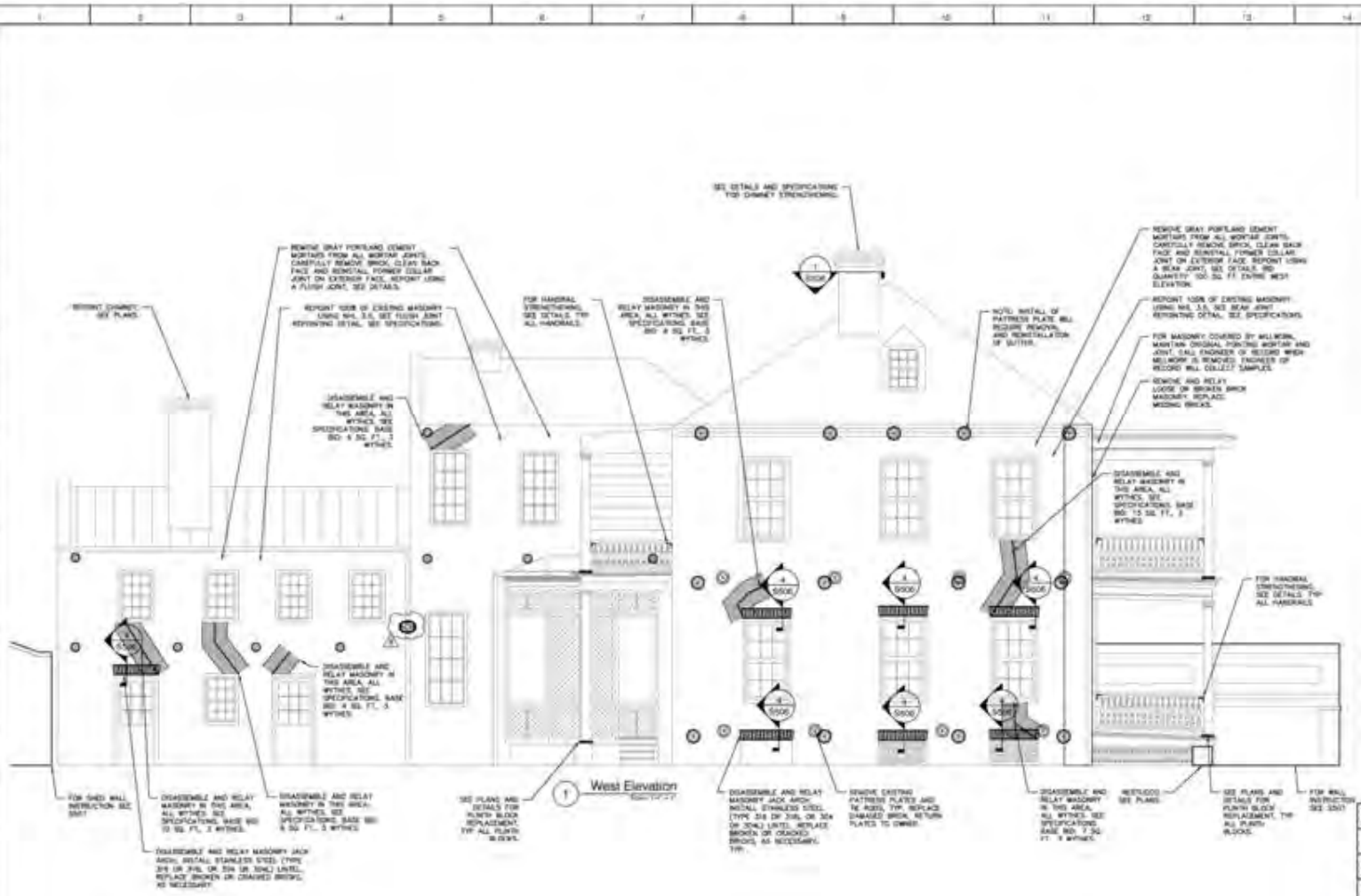
12 Bull Exterior Repairs

North Elevation

14 May 2015

14-026

S203



Bennett PRESERVATION ENGINEERING PC

1.	JULY 29, 2015 FOR PRICING
2.	SEPT 29, 2015 FOR CONSTRUCTION
3.	OCT 1, 2015
4.	NOV 18, 2015

Construction Documents

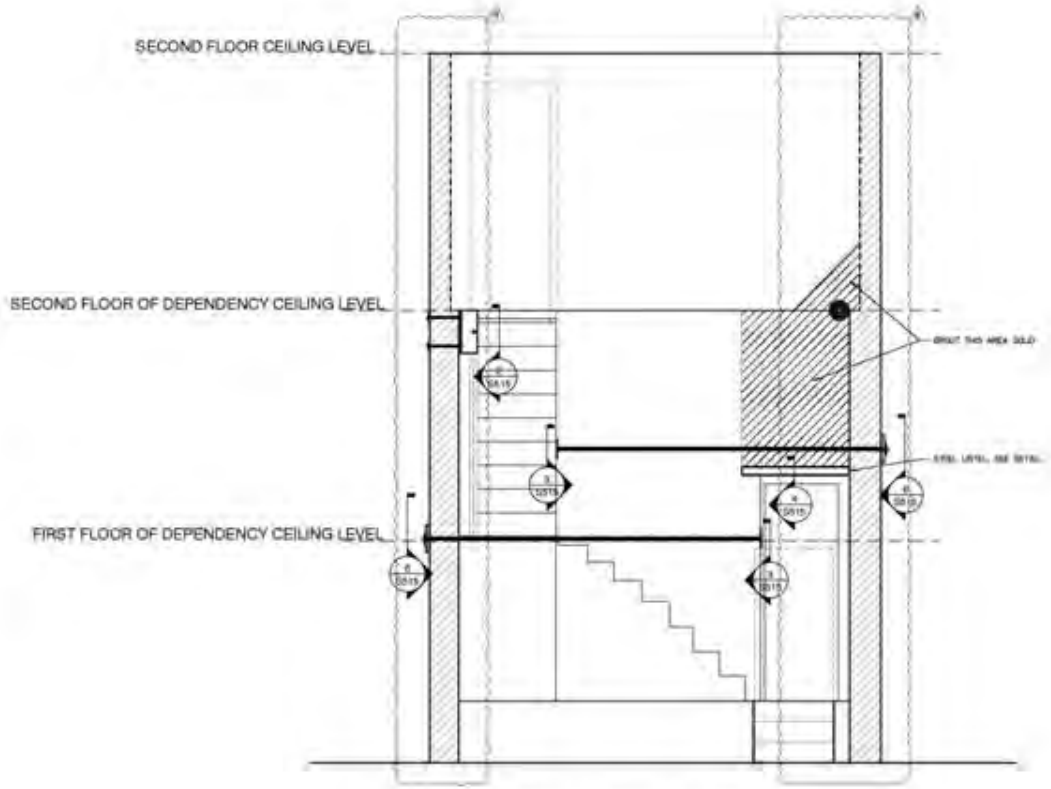
12 Bull Exterior Repairs

West Elevation

14 May 2015

14-026

S204



1 Section of Dependency Wall Looking South

A	JULY 29, 2015 FOR PRICING
B	SEPT 28, 2015 FOR CONSTRUCTION
C	NOV 16, 2015

Bennett PRESERVATION ENGINEERING PC

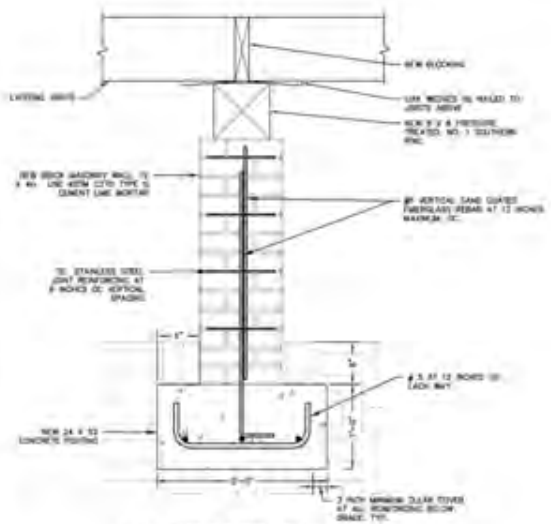
Construction Documents

12 Buil Exterior Repairs

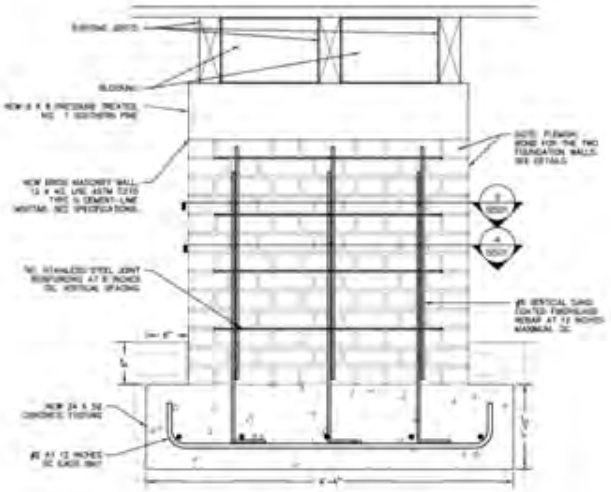
Section of Dependency Wall Looing South

14-026

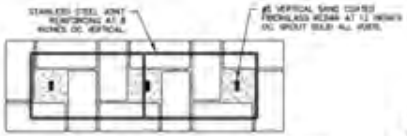
S301



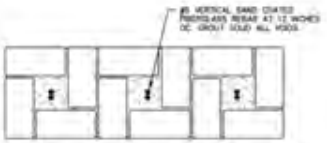
1 Brick Masonry Wall Section



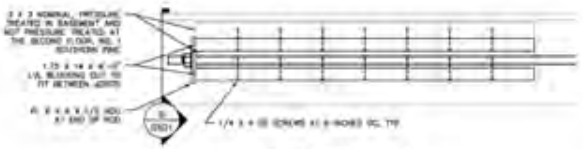
2 Brick Masonry Wall Section



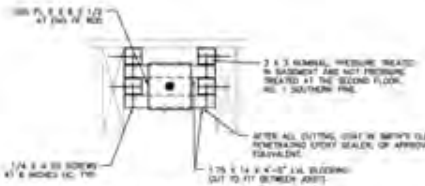
3 Flemish Bond - Course 1 with Joint Reinforcing



4 Flemish Bond - Course 2



5 Tie Rod Vertical Section



6 Tie Rod End Section

Bennett PRESERVATION ENGINEERING

12 Bull Exterior Repairs

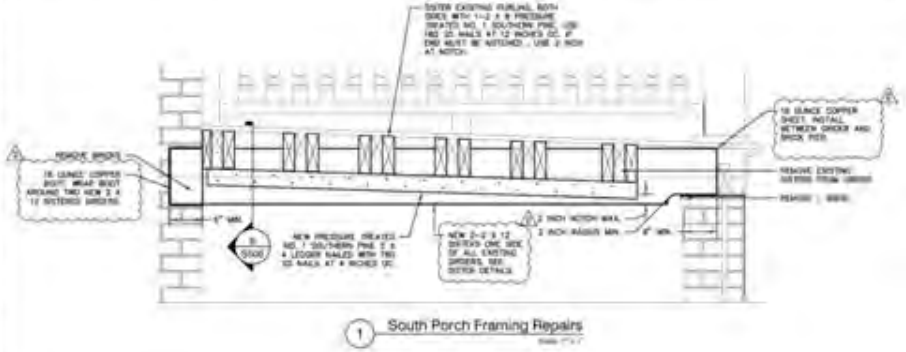
Details

Construction Documents

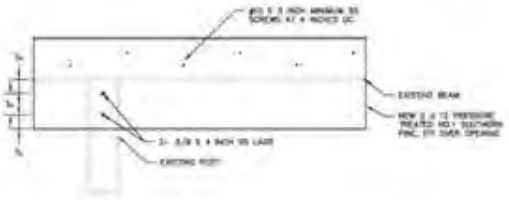
14 May 2015

14-026

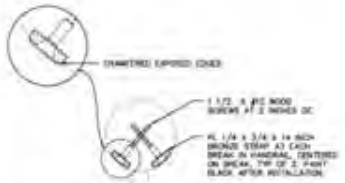
S501



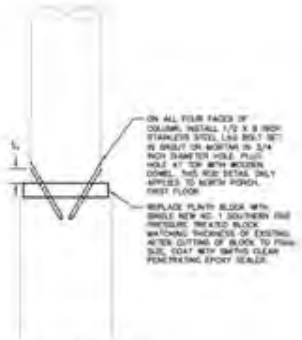
1 South Porch Framing Repairs



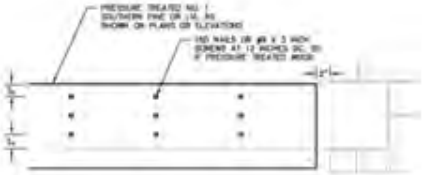
2 Sister Detail



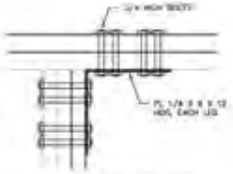
3 Interior Stair Handrail Strengthening



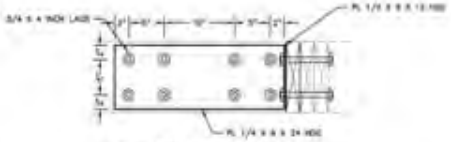
4 Column Stabilization



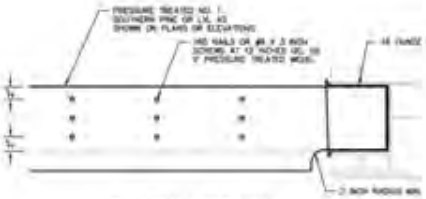
5 Sister Stopping Short of Support



6 Stair Strengthening



7 Stair Strengthening



8 Sister over Support

Bennett PRESERVATION ENGINEERING PC

Construction Documents

12 Bull Exterior Repairs

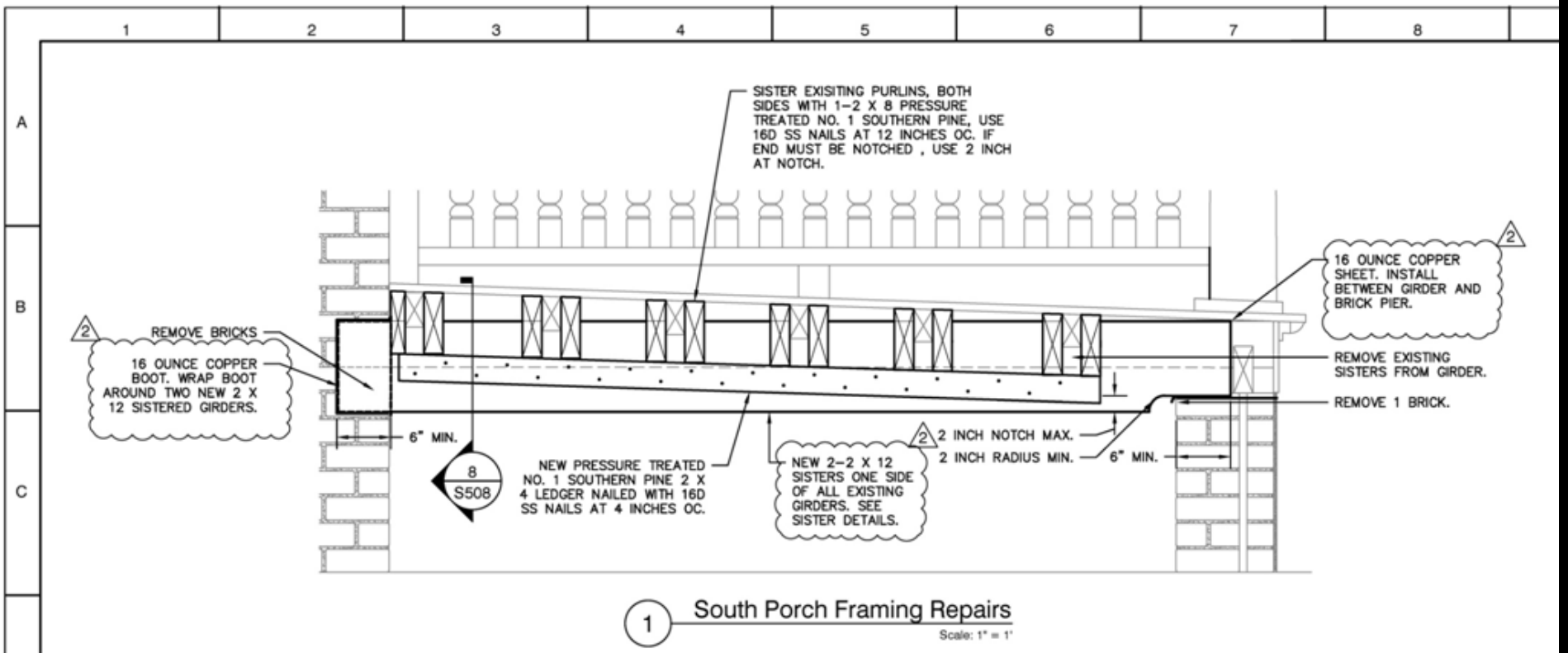
Details

July 8, 2015

14 May 2015

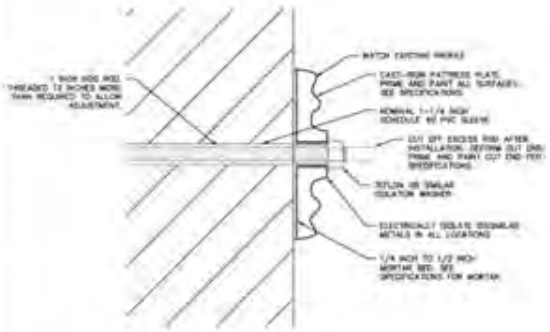
14-026

S502

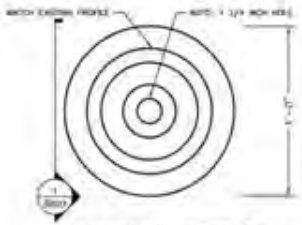


1 South Porch Framing Repairs

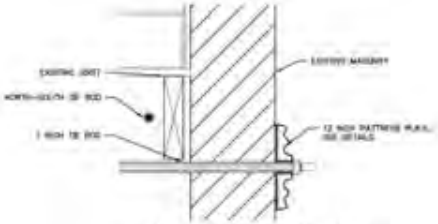
Scale: 1" = 1'



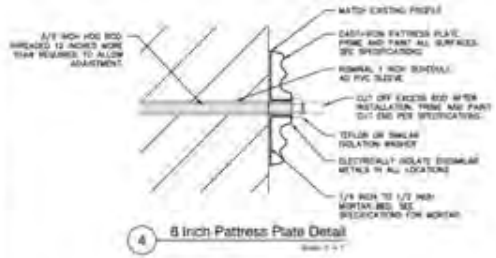
1 12 inch Pattress Plate Detail



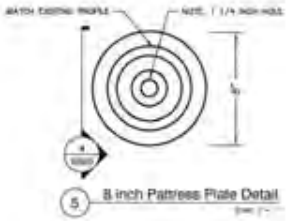
2 12 inch Pattress Plate Detail



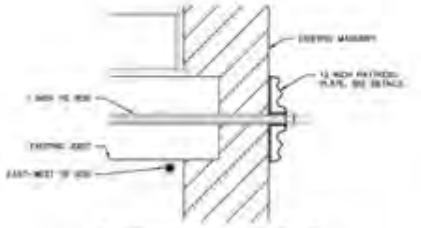
3 First Floor Framing East-West Rod and Pattress Plate Connection



4 8 inch Pattress Plate Detail



5 8 inch Pattress Plate Detail



6 First Floor Framing North-South Rod and Pattrass Plate Connection

Bennett PRESERVATION ENGINEERING

Construction Documents

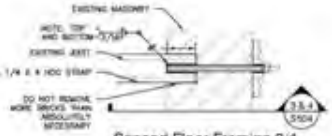
12 Bull Exterior Repairs

Details

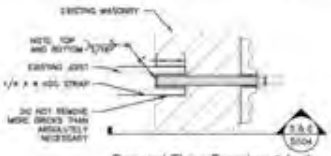
14 May 2015

14-026

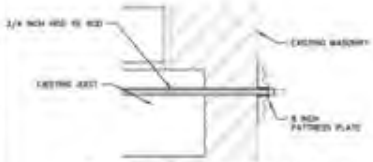
S503



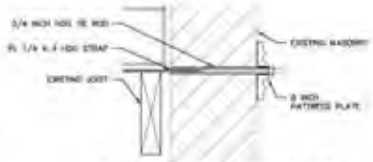
Second Floor Framing 3/4 Inch Rod to Strap Connection



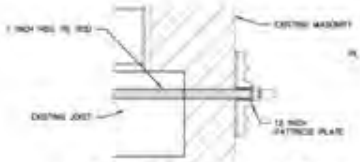
Second Floor Framing 1 Inch Rod to Strap Connection



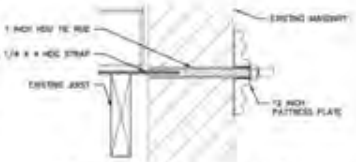
Second Floor Framing 3/4 Inch Rod to Strap Connection Parallel to Joists



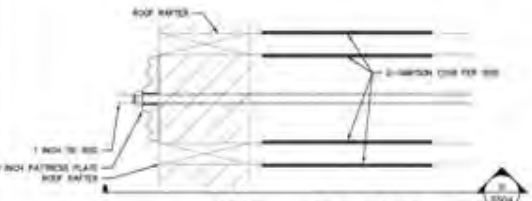
Second Floor Framing 3/4 Inch Rod to Strap Connection Perpendicular to Joists



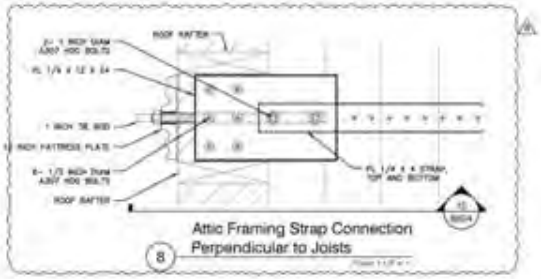
Second Floor Framing 1 Inch Rod to Strap Connection Parallel to Joists



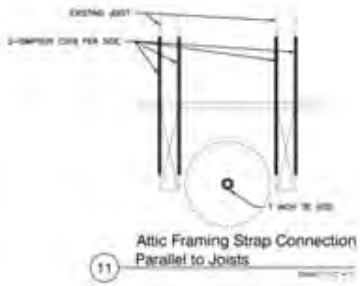
Second Floor Framing 1 Inch Rod to Strap Connection Perpendicular to Joists



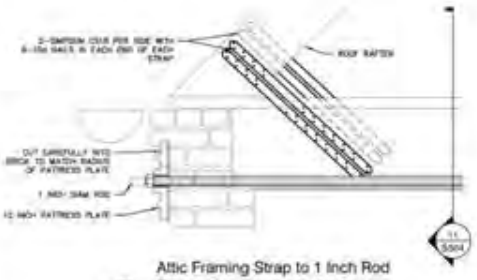
Attic Framing Strap to 1 Inch Rod Connection Parallel to Joists



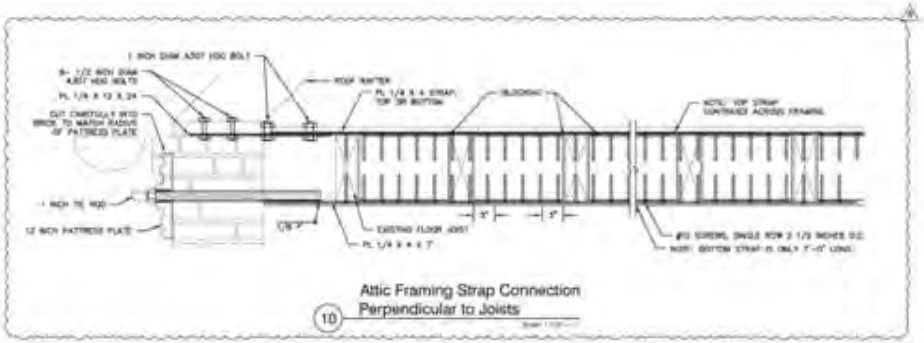
Attic Framing Strap Connection Perpendicular to Joists



Attic Framing Strap Connection Parallel to Joists



Attic Framing Strap to 1 Inch Rod Connection Parallel to Joists



Attic Framing Strap Connection Perpendicular to Joists

Bennett PRESERVATION ENGINEERING

Construction Document

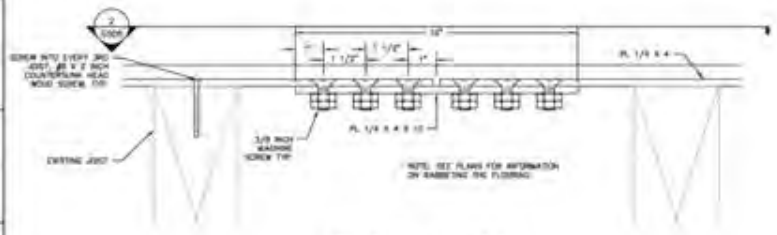
12 Bull Exterior Repairs

Details

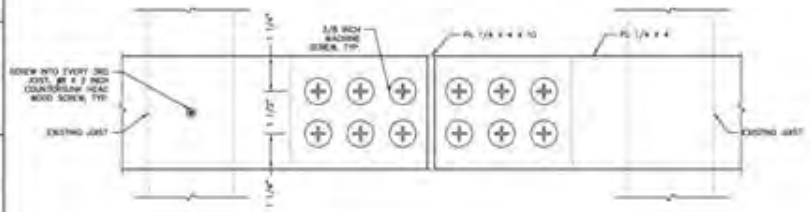
14 May 2015

14-026

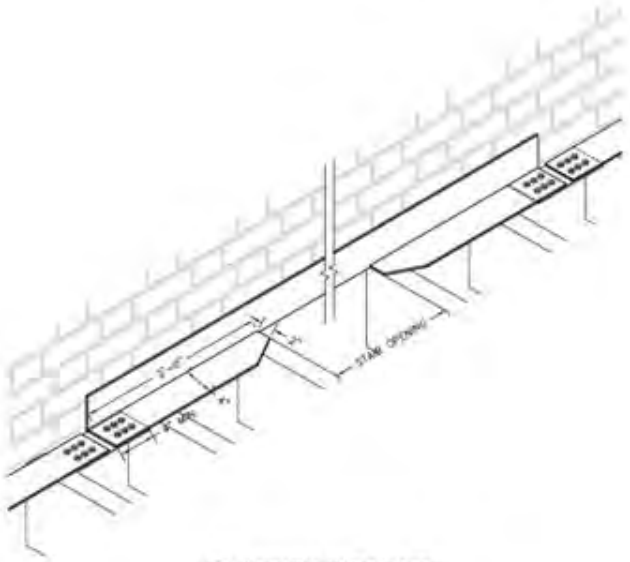
S504



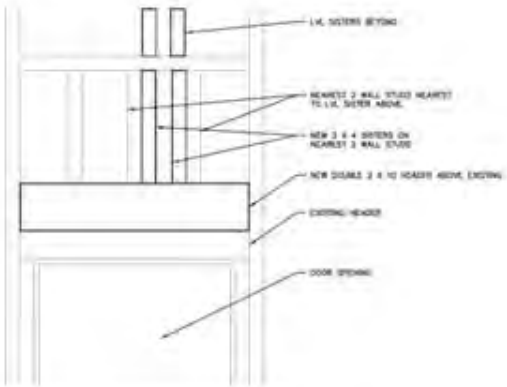
1 Section of Strap Splice



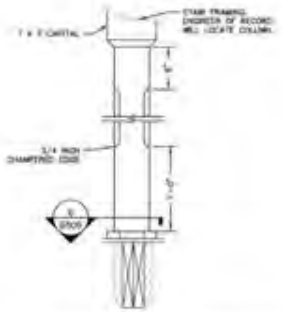
2 Plan of Strap Splice



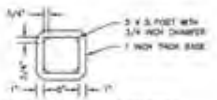
3 Connection of Strap to Angle



4 Elevation of Stud Sistering over Door Opening



5 Section of Interior Stair Support Column



6 Interior Stair Support Column

Bennett PRESERVATION ENGINEERING

Construction Document

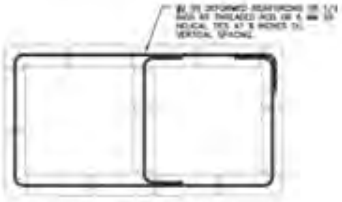
12 Bull Exterior Repairs

Details

14 May 2015

14-026

S505



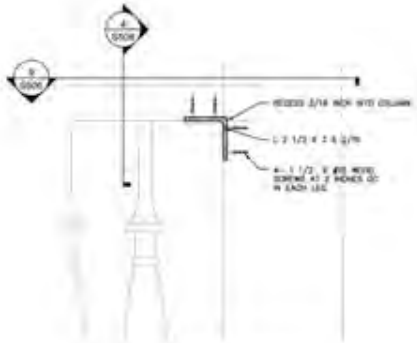
1 Chimney Reinforcing

2 Chimney Reinforcing

3 Beak Joint Pointing

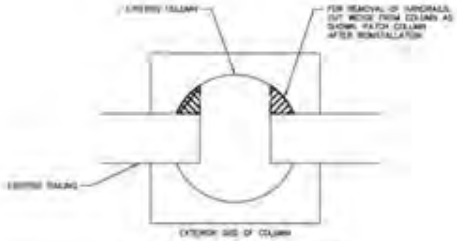
4 Steel Lintel Detail

5 Steel Lintel Detail 2 Wythes

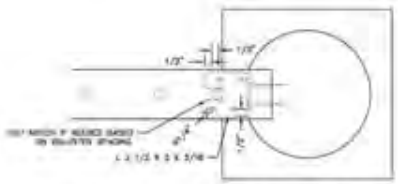


6 Exterior Handrail Strengthening

7 Flush Joint Repointing



8 Column and Handrail Repair



9 Column and Handrail Connection - Plan

Bennett PRESERVATION ENGINEERING

Construction Document

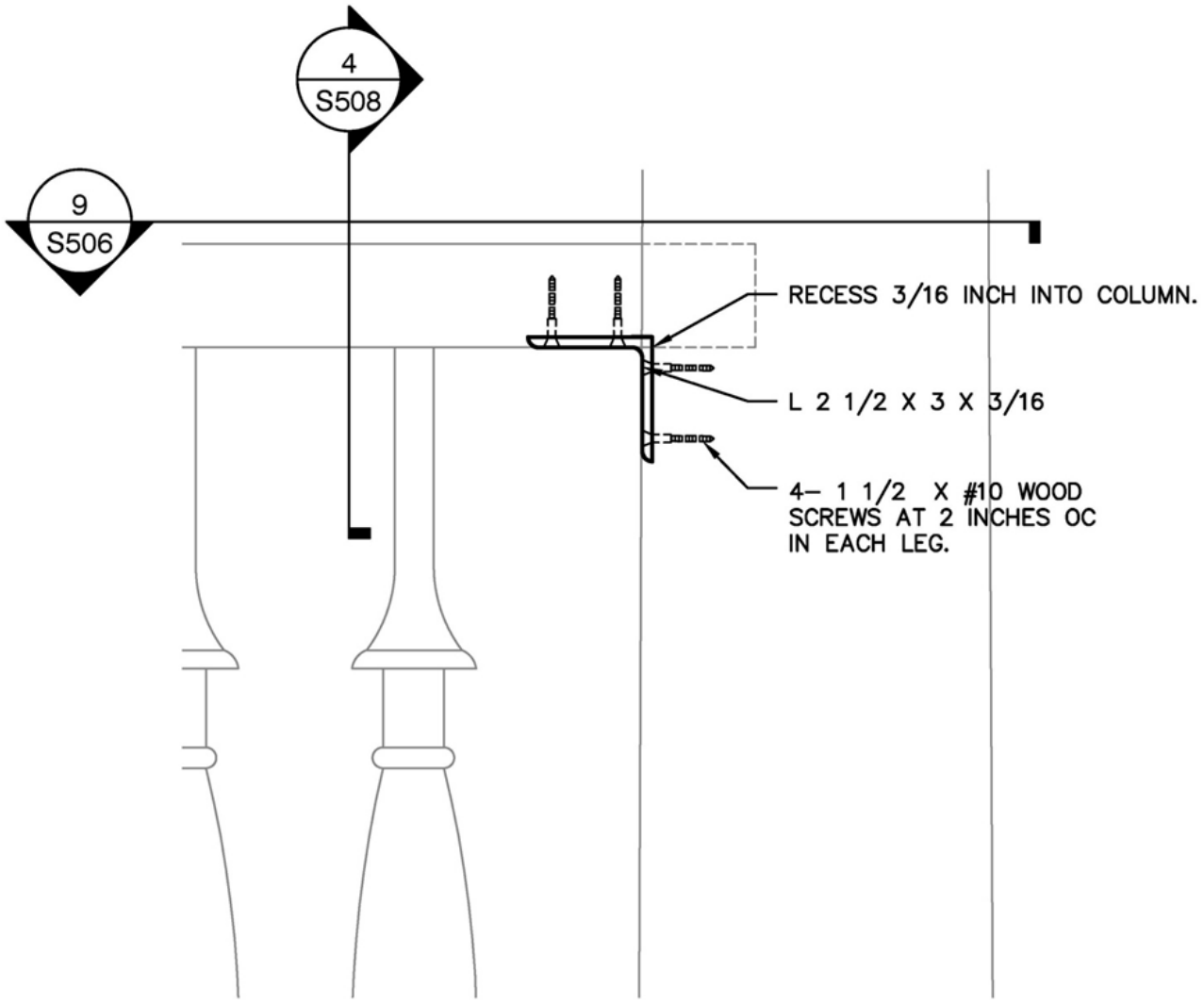
12 Bull Exterior Repairs

Details

18 May 2015

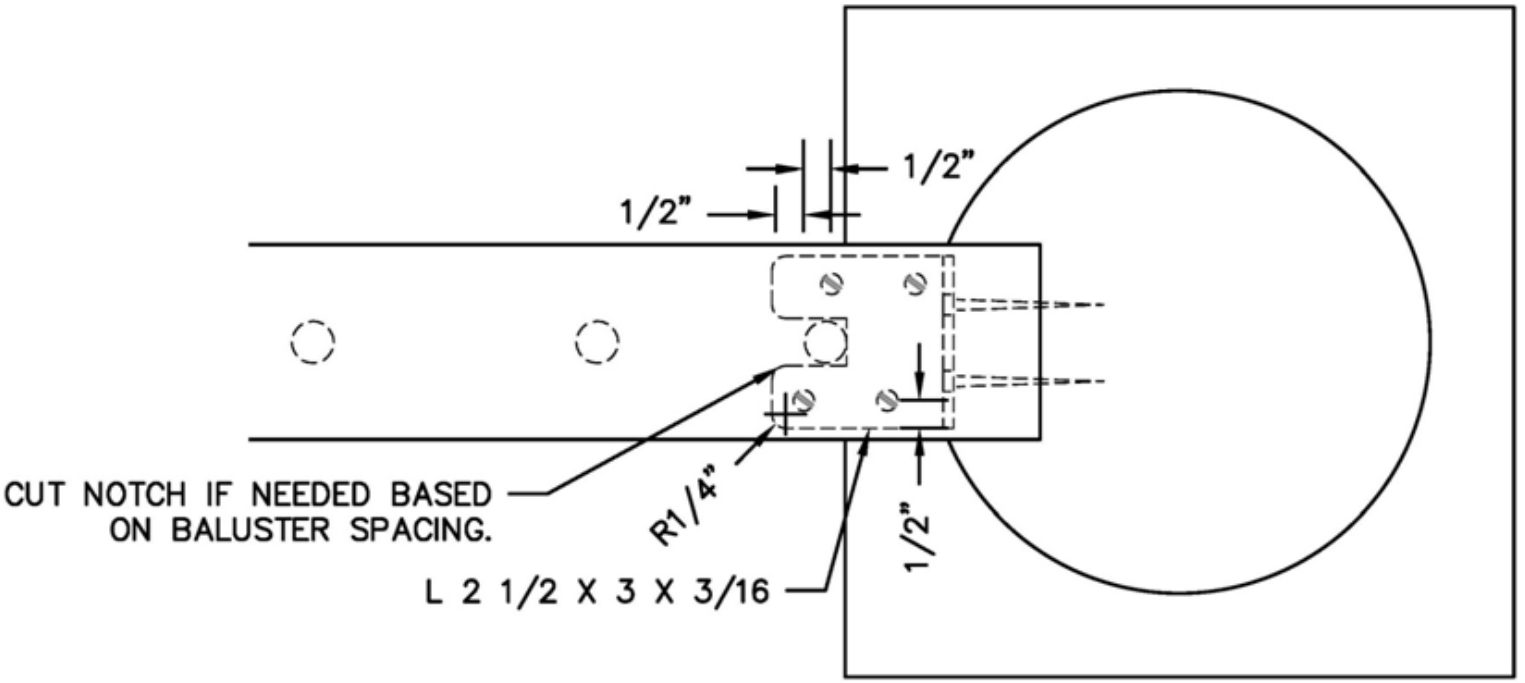
14-026

S506



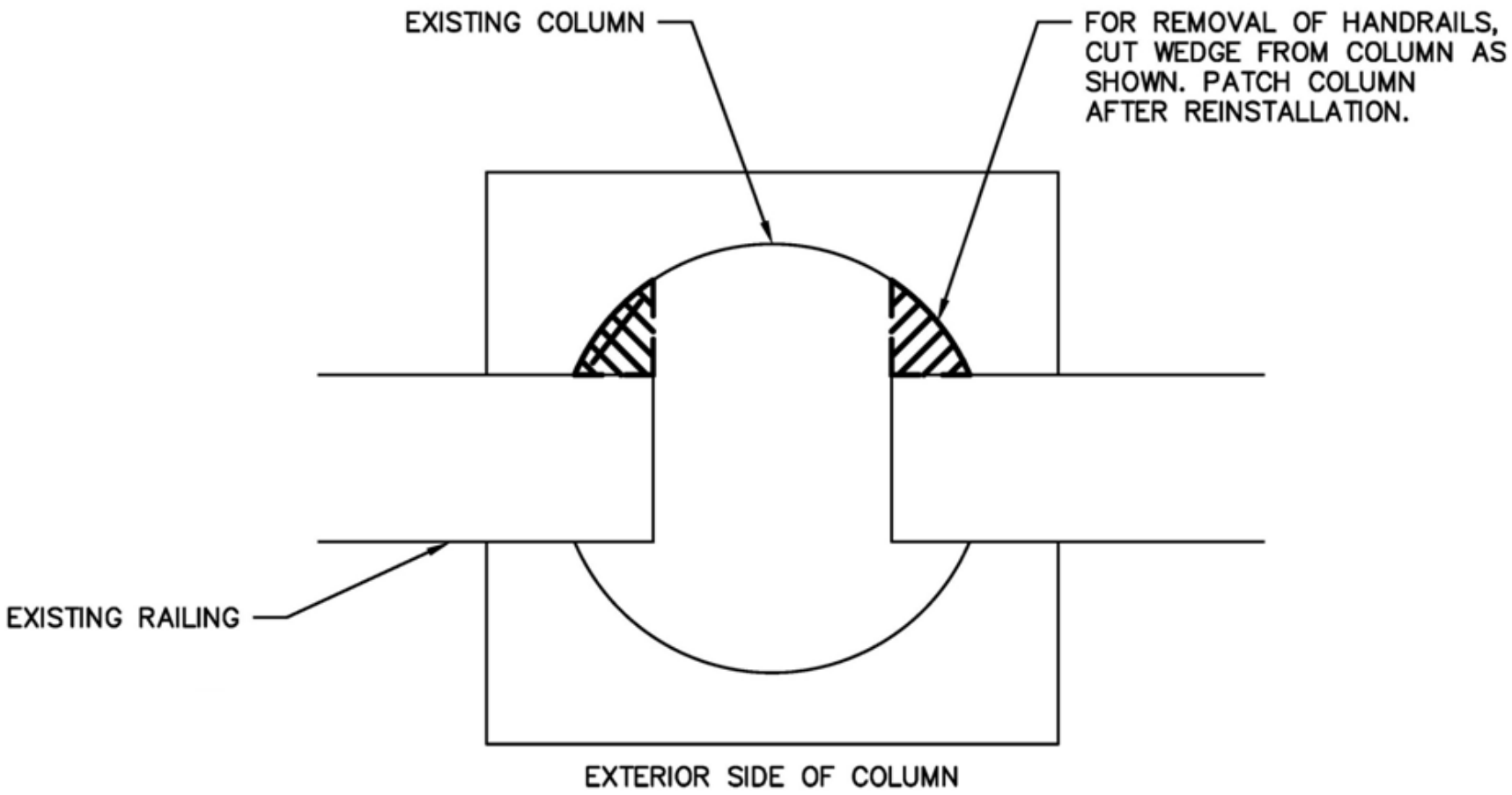
6 Exterior Handrail Strengthening

Scale: 3" = 1'



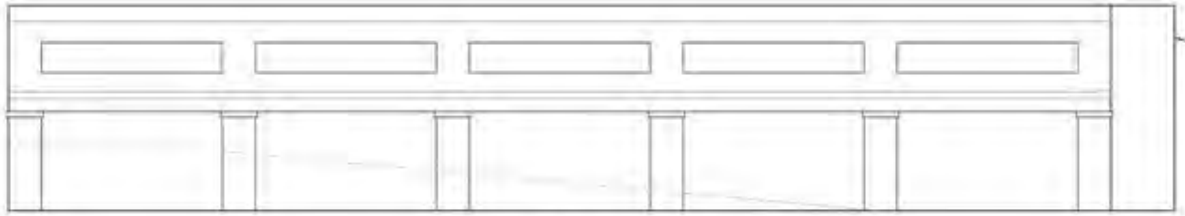
9 Column and Handrail Connection - Plan

Scale: 3" = 1'

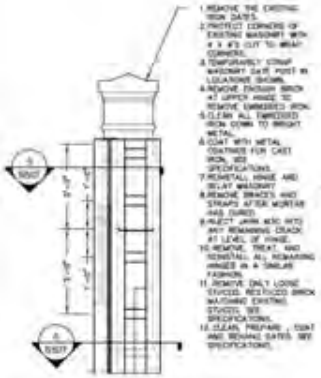


8 Column and Handrail Repair

Scale: 3" = 1'

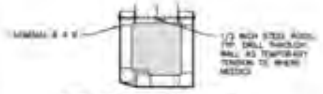


1 West Elevation of the East Wall

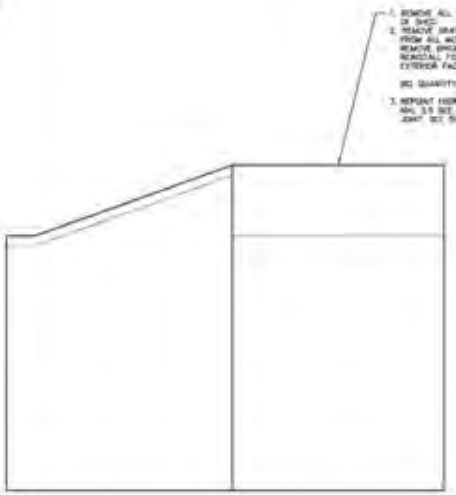


2 Gate Post West Elevation

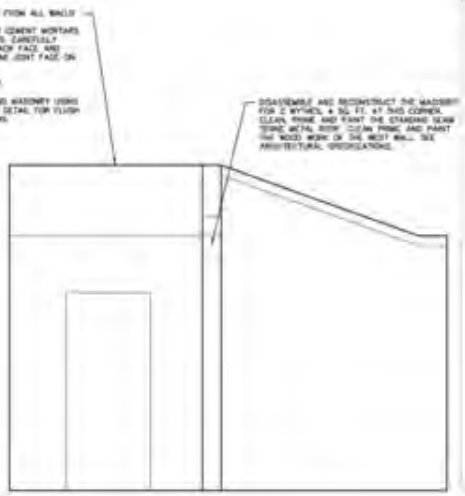
5 Gate Post West Plan



6 Gate Post West Plan



3 Shed Wall East Elevation



4 Shed Wall West Elevation

Bennett PRESERVATION ENGINEERING PC

Construction Documents

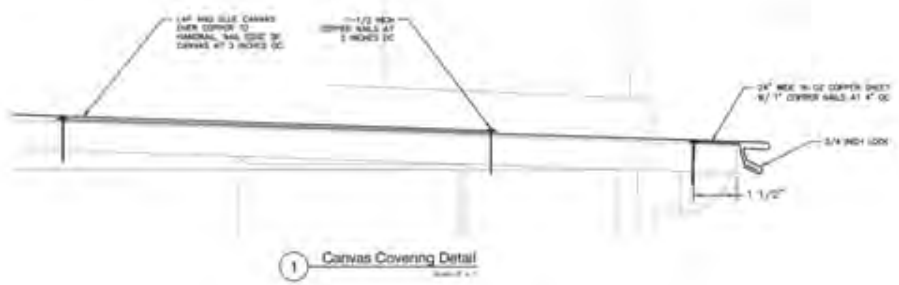
12 Bull Exterior Repairs

Details

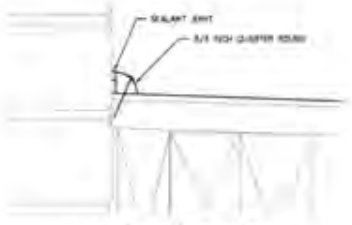
18 May 2015

14-026

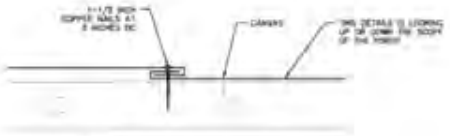
S507



1 Canvas Covering Detail

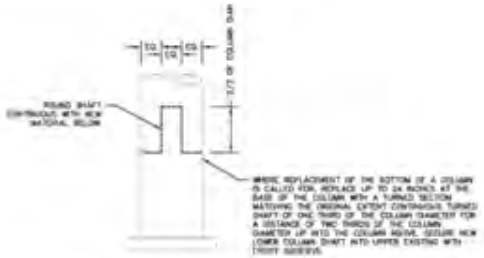


2 Canvas Covering Detail

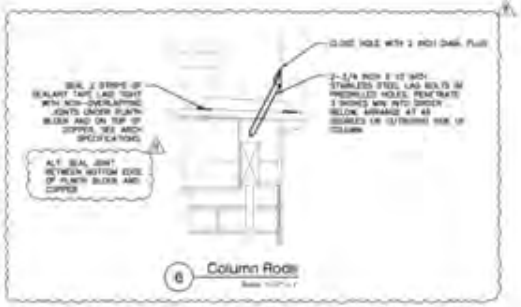


3 Canvas Covering Detail

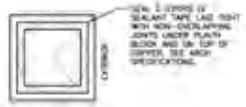
4 Handrail Connection



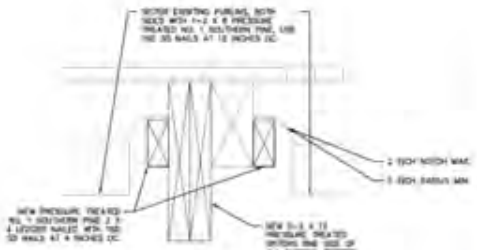
5 Column Replacement



6 Column Roots



7 Column Rods



8 First Floor Porch Connections

2	JULY 8, 2015
1	NOV 19, 2015

Bennett PRESERVATION ENGINEERING

Construction Documents

12 Bull Exterior Repairs

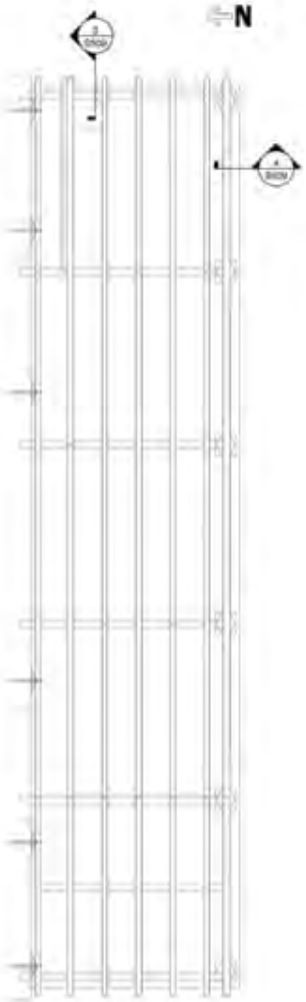
Details

14 May 2015

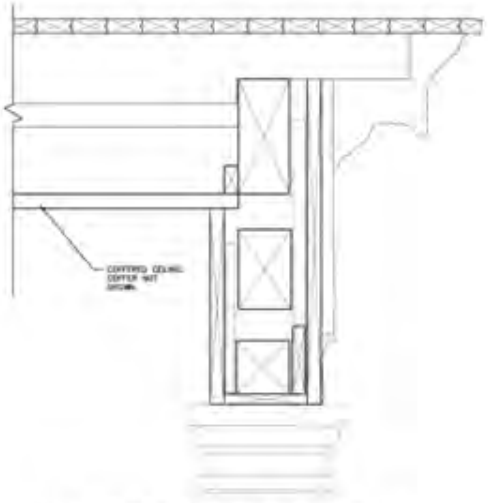
14-026

S508

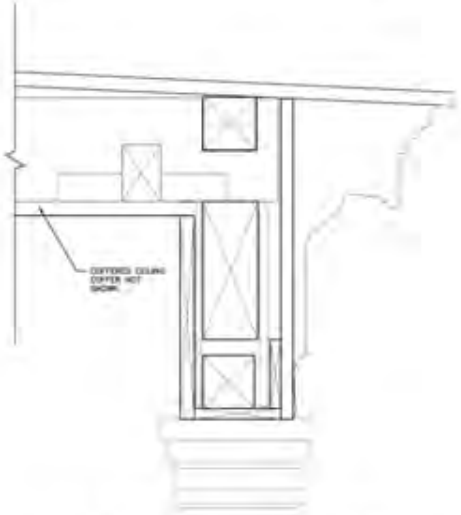
1 Existing South Porch Girder and Ceiling Support Plan



2 Existing South Porch Joist Plan



3 Existing Section through East Side of South Porch



4 Existing Section through South Side of South Porch

Bennett PRESERVATION ENGINEERING PC

Construction Documents

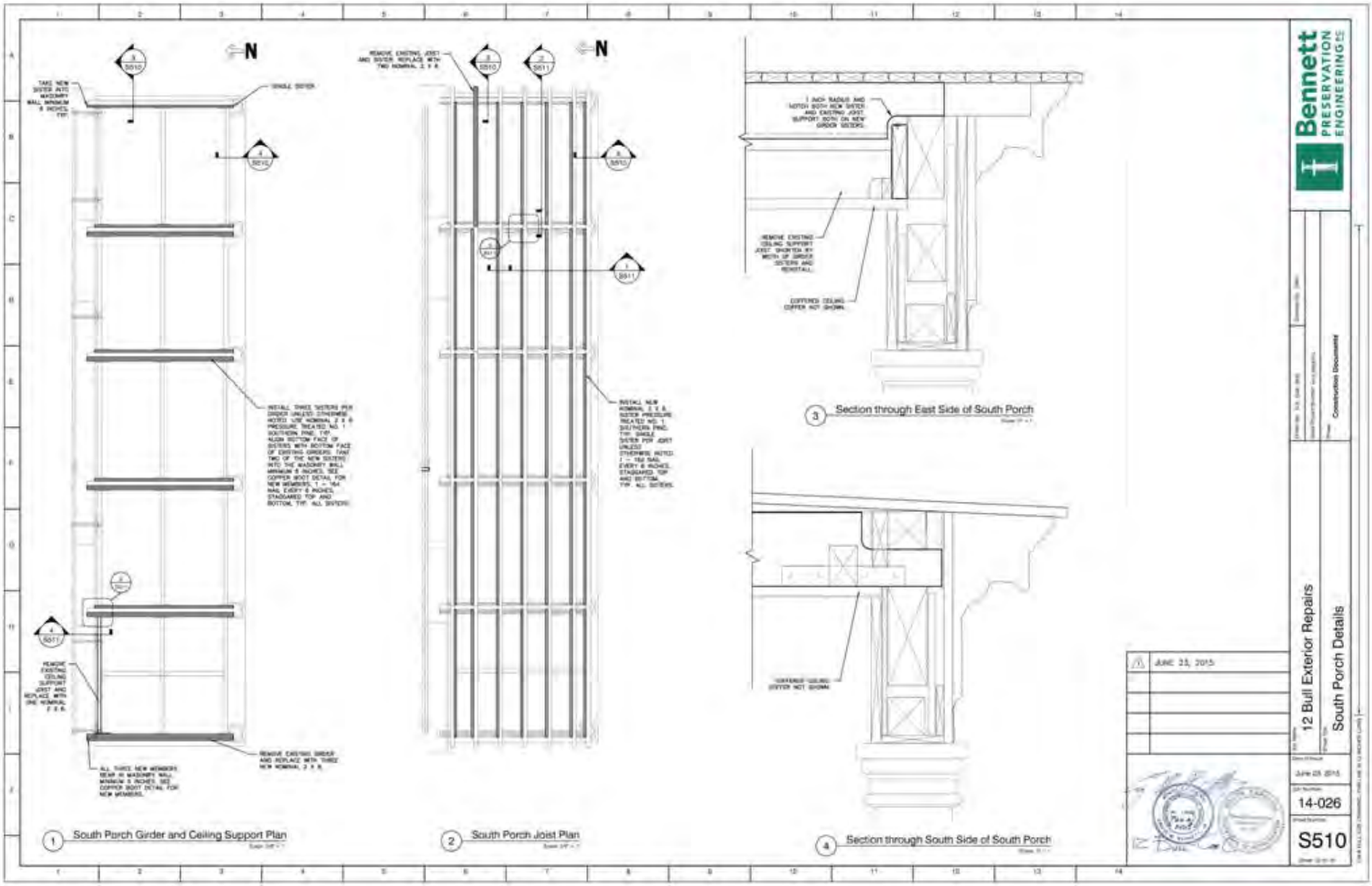
12 Bull Exterior Repairs

South Porch Existing Details

⚠	JUNE 23, 2015

14-026

S509



1 South Porch Girder and Ceiling Support Plan

2 South Porch Joist Plan

3 Section through East Side of South Porch

4 Section through South Side of South Porch

⚠	JUNE 23, 2015

Bennett PRESERVATION ENGINEERING PC

Construction Document

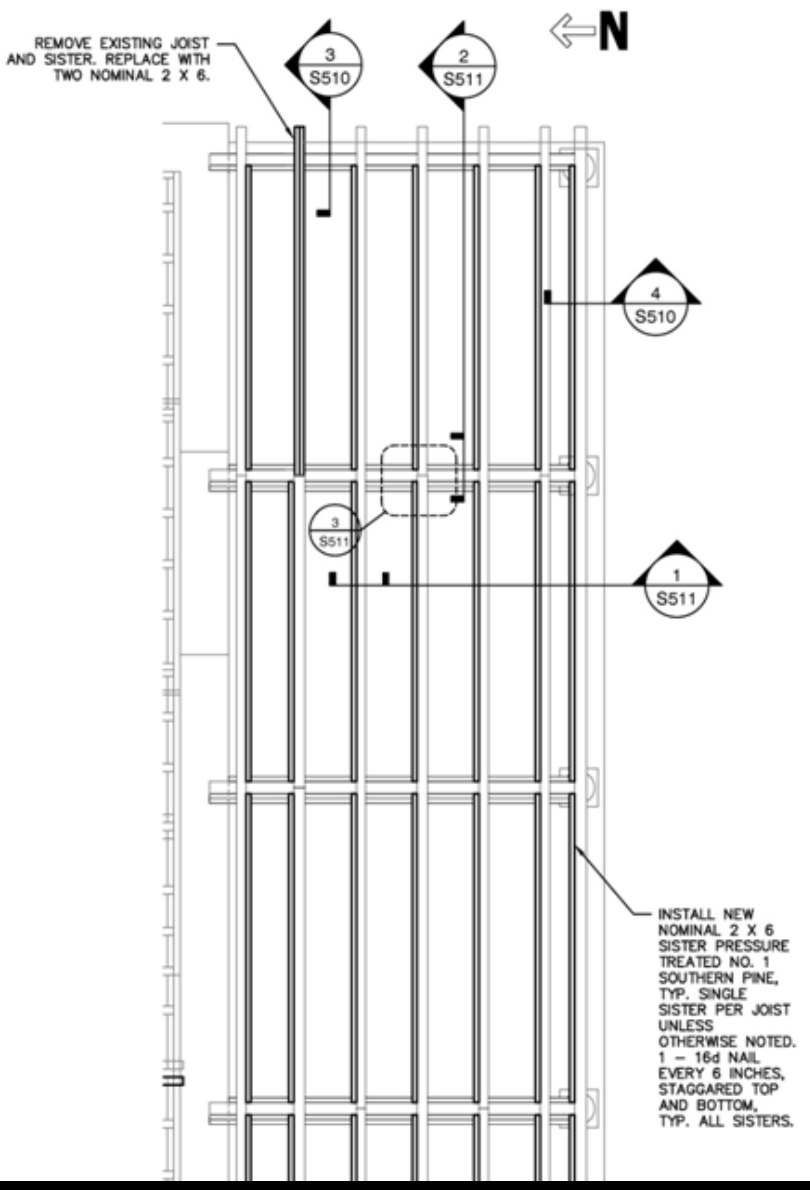
12 Bull Exterior Repairs

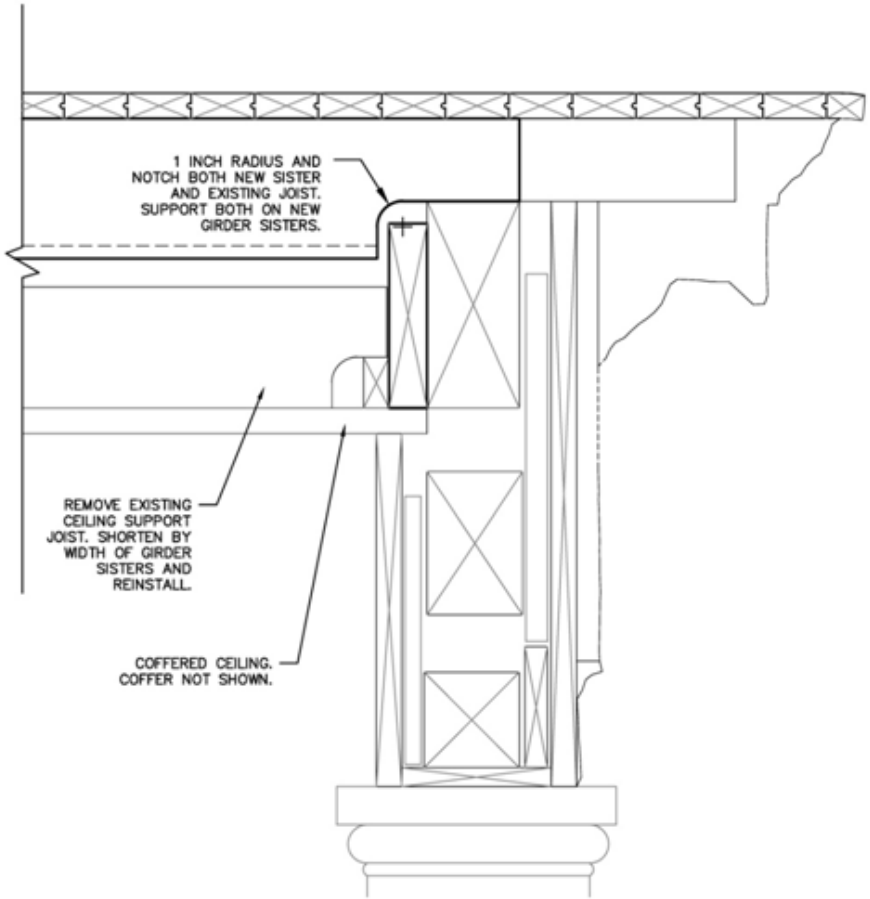
South Porch Details

June 23, 2015

14-026

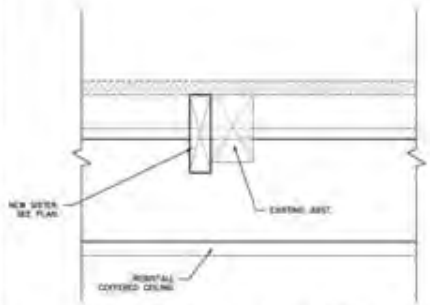
S510



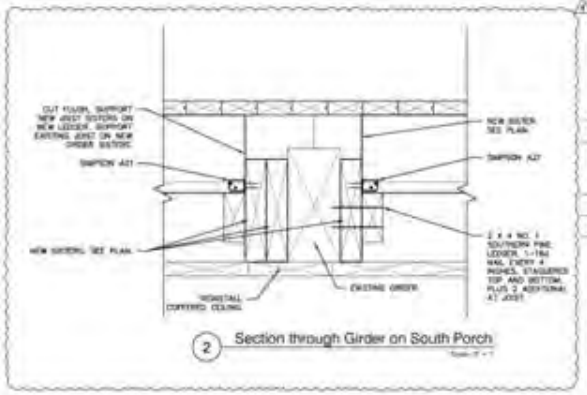


3 Section through East Side of South Porch

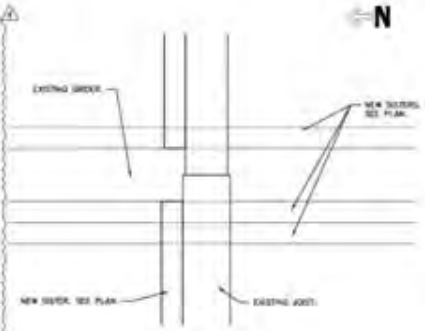
Scale: 3" = 1'



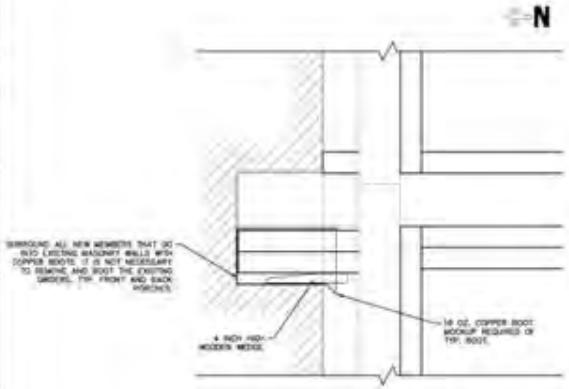
1 Section through Joist on South Porch



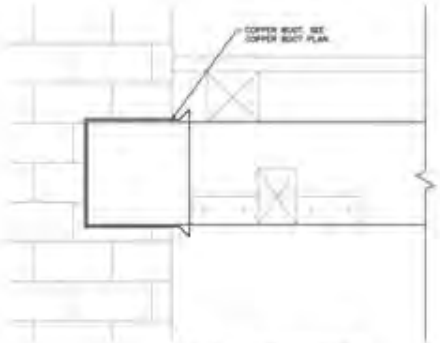
2 Section through Girder on South Porch



3 Detail Plan



4 Copper Boot Plan



5 Copper Boot Section

Bennett PRESERVATION ENGINEERING

1	JUNE 23, 2015
2	JULY 17, 2015

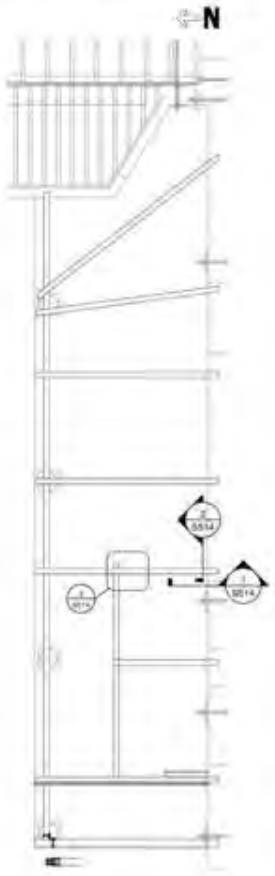
12 Bull Exterior Repairs

South Porch Details

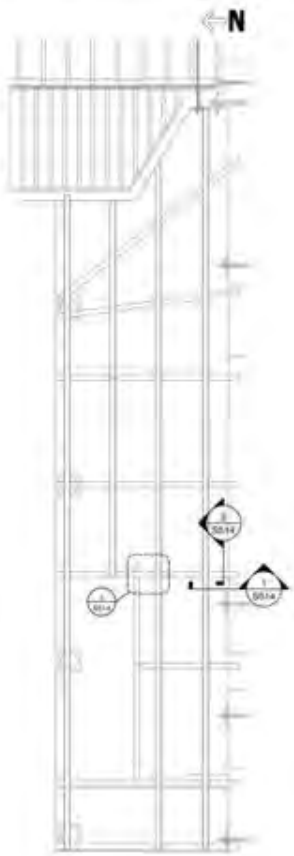
June 23, 2015

14-026

S511



1 Existing North Porch Girder Plan



2 Existing North Porch Joist Plan

⚠	JUNE 23, 2015

Bennett PRESERVATION ENGINEERING

Construction Document

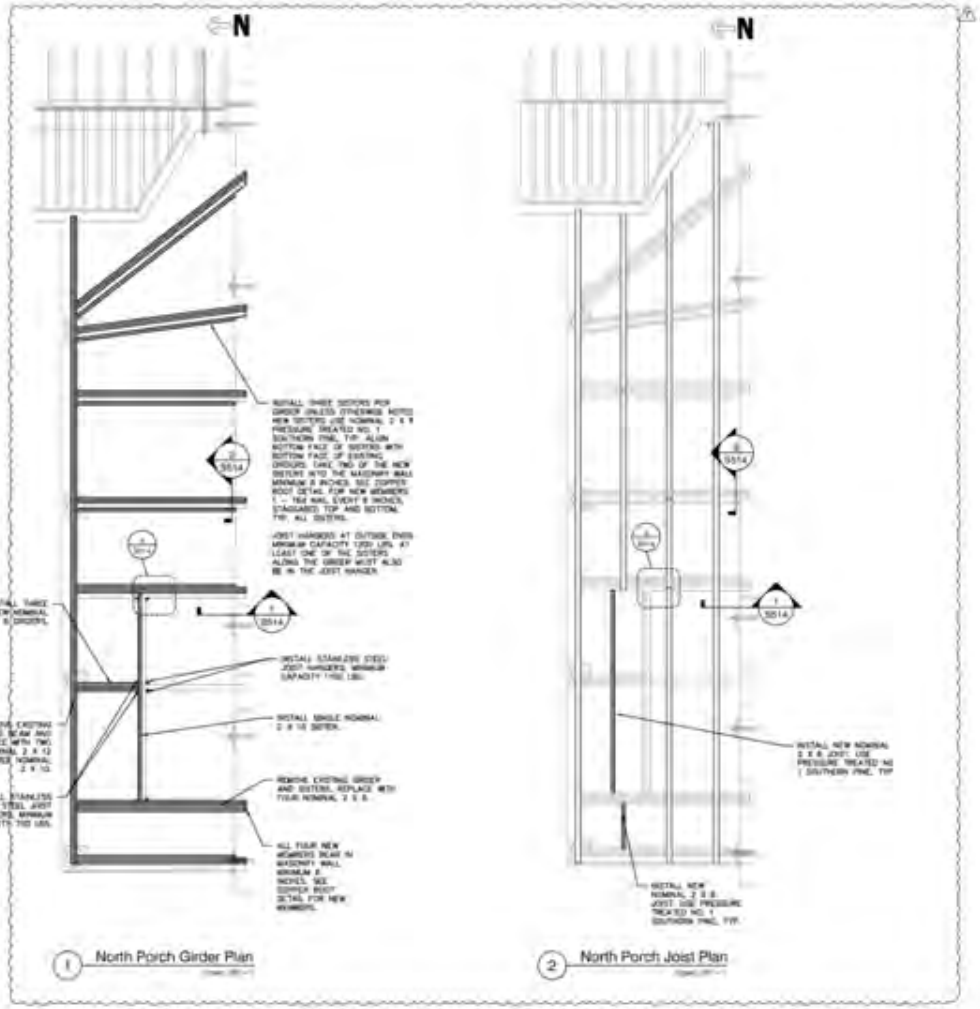
12 Bull Exterior Repairs

North Porch Existing Details

June 23, 2015

14-026

S512



Bennett PRESERVATION ENGINEERING PC

1	JUNE 23, 2015
2	OCT 14, 2015

Phase: Construction Documents

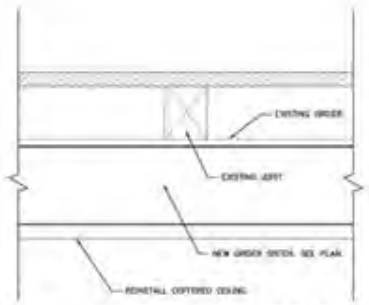
12 Bull Exterior Repairs

North Porch Details

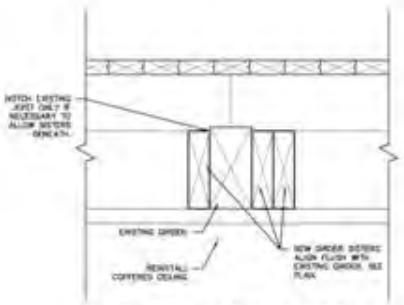
Date: AUG 07, 2015

Job Number: 14-026

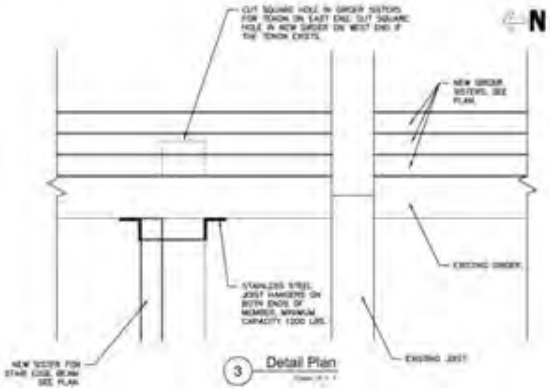
Sheet Number: S513



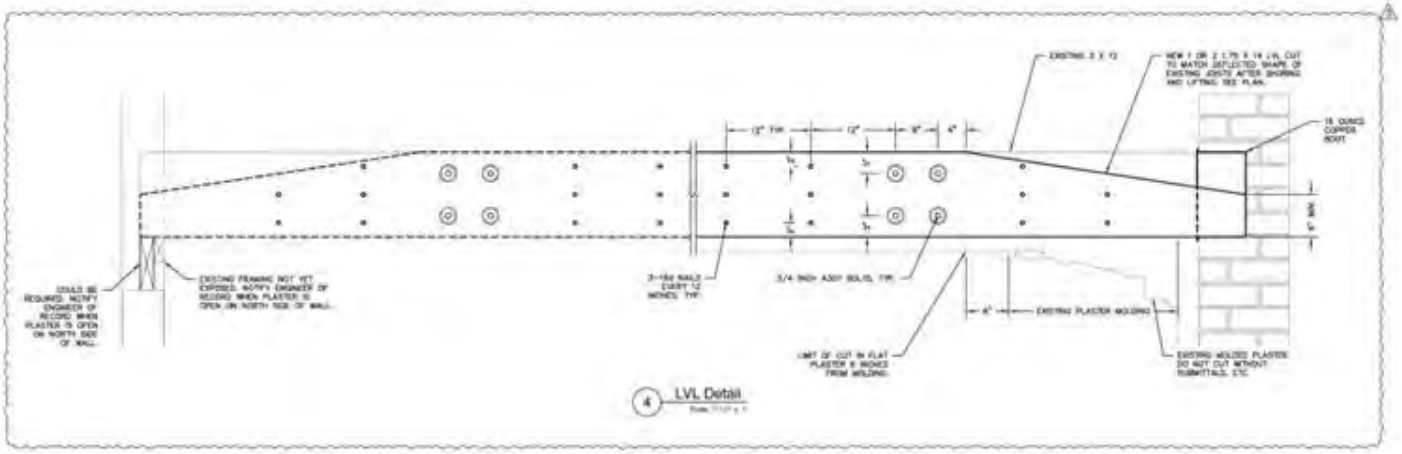
1 Section through Joist on North Porch



2 Section through Girder on North Porch



3 Detail Plan



4 LVL Detail

1	JUNE 23, 2015
2	JULY 15, 2015

Bennett PRESERVATION ENGINEERING

Construction Documents

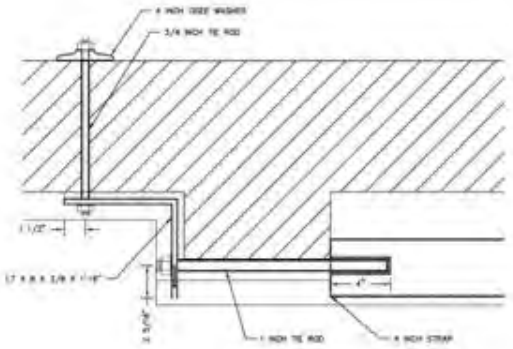
12 Bull Exterior Repairs

North Porch Details

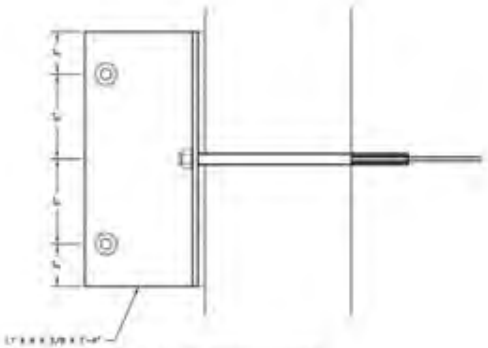
June 23, 2015

14-026

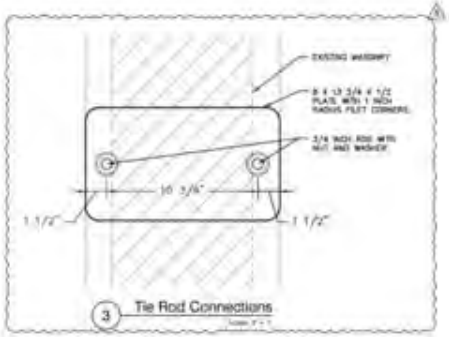
S514



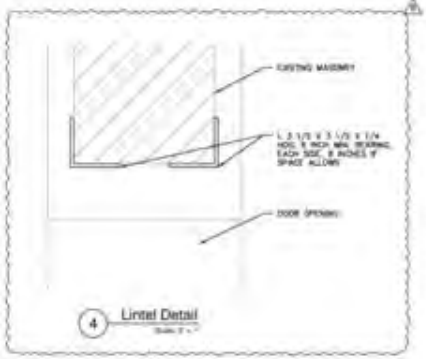
1 Tie Rod Connections



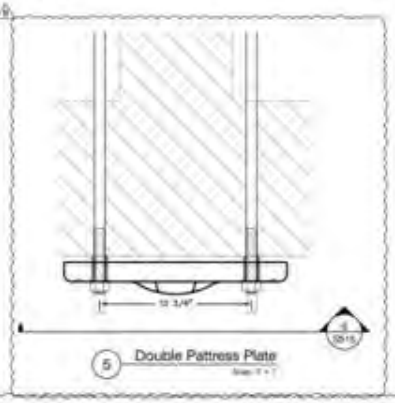
2 Tie Rod Connections



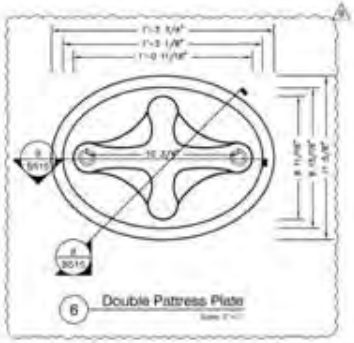
3 Tie Rod Connections



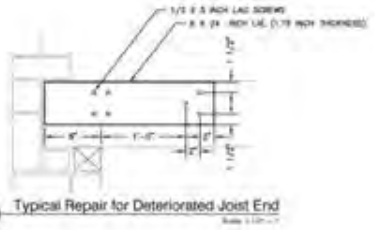
4 Lintel Detail



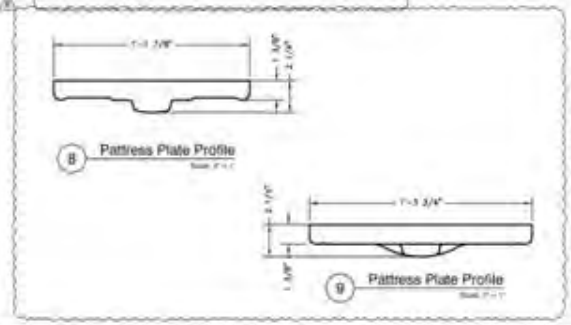
5 Double Pattress Plate



6 Double Pattress Plate



7 Typical Repair for Deteriorated Joist End



8 Pattress Plate Profile

9 Pattress Plate Profile

1	JUNE 23, 2015
2	JULY 15, 2015
3	JULY 29, 2015 FOR PRICING
4	SEPT 29, 2015 FOR CONSTRUCTION
5	OCT 1, 2015
6	NOV 18, 2015

Bennett PRESERVATION ENGINEERING

Construction Document

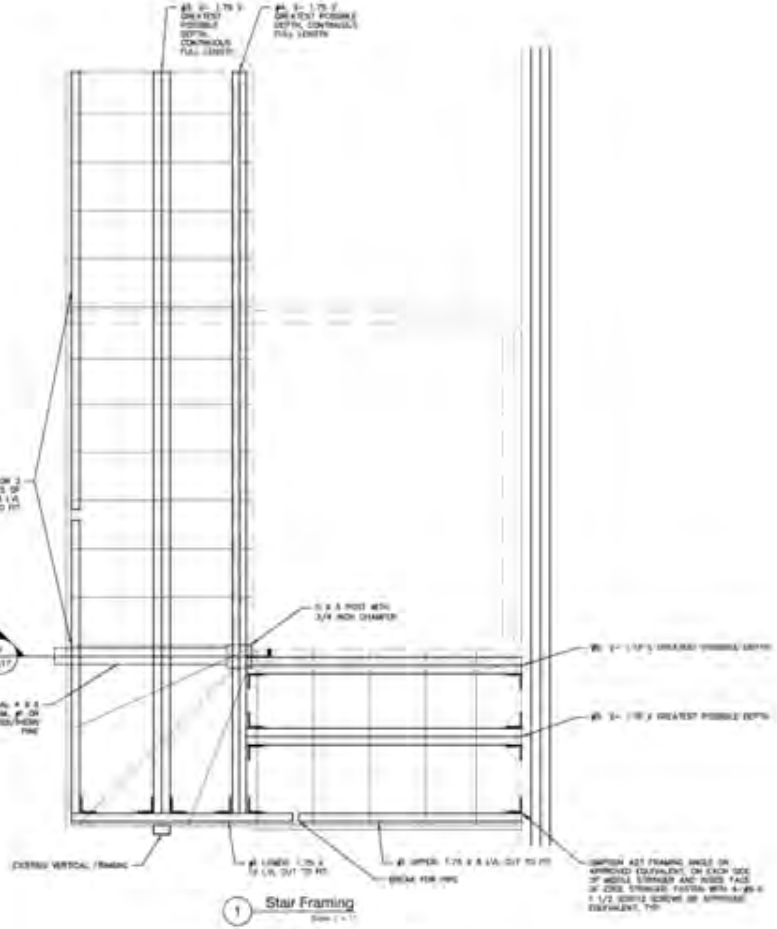
12 Bull Exterior Repairs

Details

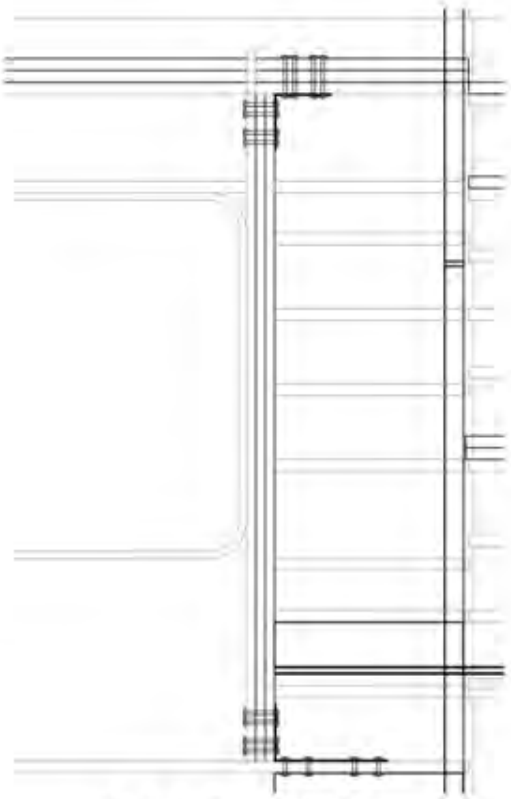
June 23, 2015

14-026

S515



1 Stair Framing



2 2nd Floor Stair Landing Connections

1	OCT 16, 2020

Bennett PRESERVATION ENGINEERING

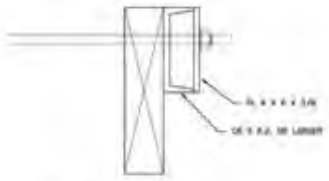
Construction Documents

12 Bull Exterior Repairs

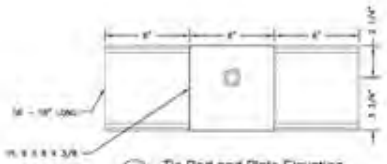
Details

14-026

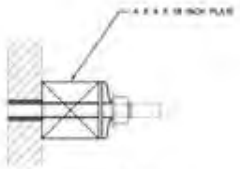
S516



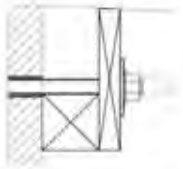
1 Tie Rod and Plate Section



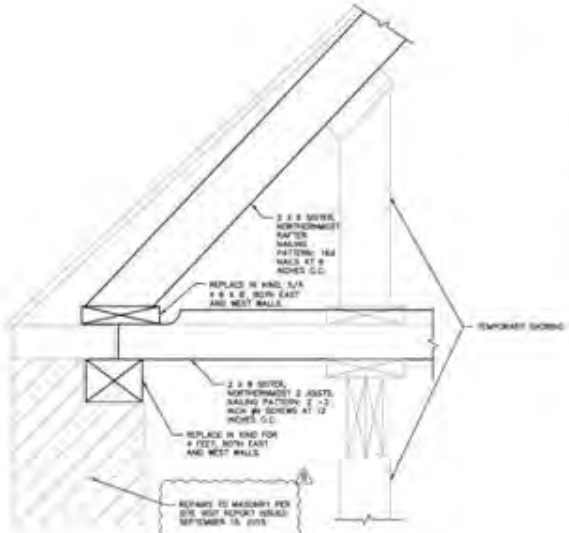
2 Tie Rod and Plate Elevation



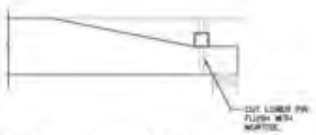
3 Ogee Washer Section



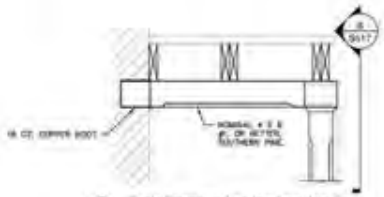
4 Ogee Washer Section



5 North Dependency Attic Framing



6 Detail at Second Floor Stair Framing



7 Stair Framing Section Looking East

8 Stair Post

1	OCT 1, 2015
2	NOV 16, 2015

Bennett PRESERVATION ENGINEERING

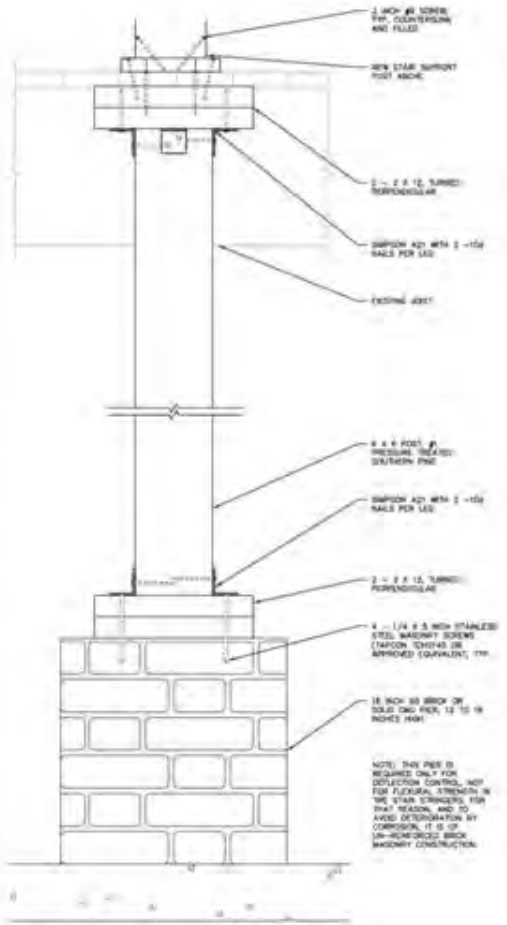
12 Bull Exterior Repairs

Details

June 25, 2015

14-026

S517



1 Basement Level Stair Support Post

Bennett PRESERVATION ENGINEERING

Construction Document

12 Bull Exterior Repairs

Details

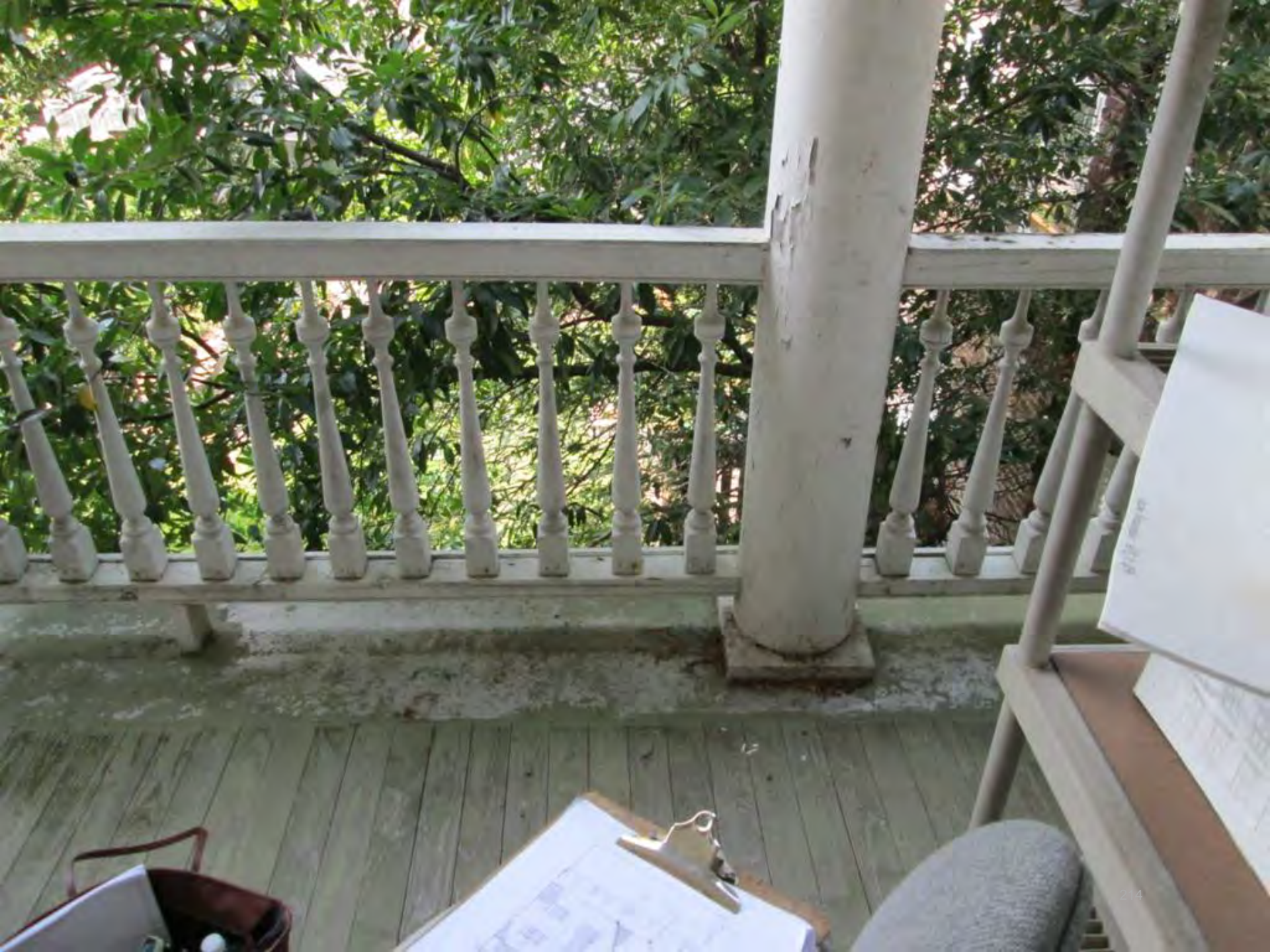
OCT 14, 2015

June 23, 2015

14-026

S518


SIZE: 11½ X 48
TYPE: REVERSIBLE




1
2
3
4
5
6
7
8
9
10
11
12
13


STANLEY
2
3
4
5
6
7

7
6
5
4
3
2
in
STANLEY


TION


DANGER
HARD HAT
AREA
DANGER
KEEP OUT


The Caroline and Albert Simons, Jr.
CENTER FOR HISTORIC PRESERVATION

Recommendations on making porches last with minimal deterioration

- Copper or other metal coverings over the edges
- Coverings over the deck

Summary

- Why? - Life safety, maintenance of historic structures
- Repair and strengthening – Sister members, strengthen connections
- Protect the users - Tie the handrails into the columns
- Long term - Protect the porches from weather

Thank you.

Questions?

Craig M. Bennett, Jr. with:

Taylor Frost, George Fischer,
Amanda Brown and Ben Walker

Bennett PRESERVATION ENGINEERING PC