

06/05/2025

Quackenbush Architects + Planners  
1217 Hampton Street  
Columbia, South Carolina 29201

June 05, 2025

## **ADDENDUM NO. 2**

The following items shall take precedence over the drawings and specifications for the above named project and shall become a part of the contract documents. Where any item called for in the specifications, or indicated on the drawings, is not supplemented hereby, the original requirements shall remain in effect. Where any original item is amended, voided or superseded hereby, the provisions of such item not specifically amended, voided or superseded shall remain in effect.

## **ATTACHMENTS**

Documents:

1. Questions
2. Drawings: C-105, C-106, C-110, L101, L102, L103, L104, L105, A-001, M-501
3. Specification Sections: SE-310, 011000, 018113.54, 051200, 102600, 237416.13, 238126, 283111, 321400

## **GENERAL**

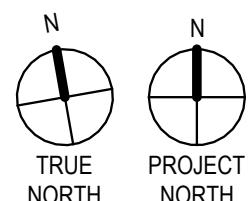
1. Bidders are hereby advised that information from bid documents which are not received from the sources listed in the Invitation for Bids is not legitimate and the bidder accepts full responsibility for any differences. Quackenbush Architects + Planners has not authorized the scanning of their documents. Bidders should be aware that the plans are copyrighted and any unlawful use is subject to legal action. Bidders are further advised that the purchase and/or use of partial bid documents is not recommended and bidder will be responsible for any discrepancies which might have been avoided had a full set of documents been reviewed.
2. Listing of multiple products or manufacturers within specifications or approval of products or manufacturers via substitution request does not waive or preclude any and all performance, warranty or specific requirements listed within the specification unless specifically noted in the Addendum. Only manufacturers and products meeting the specification requirements and listed in the specifications or included in the Addendum shall be approved for the project.

## **Questions**

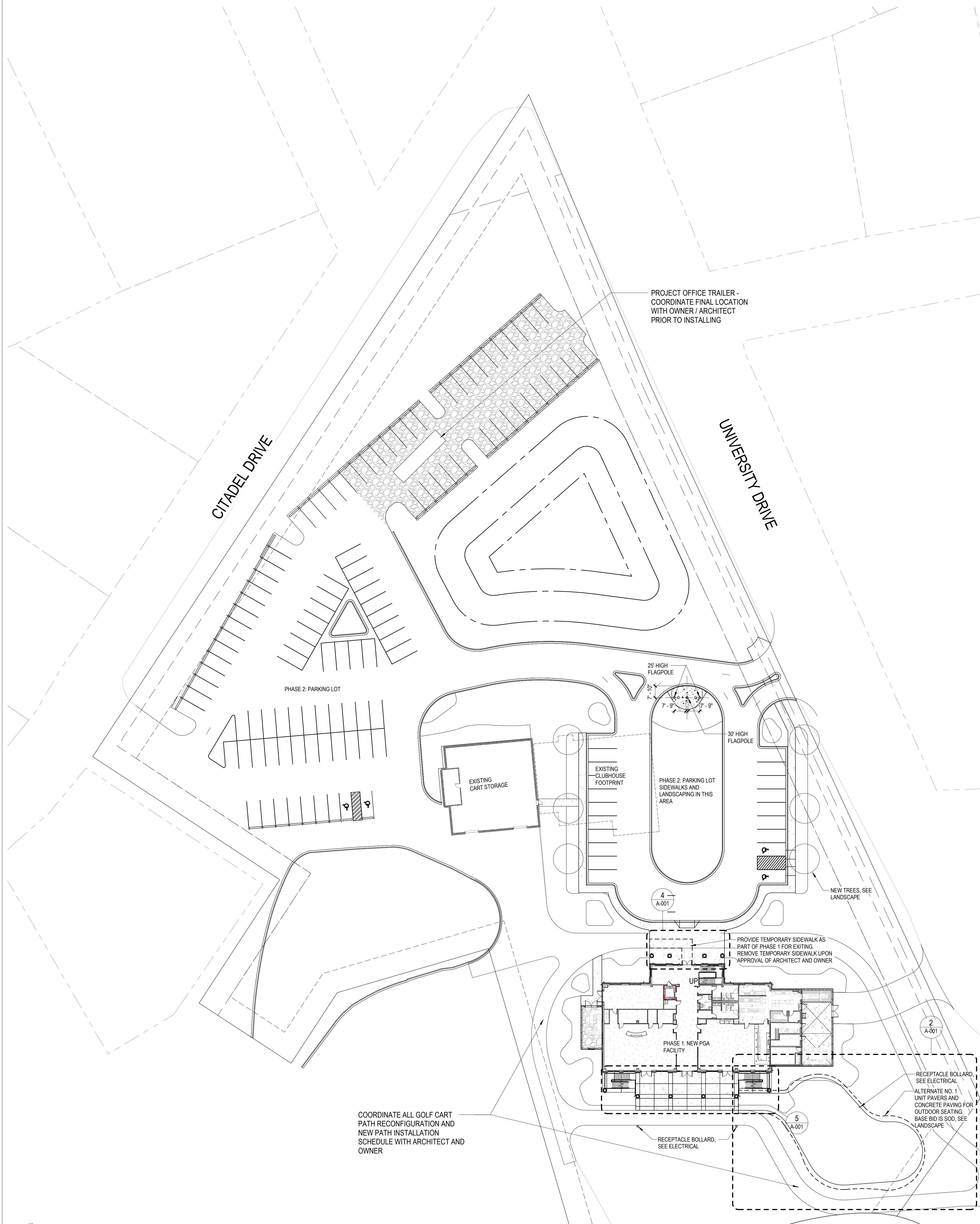
| <b><u>Item No.</u></b> | <b><u>Description</u></b> |
|------------------------|---------------------------|
|------------------------|---------------------------|

- |     |   |
|-----|---|
| 2-1 | [Civil Drawings] What are the existing water and sewer sizes for tie ins?<br>a) 8" gravity sewer. 8" Watermain. |
|-----|---|

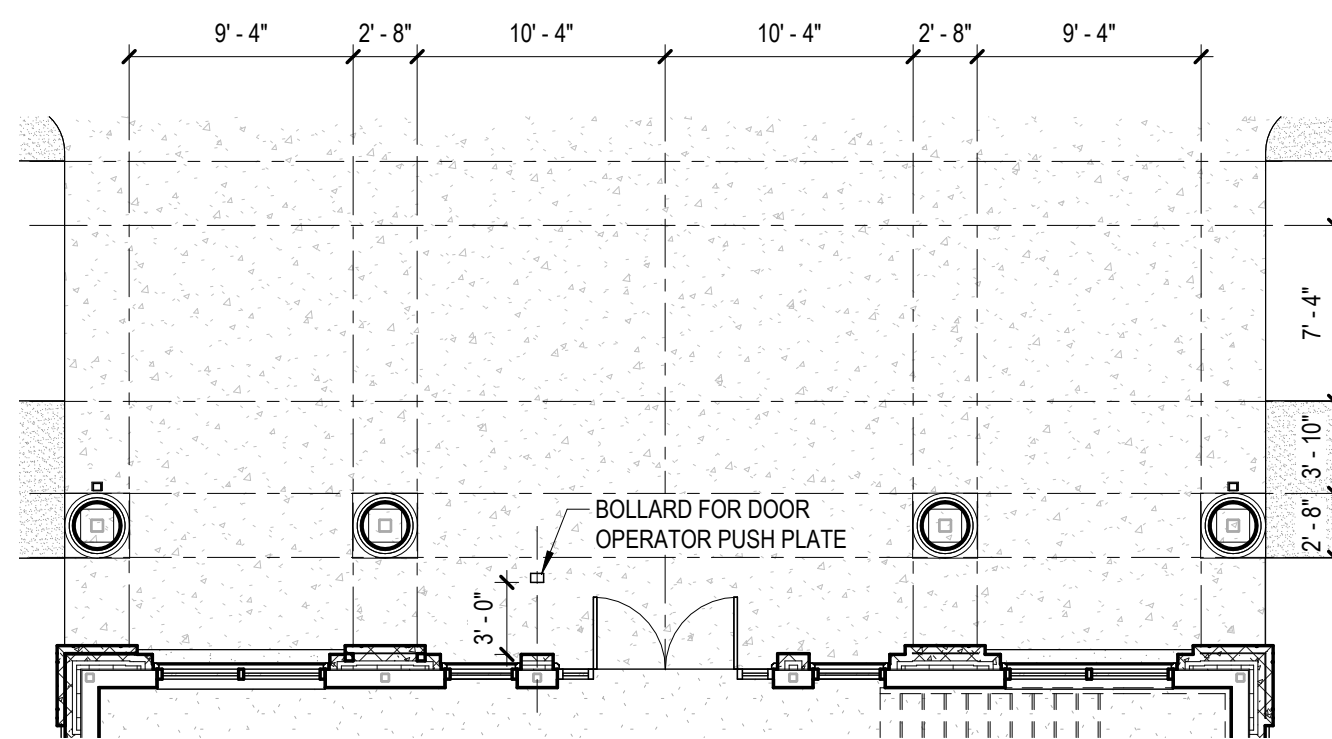


1  
A-001  
SCALE: 1" = 30'-0"

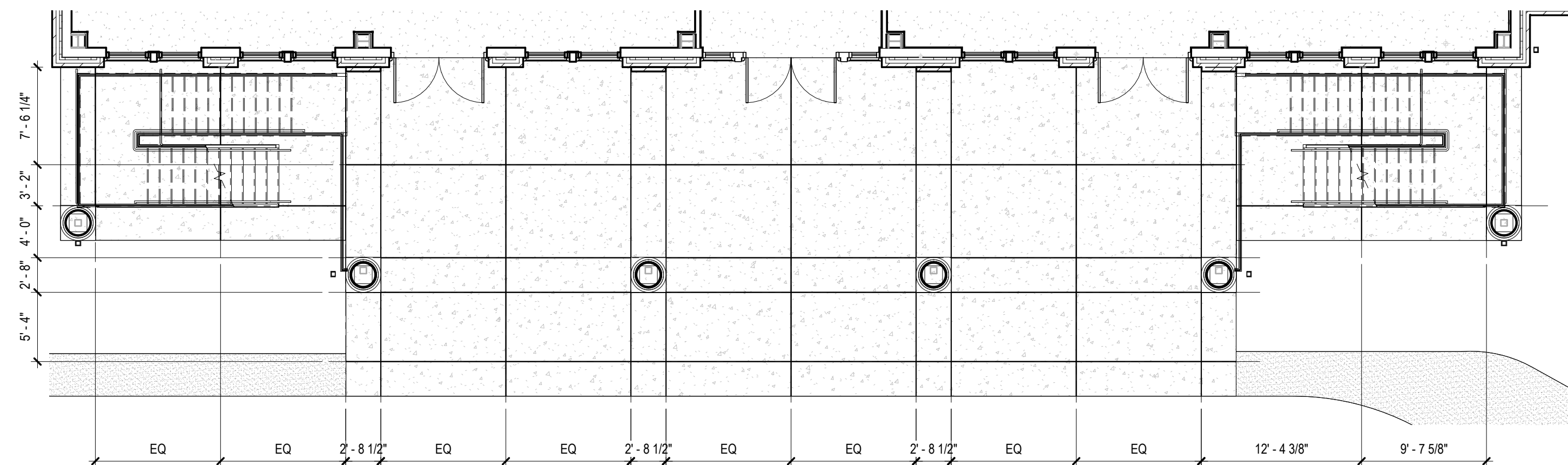
## ARCHITECTURAL SITE PLAN

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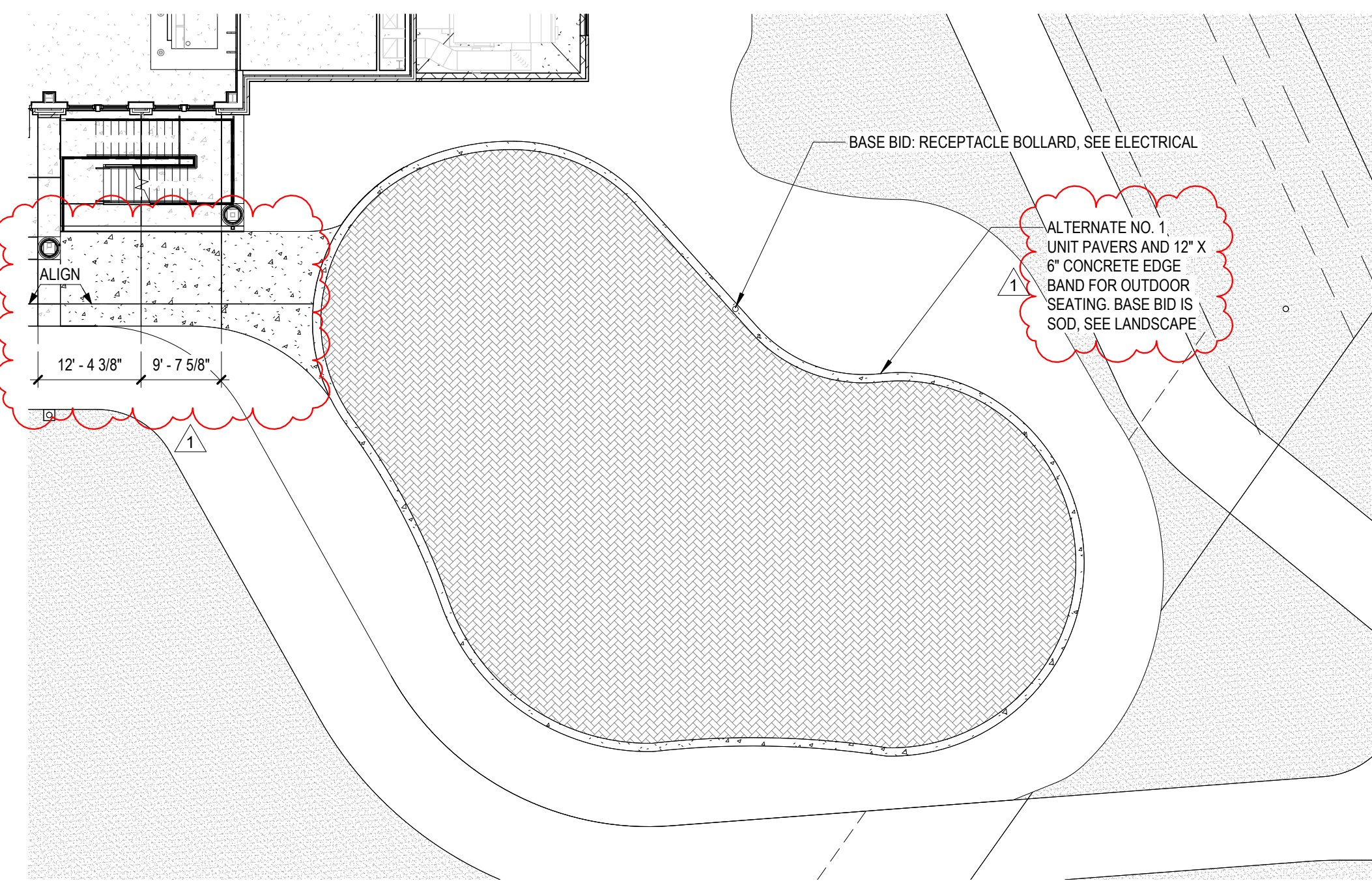
## SITE DETAIL - FLAG POLE - CONCRETE

4  
A-001  
SCALE: 1/8\"/>

## NORTH ENTRY CONCRETE JOINT PATTERN PLAN

5  
A-001  
SCALE: 1/8\"/>

## SOUTH ENTRY CONCRETE JOINT PATTERN PLAN

2  
A-001  
SCALE: 1:180

## SITE PLAN - ALTERNATE NO. 1

## GENERAL SITE NOTES

- SEE CIVIL DRAWINGS FOR LAYOUT AND DIMENSIONS. NOTIFY ARCHITECT OF ANY DISCREPANCIES BETWEEN ARCHITECTURAL & CIVIL DIMENSIONS.
- SEE CIVIL DRAWINGS & SPECIFICATIONS FOR PAVEMENT JOINT LOCATIONS. UNLESS DIMENSIONS NOTED OTHERWISE IN ARCHITECTURAL OR LANDSCAPE DRAWINGS. IN GENERAL, JOINTS SHALL ALIGN WITH BUILDING CORNERS, COLUMN CENTER LINES, OR CENTERED ON OPENINGS.
- ALL CONCRETE SIDEWALKS TO BE BROOM FINISHED UNLESS NOTED OTHERWISE.
- SEE LANDSCAPING DRAWINGS AND SPECIFICATIONS FOR TREES, PLANTING, GROUND COVER AND IRRIGATION. TREES SHOWN DIAGRAMMATICALLY ONLY.
- PROTECT ALL EXISTING TREES AND LANDSCAPING TO REMAIN. DO NOT STORE ANY MATERIAL, VEHICLES, OR EQUIPMENT UNDER TREE CANOPIES. NOTIFY ARCHITECT PRIOR TO REMOVING ANY TREES OR LANDSCAPING.
- ALL EXISTING SIDEWALKS, BUILDINGS AND OTHER SITE APPURTENANCES SHALL REMAIN UNLESS NOTED OTHERWISE. SEE CIVIL FOR DEMOLITION SCOPE.
- COMPLETE FINISH GRADING IN ACCORDANCE WITH CIVIL DRAWINGS. FINISH GRADE AND LANDSCAPING SHALL BE A MINIMUM OF 6\"/>
- SEE ELECTRICAL FOR SITE LIGHTING. LIGHT POLES SHALL BE CENTERED AND ALIGNED. SEE ARCHITECTURAL SITE PLAN FOR SPECIFIC DIMENSIONS FOR LIGHT POLE STAKING.
- EXISTING SITE MOVABLE APPURTENANCES (BENCHES, TRASH CANS, BIKE RACKS, ETC) IN AREA OF WORK WILL BE MOVED / RELOCATED BY OWNER.

## GENERAL CONST &amp; PHASING NOTES

- LIMITS OF CONSTRUCTION ILLUSTRATES LOCATION OF CONSTRUCTION FENCING. PROVIDE MINIMUM OF TWO PEDESTRIAN GATES ALONG PERIMETER. CONSTRUCTION FENCE SHOWN IS DIAGRAMMATIC AND ACTUAL LOCATION AND EXTENT SHALL BE COORDINATED WITH WORK SHOWN ON CIVIL DRAWINGS, AND OWNER PRIOR TO INSTALLATION. ALL GATES SHALL BE LOCKABLE AND COPY OF KEYS SHALL BE PROVIDED OWNER.
- PROVIDE 6'-0\"/>
- COORDINATE ACTUAL LOCATION / EXTENTS OF CONSTRUCTION LAY-DOWN AREA AND TRAILER LOCATIONS WITH OWNER PRIOR TO INSTALLING. RETURN TO EXISTING CONDITION AFTER COMPLETION OF PROJECT IF AREA IS NOT DISTURBED AS PART OF CONSTRUCTION. INSTALL 6'-0\"/>
- MAINTAIN 6'-0\"/>
- CONTRACTOR IS RESPONSIBLE TO MAINTAIN FIRE TRUCK ACCESS CLEAR AND FREE THROUGHOUT PROJECT, INCLUDING CLEANING REGULARLY OF MUD AND DIRT.
- CONTRACTOR IS RESPONSIBLE TO MAINTAIN DRIVES AND PARKING AREA OUTSIDE OF CONSTRUCTION ENTRANCES CLEAN OF SEDIMENT, MUD AND DEBRIS.
- CONTRACTOR IS RESPONSIBLE TO PATCH AND REPAIR OR REPLACE DAMAGE TO ADJACENT ROAD(S), PARKING LOTS, CURBS, SIDEWALKS, LANDSCAPING AND OTHER SITE APPURTENANCES TO MATCH EXISTING.
- STORAGE / STAGING AREAS SHALL BE LOCATED WITHIN THE LIMITS OF CONSTRUCTION UNLESS NOTED OTHERWISE.
- PHASING: SEE SPECIFICATIONS FOR ADDITIONAL PHASING REQUIREMENTS & DATES ASSOCIATED WITH PHASING. EXISTING SITE AREA WILL BE IN USE AND OCCUPIED DURING CONSTRUCTION.

## GENERAL CONCRETE / PAVING NOTES

- SEE CIVIL DRAWINGS FOR CONCRETE SIDEWALK / PAVING JOINTS NOT SHOWN.
- SEE CIVIL DRAWINGS FOR CONCRETE SIDEWALK / PAVING JOINT CONSTRUCTION REQUIREMENTS.
- PROVIDE EXPANSION JOINT MATERIAL BETWEEN CONCRETE AND ADJACENT VERTICAL CONSTRUCTION (BRICK/MASONRY WALL & CAST STONE WALLS).
- JOINTS SHALL ALIGN WITH GEOMETRY AS INDICATED (COLUMN CORNERS, BUILDING CORNERS, AND PLASTER CORNERS). REVIEW DIMENSIONAL DISCREPANCIES WITH ARCHITECT PRIOR TO INSTALLING CONCRETE.

A/E SEAL

CORPORATE SEAL

PROJECT TITLE

PGA GOLF MANAGEMENT PROGRAM  
ACADEMIC LEARNING LAB CONSTRUCTION  
COASTAL CAROLINA UNIVERSITY

CONDITIONS OF USE:  
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PHASE  
CONSTRUCTION  
DOCUMENTS - FINAL

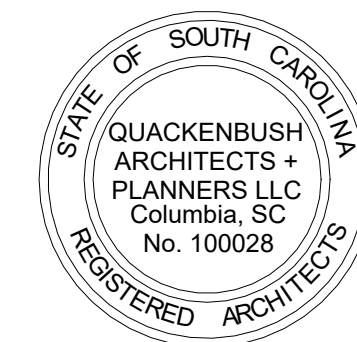
ISSUE DATE 04.10.24  
PROJECT NO. 22.304.00  
STATE PROJECT NO. H17-9623-MJ

REVISION DATE  
1 ADDENDUM 2 06.05.25

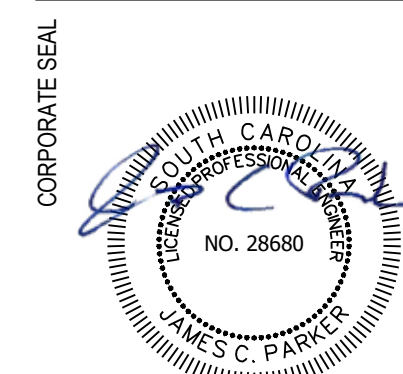
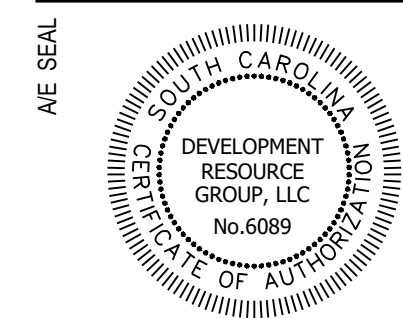
TITLE  
ARCHITECTURAL SITE  
PLAN

SHEET NO

A-001







PROJECT TITLE  
PGA GOLF MANAGEMENT PROGRAM  
ACADEMIC LEARNING LAB CONSTRUCTION  
COASTAL CAROLINA UNIVERSITY  
107 CITADEL DR. CONWAY, SC 29536

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PHASE  
CONSTRUCTION  
DOCUMENTS - FINAL

ISSUE DATE 06.24.25  
PROJECT NO. 22.304.00  
STATE PROJECT NO. H17-9623-MJ

REVISION DATE

TITLE  
HORIZONTAL  
CONTROL PLAN

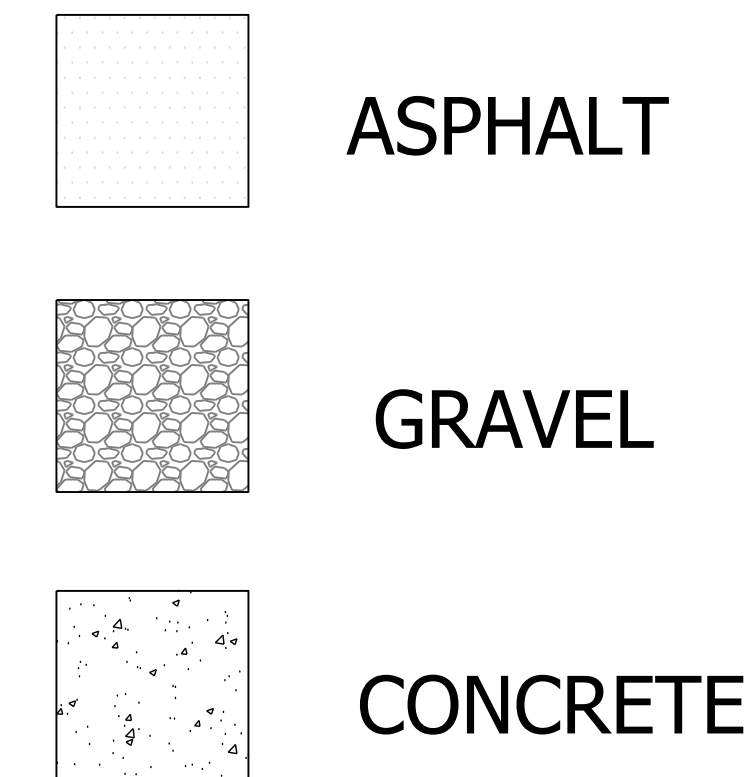
SHEET NO.

C-105

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TMS: 151-00-02-013  
Coastal Carolina University  
Deed Book 3474 Deed Page 141  
Plat Book 200 Plat Page 130

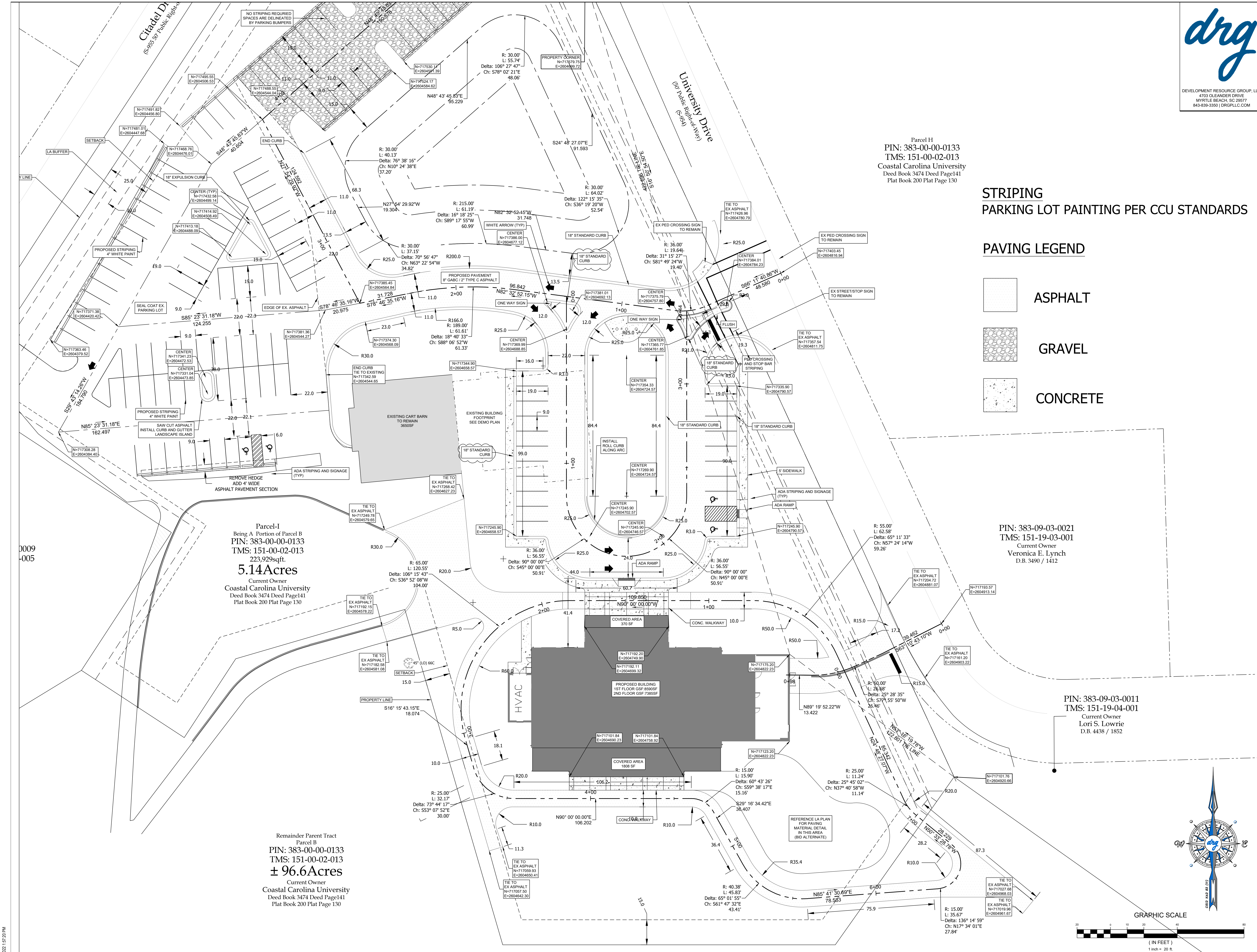
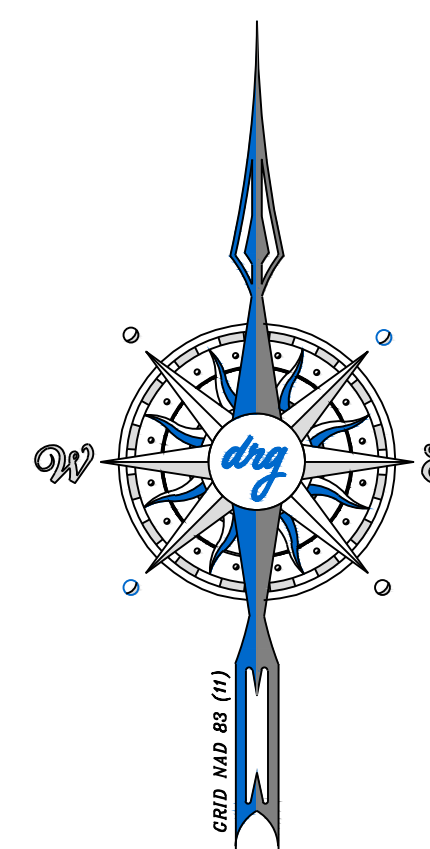
## STRIPING PARKING LOT PAINTING PER CCU STANDARDS

### PAVING LEGEND



PIN: 383-09-03-0021  
TMS: 151-19-03-001  
Current Owner  
Veronica E. Lynch  
D.B. 3490 / 1412

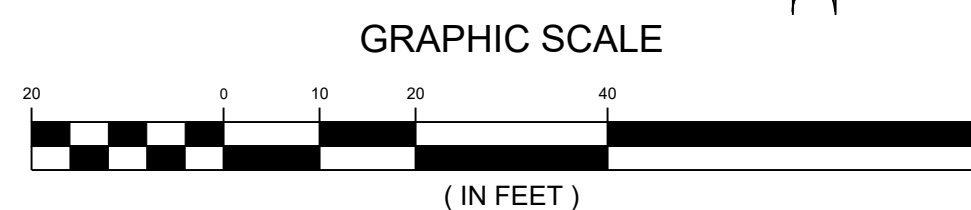
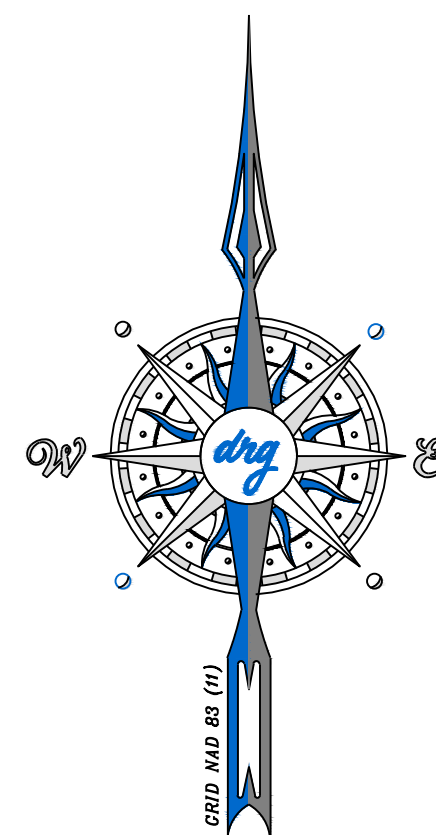
PIN: 383-09-03-0011  
TMS: 151-19-04-001  
Current Owner  
Lori S. Lowrie  
D.B. 4438 / 1852







DEVELOPMENT RESOURCE GROUP, LLC  
4703 OLEANDER DRIVE  
MYRTLE BEACH, SC 29577  
843-338-3388 | DRGPLLC.COM

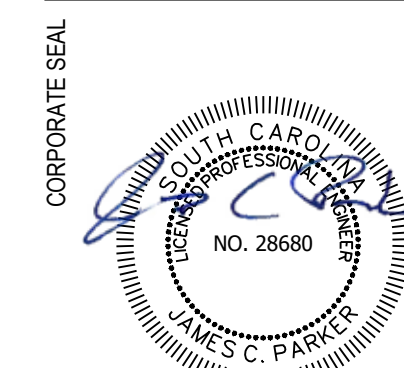
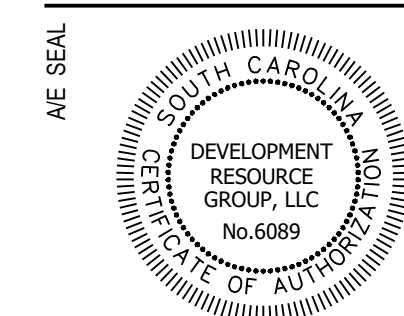


### PAVING LEGEND

- ASPHALT
- GRAVEL
- CONCRETE

Parcel H  
PIN: 383-00-00-0133  
TMS: 151-00-02-013  
Coastal Carolina University  
Deed Book 3474 Deed Page 141  
Plat Book 200 Plat Page 130

QUACKENBUSH ARCHITECTS + PLANNERS  
1217 HAMPTON | COLUMBIA, SC | 803.771.2599 | quackenbusharchitects.com



PROJECT TITLE  
PGA GOLF MANAGEMENT PROGRAM  
ACADEMIC LEARNING LAB CONSTRUCTION  
COASTAL CAROLINA UNIVERSITY  
107 CITADEL DR. CONWAY, SC 29536

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PHASE  
CONSTRUCTION  
DOCUMENTS - FINAL

ISSUE DATE 06.04.25  
PROJECT NO. 22.304.00  
STATE PROJECT NO. H17-9623-MJ

REVISION DATE

TITLE  
HORIZONTAL  
CONTROL PLAN

SHEET NO

C-106

PIN: 383-09-03-0007  
TMS: 151-19-05-007  
Current Owner  
Kenneth & Gale Marlowe  
D.B. 1926 / 681

PIN: 383-09-03-0008  
TMS: 151-19-05-006  
Current Owner  
Peter Forman  
D.B. 4446 / 1085

PIN: 383-09-04-0004  
TMS: 151-19-05-005  
Current Owner  
Gail D. Romano  
D.B. 3962 / 682

PIN: 383-09-03-0009  
TMS: 151-19-07-005  
Current Owner  
Binh V. Dinh  
D.B. 4168 / 625

Parcel-I  
Being A Portion of Parcel B  
PIN: 383-00-00-0133  
TMS: 151-00-02-013  
223,929sqft.  
5.14Acres  
Current Owner  
Coastal Carolina University  
Deed Book 3474 Deed Page 141

10/14/2021 12:20 PM





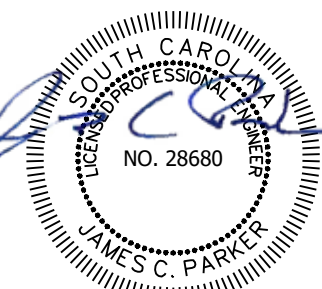
DEVELOPMENT RESOURCE GROUP, LLC  
4703 OLEANDER DRIVE  
MYRTLE BEACH, SC 29577  
843-538-3380 | DRGPLLC.COM

QUACKENBUSH ARCHITECTS + PLANNERS  
1217 HAMPTON | COLUMBIA, SC | 803.771.2599 | quackenbusharchitects.com

AE SEAL



CORPORATE SEAL



PROJECT TITLE

PGA GOLF MANAGEMENT PROGRAM  
ACADEMIC LEARNING LAB CONSTRUCTION  
COASTAL CAROLINA UNIVERSITY  
107 CITADEL DR. CONWAY, SC 29536

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PHASE

CONSTRUCTION

DOCUMENTS - FINAL

ISSUE DATE

PROJECT NO.

STATE PROJECT NO.

REVISION

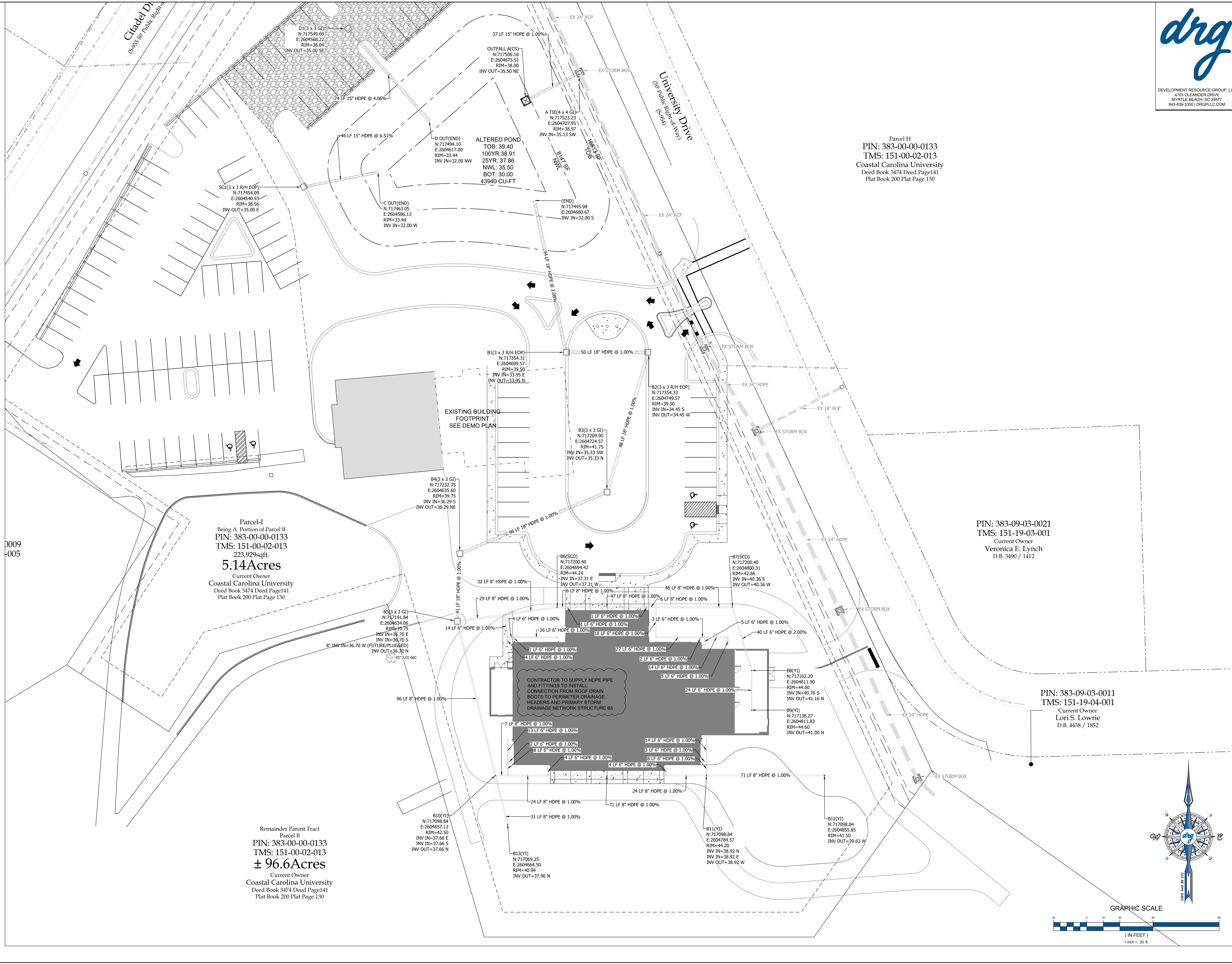
DATE

TITLE

DRAINAGE PLAN

SHEET NO

C-110



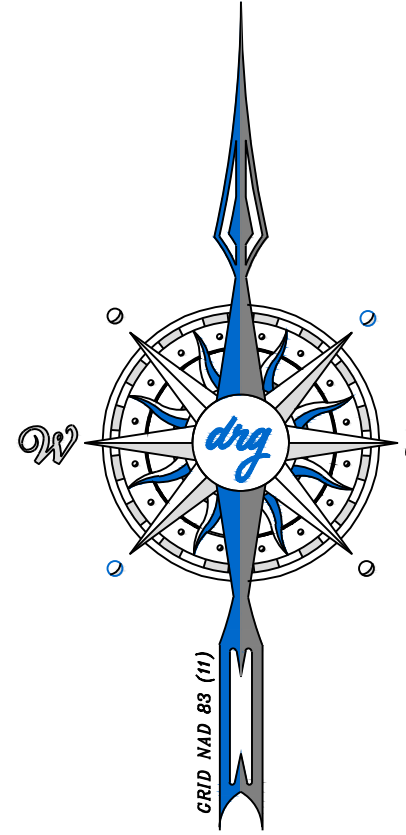
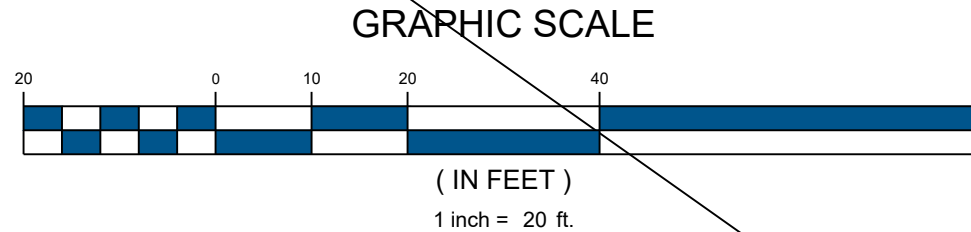
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PIN: 383-00-00-0133  
TMS: 151-00-02-013  
Coastal Carolina University  
Deed Book 3474 Deed Page141  
Plat Book 200 Plat Page 130

PIN: 383-09-03-0021  
TMS: 151-19-03-001  
Current Owner  
Veronica E. Lynch  
D.B. 3490 / 1412

PIN: 383-09-03-0011  
TMS: 151-19-04-001  
Current Owner  
Lori S. Lowrie  
D.B. 4438 / 1852

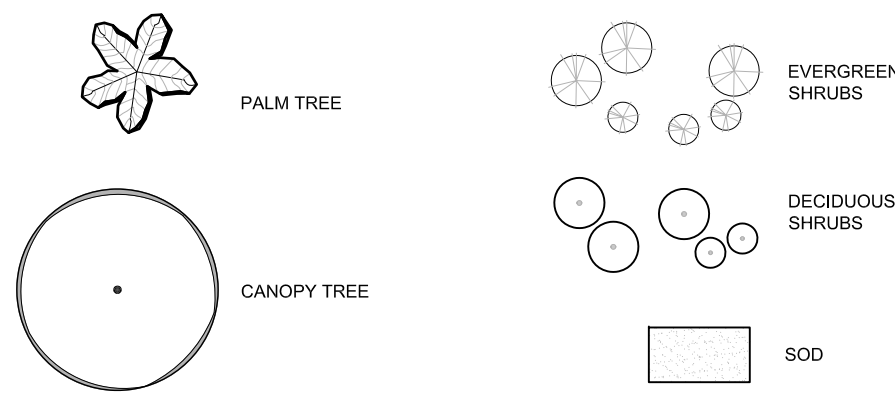
Parcel-I  
Being A Portion of Parcel B  
PIN: 383-00-00-0133  
TMS: 151-00-02-013  
223,929sqft.  
5.14Acres  
Current Owner  
Coastal Carolina University  
Deed Book 3474 Deed Page141  
Plat Book 200 Plat Page 130

Remainder Parent Tract  
Parcel B  
PIN: 383-00-00-0133  
TMS: 151-00-02-013  
± 96.6Acres  
Current Owner  
Coastal Carolina University  
Deed Book 3474 Deed Page141  
Plat Book 200 Plat Page 130





## LANDSCAPE LEGEND



## GENERAL NOTES - LANDSCAPE

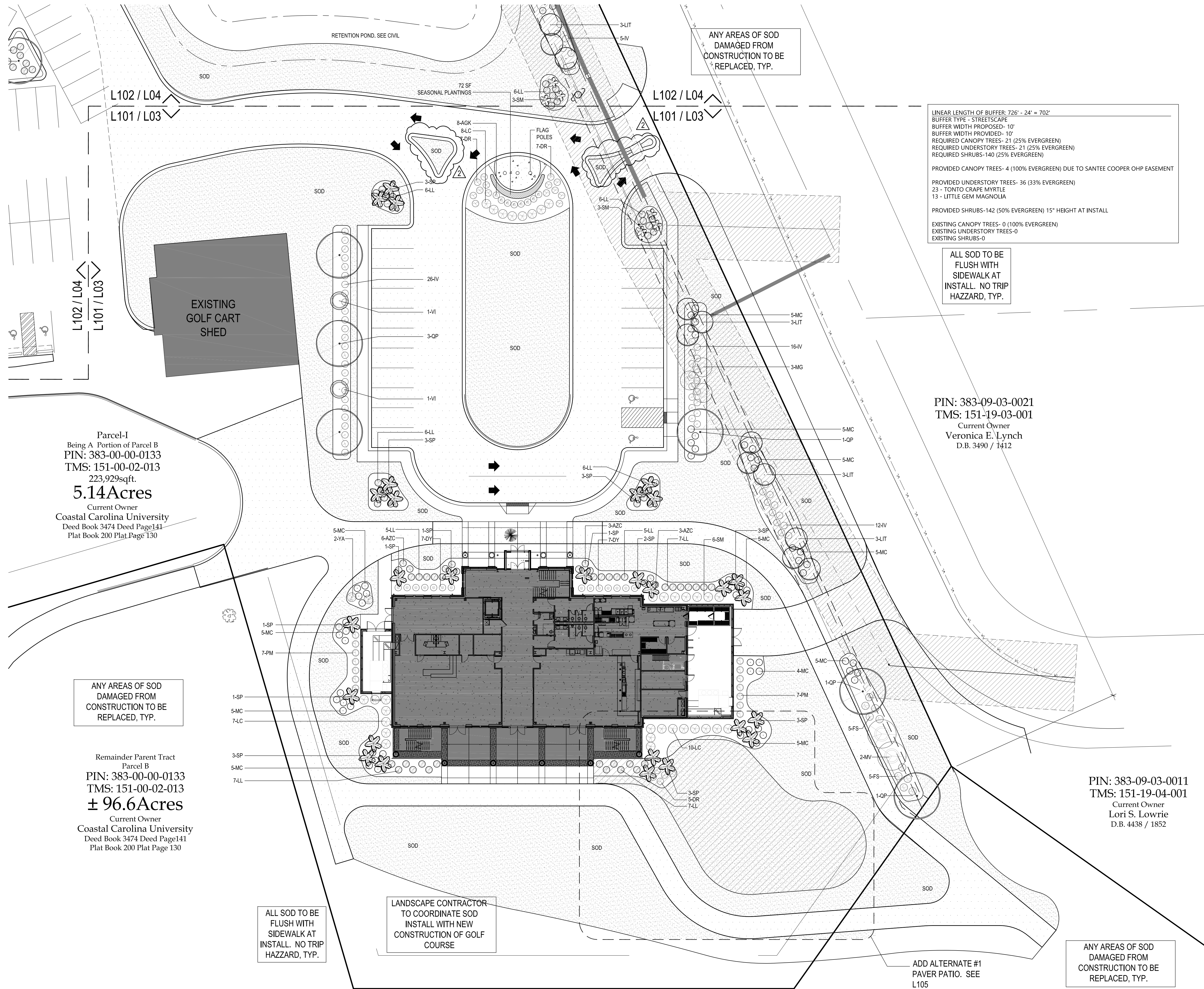
1. ALL SPECIFIED PLANT MATERIAL SHALL COMPLY THE THE AMERICAN STANDARD FOR NURSERY STOCK (ANSI Z60.1-1996). TRUDESIGN STUDIO RESERVES THE RIGHT TO REJECT INFERIOR PLANT MATERIAL.
2. CONTRACTOR / OWNER SHALL NOTIFY TRUDESIGN STUDIO OF ANY CONCERNS WITH PLANT MATERIAL SPECIFIED. OTHERWISE CONTRACTOR / OWNER ASSUMES ALL RESPONSIBILITY IN INSTALLING PLANT MATERIAL INDICATED ON PLANT LIST.
3. LANDSCAPE CONTRACTOR / OWNER SHALL ESTIMATE QUANTITY OF ALL PLANT MATERIALS, SOD AND MULCH. PLANT QUANTITIES ARE ESTIMATES ONLY AND ARE SUBJECT TO FIELD VERIFICATION BY THE LANDSCAPE CONTRACTOR. THE PLANT LIST SHALL OVER RULE THE PLANT LABELS.
4. IF THERE ARE SPECIFIED SHRUBS THAT CANNOT BE LOCATED BY THE CONTRACTOR, THE CONTRACTOR HAS THE OPTION OF SUBSTITUTING ANY OF THOSE SHRUBS THAT CANNOT BE LOCATED. ONLY AFTER THE CONTRACTOR GETS PERMISSION OF SUBSTITUTION FROM TRUDESIGN STUDIO.
5. LANDSCAPE CONTRACTOR RESPONSIBLE FOR LOCATING ALL UTILITIES, ABOVE AND BELOW GROUND, SUCH AS PALMETTO UTILITY PROTECTION SERVICE. PRIOR TO INSTALLATION / CONSTRUCTION
6. ANY EXISTING PLANT MATERIALS OR EXISTING STRUCTURES DAMAGED DURING INSTALLATION OR CONSTRUCTION ARE TO BE REPAIRED OR REPLACED AT CONTRACTORS EXPENSE.
7. ALL CLEARING, AESTHETIC EARTH MOUNDING AND FINAL PLANT LOCATIONS TO BE APPROVED BY TRUDESIGN STUDIO PRIOR TO INSTALLATION.
8. LANDSCAPE CONTRACTOR SHALL BE RESPONSIBLE FOR INSTALLING A ROOT GROWTH BARRIER IN ALL LOCATIONS WHERE THE PLANT ROOTS MAY COME INTO CONTACT WITH ARCHITECTURAL ELEMENTS SUCH AS FOUNDATIONS, WALLS, SIDEWALKS, POOLS, ETC.
9. ALL PLANTING BEDS TO HAVE 3"4" DEPTH OF MULCH.
10. TREES LOCATED IN SOD TO HAVE A MULCH RING AROUND THEM (MULCH RING MINIMUM OF 3'-0" IN DIAMETER)
11. ALL SOD LOCATED ON ANY SLOPE TO BE PINNED DOWN IN PLACE TO PREVENT SLIDING.
12. ALL PLANTED AREAS WILL BE PRE-EMERGED TO INHIBIT WEED GERMINATION. CONTRACTOR RESPONSIBLE FOR WEED GROWTH 30 DAYS AFTER INSTALLATION.
13. HEIGHT OF ANY PLANT MATERIALS WITHIN THE SIGHT TRIANGLE SHALL BE MAINTAINED BY THOSE RESPONSIBLE AS REQUIRED. OWNER SHALL ALSO CONSIDER THE FUTURE MAINTENANCE REQUIREMENTS OF THIS PROJECT TO PREVENT INJURY TO THE PUBLIC.
14. APPLY 8-24-10 FERTILIZER @ 5 LBS. PER 1000 SQUARE FEET TO SOD.
15. LANDSCAPE CONTRACTOR SHALL REMOVE TREE STAKES AND GUYING AFTER 1 YEAR WARRANTY PERIOD HAS ENDED.
16. REFER TO PLANTING DETAILS SHEET OR LANDSCAPE PLAN REGARDING THE INSTALLATION OF PLANT MATERIAL.
17. ALL BEDS TO LAID OUT WITH SPRAY PAINT AND SIGNED OFF BY LANDSCAPE DESIGNER BEFORE BEDS ARE CUT.
18. ALL LANDSCAPE MATERIALS TO BE AUTOMATICALLY IRRIGATED.

| PLANT LIST    |                 |                                      |             |           |        |              |        |  |
|---------------|-----------------|--------------------------------------|-------------|-----------|--------|--------------|--------|--|
| ABR.          | SCIENTIFIC NAME | COMMON NAME                          | QUANTITY    | GAL.      | CAL.   | HT @ INSTALL |        |  |
| TREES / PALMS | MG              | MAGNOLIA 'LITTLE GEM'                | 13          |           | 2" CAL | 10-12' HT    | NATIVE |  |
|               | MV              | MAGNOLIA VIRGINIANA                  | 25          |           | 2" CAL | 10-12' HT    | NATIVE |  |
|               | LIT             | LAGERSTRÖMIA 'TONTIO'                | 25          |           | 2" CAL | 10-12' HT    | NATIVE |  |
|               | SM              | SABAL MINOR                          | 6           |           |        | 36" HT       | NATIVE |  |
|               | SP              | SABAL PALMETTO (REGENERATED)         | 28          |           |        | 10-14' HT    | NATIVE |  |
|               | UP              | ULMUS PARVIFOLIA                     | 5           |           | 2" CAL | 10-14' HT    | NATIVE |  |
|               | VI              | VITEEX AGNUS-CASTUS                  | 10          |           | 2" CAL | 10-12' HT    | NATIVE |  |
|               | OL              | QUERCUS LAURIFOLIA                   | 7           |           | 3" CAL | 10-12' HT    | NATIVE |  |
|               | QP              | QUERCUS PHELLOS 'HIGH RISE'          | 15          |           | 4" CAL | 10-12' HT    | NATIVE |  |
|               |                 |                                      |             |           |        |              |        |  |
| SHRUBS        | AGK             | ABELIA KALEIDOSCOPE                  | 8           |           |        | 15' HT       |        |  |
|               | AZC             | RHOODENDRON ENCORE 'AUTUMN CARNIVAL' | 79          |           |        | 15' HT       |        |  |
|               | DR              | ROSA 'DRIFT'                         | 19          |           |        | 15' HT       |        |  |
|               | DY              | DISTYLUM 'BLUE CASCADE'              | 14          |           |        | 15' HT       | NATIVE |  |
|               | FS              | FELICIA SELLOWIANA                   | 25          |           |        | 15' HT       | NATIVE |  |
|               | IG              | ILEX 'COMPACTA'                      | 48          |           |        | 15' HT       | NATIVE |  |
|               | IV              | ILEX VOMITORIA 'DWARF'               | 125         |           |        | 28" HT       | NATIVE |  |
|               | LC              | LOROPETALUM CHINENSIS 'DARUMA'       | 32          |           |        | 15' HT       |        |  |
|               | LL              | LOMANORA LONGIFOLIA                  | 70          |           |        | 15' HT       | NATIVE |  |
|               | MC              | MULH. ENERGIOSA CAPILLARIS           | 75          |           |        | 15' HT       | NATIVE |  |
|               | PM              | PODOCARPUS MACROPHYLLA               | 14          |           |        | 28" HT       |        |  |
|               | YA              | YUCCA ALOIFOLIA                      | 2           |           |        | 36" HT       |        |  |
|               |                 |                                      |             |           |        |              |        |  |
|               |                 | DOUBLE HAMMERED HARDWOOD MULCH       | 300 YDS     |           |        |              |        |  |
|               |                 | AMENDED SOIL FOR LANDSCAPE BEDS      | 100 YDS     |           |        |              |        |  |
|               |                 | SOD                                  | 419 BERMUDA | 76,000 SF |        |              |        |  |

Parcel-I  
Being A Portion of Parcel B  
PIN: 383-00-00-0133  
TMS: 151-00-02-013  
223,929sqft.  
5.14Acres  
Current Owner  
Coastal Carolina University  
Deed Book 3474 Deed Page141  
Plat Book 200 Plat Page130

ANY AREAS OF SOD  
DAMAGED FROM  
CONSTRUCTION TO BE  
REPLACED, TYP.

Remainder Parent Tract  
Parcel B  
PIN: 383-00-00-0133  
TMS: 151-00-02-013  
± 96.6Acres  
Current Owner  
Coastal Carolina University  
Deed Book 3474 Deed Page141  
Plat Book 200 Plat Page 130

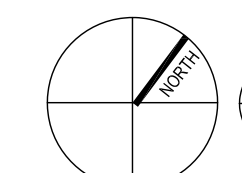


LINEAR LENGTH OF BUFFER: 726' - 24' = 702'  
BUFFER TYPE - STREETSCAPE  
BUFFER WIDTH PROPOSED- 10'  
BUFFER WIDTH PROVIDED- 10'  
REQUIRED CANOPY TREES- 21 (25% EVERGREEN)  
REQUIRED UNDERSTORY TREES- 21 (25% EVERGREEN)  
REQUIRED SHRUBS- 140 (25% EVERGREEN)  
PROVIDED CANOPY TREES- 4 (100% EVERGREEN) DUE TO SANTEE COOPER OHP EASEMENT  
PROVIDED UNDERSTORY TREES- 36 (33% EVERGREEN)  
23 - TONTO GRAPE MYRTLE  
13 - LITTLE GEM MAGNOLIA  
PROVIDED SHRUBS-142 (50% EVERGREEN) 15" HEIGHT AT INSTALL  
EXISTING CANOPY TREES- 0 (100% EVERGREEN)  
EXISTING UNDERSTORY TREES-0  
EXISTING SHRUBS-0

ALL SOD TO BE  
FLUSH WITH  
SIDEWALK AT  
INSTALL. NO TRIP  
HAZZARD, TYP.

PIN: 383-09-03-0021  
TMS: 151-19-03-001  
Current Owner  
Veronica E. Lynch  
D.B. 3490 / 1412

PIN: 383-09-03-0011  
TMS: 151-19-04-001  
Current Owner  
Lori S. Lowrie  
D.B. 4438 / 1852



01 LANDSCAPE PLAN  
L101 /SCALE: 1"= 20'-0"

0 5 10 20 40

A/E SEAL



CORPORATE SEAL



PROJECT TITLE

PGA GOLF MANAGEMENT PROGRAM  
ACADEMIC LEARNING LAB CONSTRUCTION  
COASTAL CAROLINA UNIVERSITY  
107 CITADEL DR. CONWAY, SC 29526

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PHASE  
CONSTRUCTION DOCUMENTS  
FINAL

ISSUE DATE 04.10.24  
PROJECT NO. 22.304.00  
STATE PROJECT NO. H17-9623-MU

REVISION DATE  
07.31.24  
ADDENDUM #2 06.05.25

TITLE  
LANDSCAPE  
PLAN

SHEET NO

L101

trudesign

studio

P.O. BOX 3292  
MURRELLS INLET, SC 29576  
T: 843.855.1154  
npters@trudesignia.com

QUACKENBUSH ARCHITECTS + PLANNERS  
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## LANDSCAPE LEGEND



## GENERAL NOTES - LANDSCAPE

1. ALL SPECIFIED PLANT MATERIAL SHALL COMPLY THE THE AMERICAN STANDARD FOR NURSERY STOCK (ANSI Z60.1-1996). TRUDESIGN STUDIO RESERVES THE RIGHT TO REJECT INFERIOR PLANT MATERIAL.
2. CONTRACTOR / OWNER SHALL NOTIFY TRUDESIGN STUDIO OF ANY CONCERNS WITH PLANT MATERIAL SPECIFIED. OTHERWISE CONTRACTOR / OWNER ASSUMES ALL RESPONSIBILITY IN INSTALLING PLANT MATERIAL INDICATED ON PLANT LIST.
3. LANDSCAPE CONTRACTOR / OWNER SHALL ESTIMATE QUANTITY OF ALL PLANT MATERIALS, SOD AND MULCH. PLANT QUANTITIES ARE ESTIMATES ONLY AND ARE SUBJECT TO FIELD VERIFICATION BY THE LANDSCAPE CONTRACTOR. THE PLANT LIST SHALL OVER RULE THE PLANT LABELS.
4. IF THERE ARE SPECIFIED SHRUBS THAT CANNOT BE LOCATED BY THE CONTRACTOR, THE CONTRACTOR HAS THE OPTION OF SUBSTITUTING ANY OF THOSE SHRUBS THAT CANNOT BE LOCATED. ONLY AFTER THE CONTRACTOR GETS PERMISSION OF SUBSTITUTION FROM TRUDESIGN STUDIO.
5. LANDSCAPE CONTRACTOR RESPONSIBLE FOR LOCATING ALL UTILITIES, ABOVE AND BELOW GROUND, SUCH AS PALMETTO UTILITY PROTECTION SERVICE. PRIOR TO INSTALLATION / CONSTRUCTION
6. ANY EXISTING PLANT MATERIALS OR EXISTING STRUCTURES DAMAGED DURING INSTALLATION OR CONSTRUCTION ARE TO BE REPAIRED OR REPLACED AT CONTRACTORS EXPENSE.
7. ALL CLEARING, AESTHETIC EARTH MOUNDING AND FINAL PLANT LOCATIONS TO BE APPROVED BY TRUDESIGN STUDIO PRIOR TO INSTALLATION.
8. LANDSCAPE CONTRACTOR SHALL BE RESPONSIBLE FOR INSTALLING A ROOT GROWTH BARRIER IN ALL LOCATIONS WHERE THE PLANT ROOTS MAY COME INTO CONTACT WITH ARCHITECTURAL ELEMENTS SUCH AS FOUNDATIONS, WALLS, SIDEWALKS, POOLS, ETC.
9. ALL PLANTING BEDS TO HAVE 3"4" DEPTH OF MULCH.
10. TREES LOCATED IN SOD TO HAVE A MULCH RING AROUND THEM (MULCH RING MINIMUM OF 3'-0" IN DIAMETER)
11. ALL SOD LOCATED ON ANY SLOPE TO BE PINNED DOWN IN PLACE TO PREVENT SLIDING.
12. ALL PLANTED AREAS WILL BE PRE-EMERGED TO INHIBIT WEED GERMINATION. CONTRACTOR RESPONSIBLE FOR WEED GROWTH 30 DAYS AFTER INSTALLATION.
13. HEIGHT OF ANY PLANT MATERIALS WITHIN THE SIGHT TRIANGLE SHALL BE MAINTAINED BY THOSE RESPONSIBLE AS REQUIRED. OWNER SHALL ALSO CONSIDER THE FUTURE MAINTENANCE REQUIREMENTS OF THIS PROJECT TO PREVENT INJURY TO THE PUBLIC.
14. APPLY 8-24-10 FERTILIZER @ 5 LBS. PER 1000 SQUARE FEET TO SOD.
15. LANDSCAPE CONTRACTOR SHALL REMOVE TREE STAKES AND GUYING AFTER 1 YEAR WARRANTY PERIOD HAS ENDED.
16. REFER TO PLANTING DETAILS SHEET OR LANDSCAPE PLAN REGARDING THE INSTALLATION OF PLANT MATERIAL.
17. ALL BEDS TO LAID OUT WITH SPRAY PAINT AND SIGNED OFF BY LANDSCAPE DESIGNER BEFORE BEDS ARE CUT.
18. ALL LANDSCAPE MATERIALS TO BE AUTOMATICALLY IRRIGATED.

|               | PLANT LIST |                                      | QUANTITY                      | GAL.      | CAL.   | HT @ INSTALL |        |
|---------------|------------|--------------------------------------|-------------------------------|-----------|--------|--------------|--------|
|               | ABR.       | SCIENTIFIC NAME                      |                               |           |        |              |        |
| TREES / PALMS | MG         | MAGNOLIA 'LITTLE GEM'                | LITTLE GEM MAGNOLIA           | 13        | 2" CAL | 10-12 HT     | NATIVE |
|               | MV         | MAGNOLIA VIRGINIANA                  | SWEET BAY MAGNOLIA            | 3         | 2" CAL | 10-12 HT     | NATIVE |
|               | LIT        | LAGERSTROMIA 'TONTON'                | TONTON CRAPE MYRTLE           | 23        | 2" CAL | 10-12 HT     | NATIVE |
|               | SM         | SABAL MINOR                          | DWARF SABAL PALM              | 6         |        | 38" HT       | NATIVE |
|               | SP         | SABAL PALMETTO (REGENERATED)         | REGENERATED SABAL PALM        | 28        |        | 10-14 HT     | NATIVE |
|               | UP         | ULMUS PARVIFOLIA                     | LACEBARK ELM                  | 5         | 3" CAL | 10-14 HT     | NATIVE |
|               | VI         | VITEA AGNUS-CASTUS                   | VITEA                         | 10        | 2" CAL | 10-12 HT     | NATIVE |
|               | OL         | QUERCUS LAURIFOLIA                   | LAUREL OAK                    | 7         | 3" CAL | 10-12 HT     | NATIVE |
|               | QP         | QUERCUS PHELLOS 'HIGH RISE'          | HIGHTOWER WILLOW OAK          | 15        | 4" CAL | 10-12 HT     | NATIVE |
|               |            |                                      |                               |           |        |              |        |
| SHRUBS        | AGK        | ABELIA 'KALEIDOSCOPE'                | KALEIDOSCOPE ABELIA           | 8         |        | 15' HT       |        |
|               | AZC        | RHOODENDRON ENCORE 'AUTUMN CARNIVAL' | AUTUMN CARNIVAL ENCORE AZALEA | 79        |        | 15' HT       |        |
|               | DR         | ROSA 'DRIFT'                         | DRIFT ROSE                    | 19        |        | 15' HT       |        |
|               | DY         | DISTYLUM 'BLUE CASCADE'              | BLUE CASCADE DISTYLUM         | 14        |        | 15' HT       | NATIVE |
|               | FS         | FEUJA SELLOWIANA                     | PINEAPPLE GUAVA               | 25        |        | 15' HT       | NATIVE |
|               | IG         | ILEX 'COMPACTA'                      | COMPACTA HOLLY                | 45        |        | 15' HT       | NATIVE |
|               | IV         | ILEX VOMITORIA 'DWARF'               | DWARF YALPONA HOLLY           | 125       |        | 28" HT       | NATIVE |
|               | LC         | LOROPETALUM CHINENSIS 'DARUMA'       | DWARF DARUMA LOROPETALUM      | 32        |        | 15' HT       | NATIVE |
|               | LL         | LOMANDRA LONGIFOLIA                  | BREEZE GRASS                  | 70        |        | 15' HT       | NATIVE |
|               | MC         | MUHLENBERGIA CAPILLARIS              | MUHLI GRASS                   | 75        |        | 15' HT       | NATIVE |
|               | PM         | PODOCARPUS MACROPHYLLA               | PODOCARPUS                    | 14        |        | 28" HT       | NATIVE |
|               | YA         | YUCCA ALOIFOLIA                      | SPANISH BAYONET               | 2         |        | 38" HT       |        |
|               |            | DOUBLE HAMMERED HARDWOOD MULCH       | BROWN                         | 300 YDS   |        |              |        |
|               |            | AMENDED SOIL FOR LANDSCAPE BEDS      |                               | 100 YDS   |        |              |        |
|               |            | SOD                                  | 419 BERMUDA                   | 75,000 SF |        |              |        |

LINEAR LENGTH OF BUFFER: 465'  
BUFFER TYPE - STREETSCAPE  
BUFFER WIDTH PROPOSED- 10'  
BUFFER WIDTH PROVIDED- 10'  
REQUIRED CANOPY TREES- 14 (25% EVERGREEN)  
REQUIRED UNDERSTORY TREES- 14 (25% EVERGREEN)  
REQUIRED SHRUBS-93 (25% EVERGREEN)  
  
PROVIDED CANOPY TREES- 11 (63% EVERGREEN)  
PROVIDED UNDERSTORY TREES- 14 (30% EVERGREEN)  
PROVIDED SHRUBS-97 (100% EVERGREEN) 15" HEIGHT AT INSTALL  
  
EXISTING CANOPY TREES- 3 (100% EVERGREEN)  
EXISTING UNDERSTORY TREES-0  
EXISTING SHRUBS-0

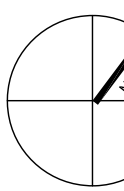
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REQUIRED UNDERSTORY TREES- 21 (25% EVERGREEN)  
REQUIRED SHRUBS-140 (25% EVERGREEN)  
  
PROVIDED CANOPY TREES- 4 (100% EVERGREEN) DUE TO SANTEE COOPER OHP EASEMENT  
PROVIDED UNDERSTORY TREES- 36 (33% EVERGREEN)  
23 - TONTON CRAPE MYRTLE  
13 - LITTLE GEM MAGNOLIA  
  
PROVIDED SHRUBS-142 (50% EVERGREEN) 15" HEIGHT AT INSTALL  
  
EXISTING CANOPY TREES- 0 (100% EVERGREEN)  
EXISTING UNDERSTORY TREES-0  
EXISTING SHRUBS-0

PIN: 383-09-03-0007  
TMS: 151-19-05-007  
Current Owner  
Kenneth & Gale Marlowe  
D.B. 1926 / 681

Parcel H  
PIN: 383-00-00-0133  
TMS: 151-00-02-013  
Coastal Carolina University  
Deed Book 3474 Deed Page141  
Plat Book 200 Plat Page 130

ANY AREAS OF SOD  
DAMAGED FROM  
CONSTRUCTION TO BE  
REPLACED, TYP.

EXISTING  
GOLF CART  
SHED



01 LANDSCAPE PLAN  
L102 / SCALE: 1"= 20'-0"

0 5 10 20 40

trudesign

studio  
P.O. BOX 3292  
MURRELLS INLET, SC 29576  
T: 843.855.1154  
nrd@trudesign.com

ARE SEAL



CORPORATE SEAL



PROJECT TITLE

PGA GOLF MANAGEMENT PROGRAM  
ACADEMIC LEARNING LAB CONSTRUCTION  
COASTAL CAROLINA UNIVERSITY

107 CITADEL DR. CONWAY, SC 29526

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PHASE  
CONSTRUCTION DOCUMENTS  
FINAL

ISSUE DATE 04.10.24  
PROJECT NO. 22.304.00  
STATE PROJECT NO. H17-9623-MU

REVISION DATE  
1 07.31.24  
2 ADDENDUM #2 06.05.25

TITLE  
LANDSCAPE  
PLAN

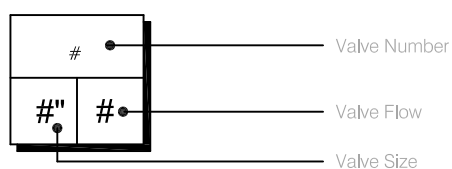
SHEET NO

L102



## IRRIGATION SCHEDULE BASE

| SYMBOL | MANUFACTURER/MODEL                              | QTY      |
|--------|---|----------|
|        | WEATHERMATIC MAX4PRS30 SPRAY HEAD STRIP SERIES  | 53       |
|        | WEATHERMATIC MAX4PRS30 SPRAY HEAD 8 SERIES      | 8        |
|        | WEATHERMATIC MAX4PRS30 SPRAY HEAD 10 SERIES     | 19       |
|        | WEATHERMATIC MAX4PRS30 SPRAY HEAD 12 SERIES     | 6        |
|        | WEATHERMATIC MAX4PRS30 SPRAY HEAD 15 SERIES     | 44       |
|        | HUNTER MP STRIP PROS-04 ROTATOR                 | 20       |
|        | HUNTER MP1000 PROS-04 ROTATOR                   | 19       |
|        | HUNTER MP2000 PROS-04 ROTATOR                   | 58       |
|        | HUNTER MP800SR PROS-04 ROTATOR                  | 9        |
| SYMBOL | MANUFACTURER/MODEL                              | QTY      |
|        | HUNTER PGP-04 ROTOR 1.5                         | 22       |
|        | HUNTER PGP-04 ROTOR 3.0                         | 42       |
|        | HUNTER PGP-04 ROTOR 6.0                         | 1        |
|        | HUNTER PGP-04-LA ROTOR 2.0                      | 16       |
|        | HUNTER PGP-04-LA ROTOR 2.5                      | 21       |
|        | HUNTER PGP-04-LA ROTOR 4.5                      | 11       |
| SYMBOL | MANUFACTURER/MODEL                              | QTY      |
|        | WEATHERMATIC SCZ-MAX-DW-10-25 DRIP VALVE 1"     | 4        |
|        | PIPE TRANSITION POINT                           | 27       |
|        | RAIN BIRD XFCV-06-18 (DRIP RING)                | 6        |
|        | AREA TO RECEIVE DRIPLINE                        |          |
|        | RAIN BIRD XFCV-06-18 (24) (GRID PATTERN)        | 35.4 LF  |
|        | AREA TO RECEIVE DRIPLINE                        |          |
|        | RAIN BIRD XFCV-06-18 (SERPENTINE PATTERN)       | 3,995 LF |
| SYMBOL | MANUFACTURER/MODEL                              | QTY      |
|        | WEATHERMATIC MAX-DW ELECTRIC VALVE 1"           | 3        |
|        | WEATHERMATIC MAX-DW ELECTRIC VALVE 1-1/2"       | 11       |
|        | GATE VALVE (MAINLINE SIZE)                      | 4        |
|        | ZURN 950XL DCA 1-1/2"                           | 1        |
|        | WEATHERMATIC SL1600 CONTROLLER                  | 1        |
|        | WEATHERMATIC SLW1 RAIN SENSOR                   | 1        |
|        | POINT OF CONNECTION                             | 1        |
|        | IRRIGATION LATERAL LINE: PVC SCHEDULE 40 1"     | 7,158 LF |
|        | IRRIGATION LATERAL LINE: PVC SCHEDULE 40 1 1/2" | 1,274 LF |
|        | IRRIGATION LATERAL LINE: PVC SCHEDULE 40 2"     | 140.7 LF |
|        | IRRIGATION MAINLINE: PVC SCHEDULE 40 2"         | 1,763 LF |
|        | PIPE SLEEVE: PVC SCHEDULE 40 2"                 | 170.3 LF |
|        | PIPE SLEEVE: PVC SCHEDULE 40 4"                 | 399.1 LF |



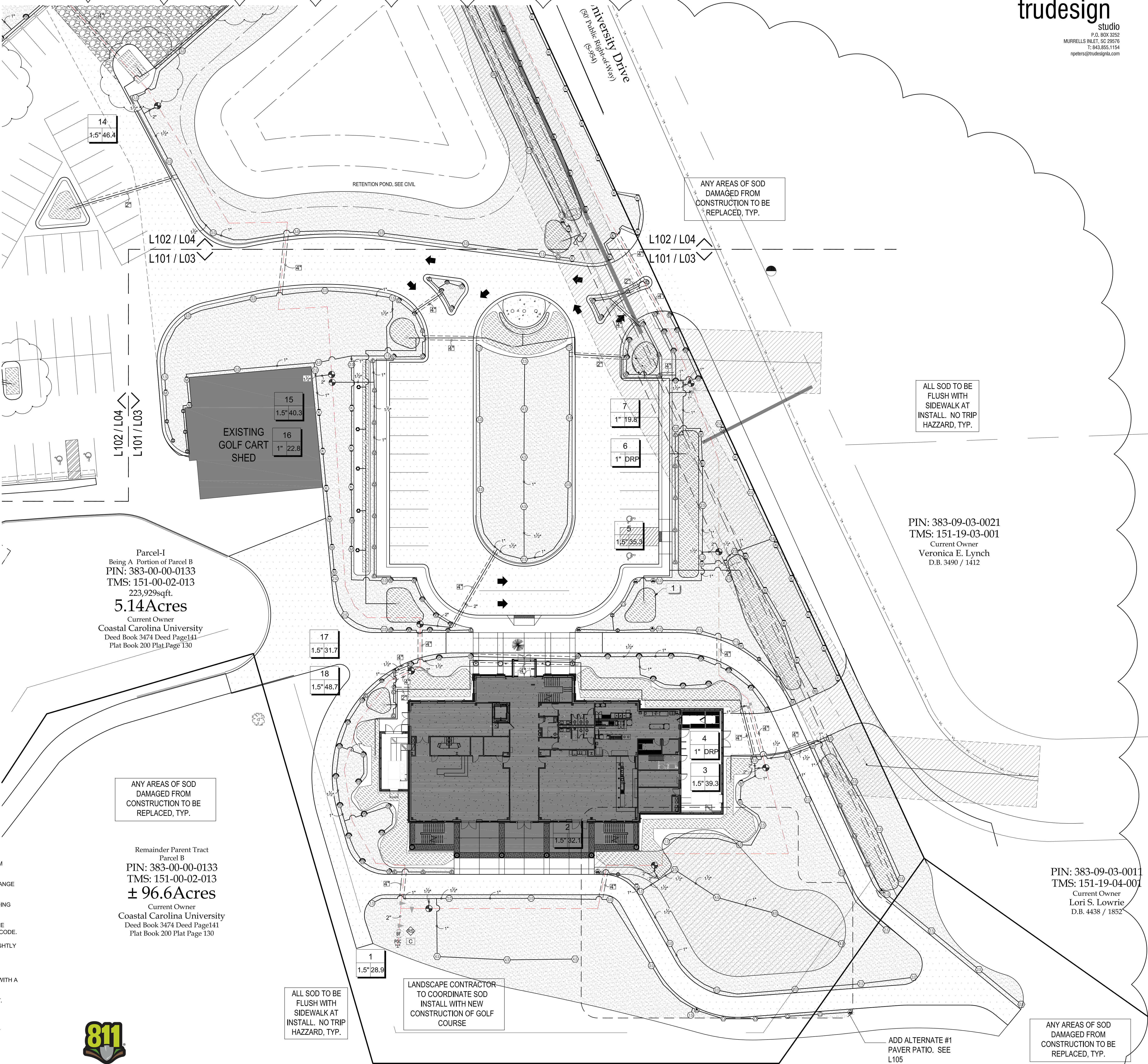
## REFERENCE NOTES\_SCHEDULE

## CODE DESCRIPTION

- 1 ONLY SOD AND PLANT MATERIAL HAVE BEEN COVERED.

## IRRIGATION NOTES

- IRRIGATION SYSTEM DESIGN BASED ON 50 GPM AT 62 PSI.
- IRRIGATION DESIGN IS FROM THE POINT OF CONNECTION (POC) ONLY. THE DESIGN IS BASED ON GALLONS PER MINUTE (GPM) AND POUNDS PER SQUARE INCH (PSI) FURNISHED BY OTHERS.
- IRRIGATION CONTRACTOR IS TO VERIFY POINT OF CONNECTION IN THE FIELD. INSTALLER IS TO CONFIRM THE MINIMUM DISCHARGE REQUIREMENTS OF THE POINT OF CONNECTION AS INDICATED ON THE LEGEND PRIOR TO INSTALLATION.
- THE PRESSURE REQUIREMENT AT THE POINT OF CONNECTION IS BASED ON NO MORE THAN 5-FEET OF ELEVATION CHANGE IN THE AREAS OF IRRIGATION.
- ALL PRODUCTS SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS AND ACCORDING TO LOCAL BUILDING, ELECTRICAL AND PLUMBING CODES.
- IRRIGATION CONTRACTOR WILL ARRANGE INSPECTIONS REQUIRED BY LOCAL AGENCIES AND ORDINANCES DURING THE COURSE OF CONSTRUCTION AS REQUIRED. ALL WIRING TO BE PER LOCAL CODE. BACKFLOW PREVENTION PER LOCAL CODE.
- LOCATION OF IRRIGATION COMPONENTS SHOWN ON DRAWINGS IS APPROXIMATE. ACTUAL PLACEMENT MAY VARY SLIGHTLY AS REQUIRED TO ACHIEVE FULL, EVEN COVERAGE.
- ALL SPRINKLER HEADS SHALL BE INSTALLED PERPENDICULAR TO FINISH GRADES, EXCEPT AS OTHERWISE INDICATED.
- INSTALL IRRIGATION MAINS WITH A MINIMUM 18" OF COVER BASED ON FINISH GRADES. INSTALL IRRIGATION LATERAL WITH A MINIMUM 12" OF COVER BASED ON FINISH GRADES.
- PIPE LOCATIONS ARE DIAGRAMATIC. VALVES AND MAINLINE SHOWN IN PAVED AREAS ARE FOR GRAPHIC CLARITY ONLY.
- THE IRRIGATION CONTRACTOR SHALL COMPLY WITH PIPE SIZES AS INDICATED.
- ALL WIRE SPLICES OR CONNECTIONS SHALL BE MADE WITH APPROVED WATERPROOF WIRE CONNECTORS AND BE IN A VALVE OR SPLICE BOX.
- ALL CONTROL WIRING DOWNSTREAM OF THE CONTROLLER IS TO BE 14 AWG, UL APPROVED DIRECT BURY.



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studio  
P.O. BOX 3292  
MURRELLS INLET, SC 29576  
T: 843.855.1154  
rudesign@trudesignia.com

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A/E SEAL



CORPORATE SEAL



PROJECT TITLE

PGA GOLF MANAGEMENT PROGRAM  
ACADEMIC LEARNING LAB CONSTRUCTION  
COASTAL CAROLINA UNIVERSITY

107 CITABEL DR. CONWAY, SC 29626

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PHASE  
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ISSUE DATE 04.10.24  
PROJECT NO. 22.304.00  
STATE PROJECT NO. H17-9623-MJ

REVISION DATE  
1 07.31.24  
2 ADDENDUM #2 06.05.25

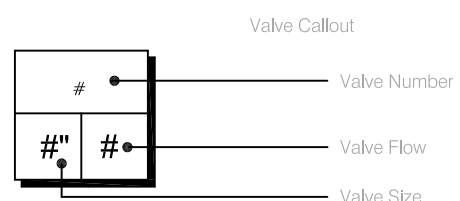
TITLE  
IRRIGATION  
PLAN

SHEET NO

L103



| IRRIGATION SCHEDULE BASE |   |          |
|--------------------------|---|----------|
| SYMBOL                   | MANUFACTURER/MODEL                              | QTY      |
|                          | WEATHERMATIC MAX4PRS30 SPRAY HEAD STRIP SERIES  | 53       |
|                          | WEATHERMATIC MAX4PRS30 SPRAY HEAD 8 SERIES      | 8        |
|                          | WEATHERMATIC MAX4PRS30 SPRAY HEAD 10 SERIES     | 19       |
|                          | WEATHERMATIC MAX4PRS30 SPRAY HEAD 12 SERIES     | 6        |
|                          | WEATHERMATIC MAX4PRS30 SPRAY HEAD 15 SERIES     | 44       |
|                          | HUNTER MP STRIP PROS-04 ROTATOR                 | 20       |
|                          | HUNTER MP1000 PROS-04 ROTATOR                   | 19       |
|                          | HUNTER MP2000 PROS-04 ROTATOR                   | 58       |
|                          | HUNTER MP800SR PROS-04 ROTATOR                  | 9        |
| SYMBOL                   | MANUFACTURER/MODEL                              | QTY      |
|                          | HUNTER PGP-04 ROTOR 1.5                         | 22       |
|                          | HUNTER PGP-04 ROTOR 3.0                         | 42       |
|                          | HUNTER PGP-04 ROTOR 6.0                         | 1        |
|                          | HUNTER PGP-04-LA ROTOR 2.0                      | 16       |
|                          | HUNTER PGP-04-LA ROTOR 2.5                      | 21       |
|                          | HUNTER PGP-04-LA ROTOR 4.5                      | 11       |
| SYMBOL                   | MANUFACTURER/MODEL                              | QTY      |
|                          | WEATHERMATIC SC2-MAX-DW-10-25 DRIP VALVE 1"     | 4        |
|                          | PIPE TRANSITION POINT                           | 27       |
|                          | RAIN BIRD XFCV-06-18 (DRIP RING)                | 6        |
|                          | AREA TO RECEIVE DRIPLINE                        | 35.4 LF  |
|                          | RAIN BIRD XFCV-06-18 (24) (GRID PATTERN)        |          |
|                          | RAIN BIRD XFCV-06-18 (SERPENTINE PATTERN)       | 3,995 LF |
| SYMBOL                   | MANUFACTURER/MODEL                              | QTY      |
|                          | WEATHERMATIC MAX-DW ELECTRIC VALVE 1"           | 3        |
|                          | WEATHERMATIC MAX-DW ELECTRIC VALVE 1-1/2"       | 11       |
|                          | GATE VALVE (MAINLINE SIZE)                      | 4        |
|                          | ZURN 950XL DCA 1-1/2"                           | 1        |
|                          | WEATHERMATIC SL1600 CONTROLLER                  | 1        |
|                          | WEATHERMATIC SLW1 RAIN SENSOR                   | 1        |
|                          | POINT OF CONNECTION                             | 1        |
|                          | IRRIGATION LATERAL LINE: PVC SCHEDULE 40 1"     | 7,158 LF |
|                          | IRRIGATION LATERAL LINE: PVC SCHEDULE 40 1 1/2" | 1,274 LF |
|                          | IRRIGATION LATERAL LINE: PVC SCHEDULE 40 2"     | 140.7 LF |
|                          | IRRIGATION MAINLINE: PVC SCHEDULE 40 2"         | 1,763 LF |
|                          | PIPE SLEEVE: PVC SCHEDULE 40 2"                 | 170.3 LF |
|                          | PIPE SLEEVE: PVC SCHEDULE 40 4"                 | 399.1 LF |



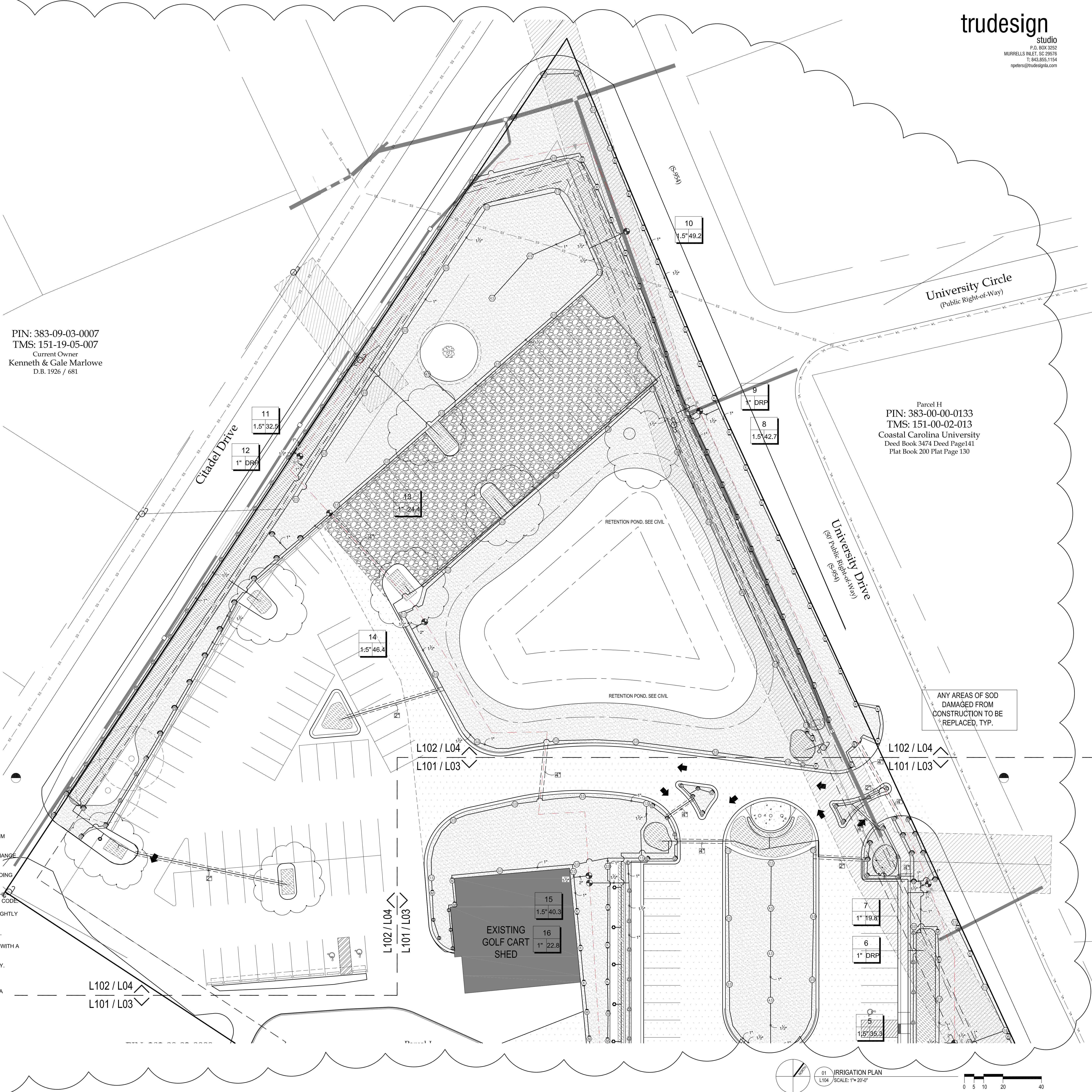
### REFERENCE\_NOTES\_SCHEDULE

| CODE | DESCRIPTION                                    |
|------|--|
| 1    | ONLY SOD AND PLANT MATERIAL HAVE BEEN COVERED. |

### IRRIGATION NOTES

- IRRIGATION SYSTEM DESIGN BASED ON 50 GPM AT 62 PSI.
- IRRIGATION DESIGN IS FROM THE POINT OF CONNECTION (POC) ONLY. THE DESIGN IS BASED ON GALLONS PER MINUTE(GPM)AND POUNDS PER SQUARE INCH(PSI)FURNISHED BY OTHERS.
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- ALL SPRINKLER HEADS SHALL BE INSTALLED PERPENDICULAR TO FINISH GRADES, EXCEPT AS OTHERWISE INDICATED.
- INSTALL IRRIGATION MAINS WITH A MINIMUM 18" OF COVER BASED ON FINISH GRADES. INSTALL IRRIGATION LATERAL WITH A MINIMUM 12" OF COVER BASED ON FINISH GRADES.
- PIPE LOCATIONS ARE DIAGRAMMATIC. VALVES AND MAINLINE SHOWN IN PAVED AREAS ARE FOR GRAPHIC CLARITY ONLY.
- THE IRRIGATION CONTRACTOR SHALL COMPLY WITH PIPE SIZES AS INDICATED.
- ALL WIRE SPLICES OR CONNECTIONS SHALL BE MADE WITH APPROVED WATERPROOF WIRE CONNECTORS AND BE IN A VALVE OR SPLICE BOX.
- ALL CONTROL WIRING DOWNSTREAM OF THE CONTROLLER IS TO BE 14 AWG, UL APPROVED DIRECT BURY.

PIN: 383-09-03-0007  
TMS: 151-19-05-007  
Current Owner  
Kenneth & Gale Marlowe  
D.B. 1926 / 681



trudesign  
studio  
P.O. BOX 3292  
MURRELLS INLET, SC 29576  
T: 843.855.1154  
npters@trudesignla.com

Parcel H  
PIN: 383-00-00-0133  
TMS: 151-00-02-013  
Coastal Carolina University  
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Plat Book 200 Plat Page130

ANY AREAS OF SOD  
DAMAGED FROM  
CONSTRUCTION TO BE  
REPLACED, TYP.

ASE SEAL



CORPORATE SEAL



PROJECT TITLE

PGA GOLF MANAGEMENT PROGRAM  
ACADEMIC LEARNING LAB CONSTRUCTION  
COASTAL CAROLINA UNIVERSITY  
107 CITADEL DR. CONWAY, SC 29626

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PHASE  
CONSTRUCTION DOCUMENTS  
FINAL

ISSUE DATE 04.10.24  
PROJECT NO. 22.304.00  
STATE PROJECT NO. H17-9623-MJ

REVISION DATE  
1 07.31.24  
2 ADDENDUM #2 06.05.25

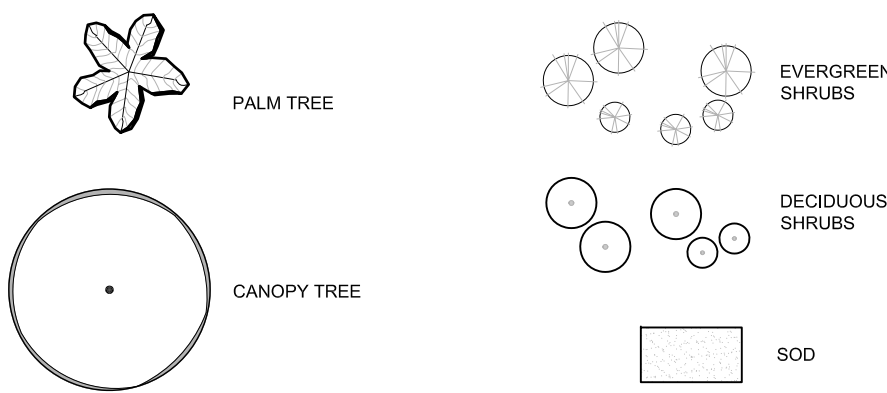
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
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LANDSCAPE LEGEND



- GENERAL NOTES - LANDSCAPE
1. ALL SPECIFIED PLANT MATERIAL SHALL COMPLY THE THE AMERICAN STANDARD FOR NURSERY STOCK (ANSI Z60.1-1996). TRUDESIGN STUDIO RESERVES THE RIGHT TO REJECT INFERIOR PLANT MATERIAL.
  2. CONTRACTOR / OWNER SHALL NOTIFY TRUDESIGN STUDIO OF ANY CONCERNS WITH PLANT MATERIAL SPECIFIED. OTHERWISE CONTRACTOR / OWNER ASSUMES ALL RESPONSIBILITY IN INSTALLING PLANT MATERIAL INDICATED ON PLANT LIST.
  3. LANDSCAPE CONTRACTOR / OWNER SHALL ESTIMATE QUANTITY OF ALL PLANT MATERIALS, SOD AND MULCH. PLANT QUANTITIES ARE ESTIMATES ONLY AND ARE SUBJECT TO FIELD VERIFICATION BY THE LANDSCAPE CONTRACTOR. THE PLANT LIST SHALL OVER RULE THE PLANT LABELS.
  4. IF THERE ARE SPECIFIED SHRUBS THAT CANNOT BE LOCATED BY THE CONTRACTOR, THE CONTRACTOR HAS THE OPTION OF SUBSTITUTING ANY OF THOSE SHRUBS THAT CANNOT BE LOCATED. ONLY AFTER THE CONTRACTOR GETS PERMISSION OF SUBSTITUTION FROM TRUDESIGN STUDIO.
  5. LANDSCAPE CONTRACTOR RESPONSIBLE FOR LOCATING ALL UTILITIES. ABOVE AND BELOW GROUND, SUCH AS PALMETTO UTILITY PROTECTION SERVICE. PRIOR TO INSTALLATION / CONSTRUCTION
  6. ANY EXISTING PLANT MATERIALS OR EXISTING STRUCTURES DAMAGED DURING INSTALLATION OR CONSTRUCTION ARE TO BE REPAIRED OR REPLACED AT CONTRACTORS EXPENSE.
  7. ALL CLEARING, AESTHETIC EARTH MOUNDING AND FINAL PLANT LOCATIONS TO BE APPROVED BY TRUDESIGN STUDIO PRIOR TO INSTALLATION.
  8. LANDSCAPE CONTRACTOR SHALL BE RESPONSIBLE FOR INSTALLING A ROOT GROWTH BARRIER IN ALL LOCATIONS WHERE THE PLANT ROOTS MAY COME INTO CONTACT WITH ARCHITECTURAL ELEMENTS SUCH AS FOUNDATIONS, WALLS, SIDEWALKS, POOLS, ETC.
  9. ALL PLANTING BEDS TO HAVE 3"-4" DEPTH OF MULCH.
  10. TREES LOCATED IN SOD TO HAVE A MULCH RING AROUND THEM (MULCH RING MINIMUM OF 3'-0" IN DIAMETER)
  11. ALL SOD LOCATED ON ANY SLOPE TO BE PINNED DOWN IN PLACE TO PREVENT SLIDING.
  12. ALL PLANTED AREAS WILL BE PRE-EMERGED TO INHIBIT WEED GERMINATION. CONTRACTOR RESPONSIBLE FOR WEED GROWTH 30 DAYS AFTER INSTALLATION.
  13. HEIGHT OF ANY PLANT MATERIALS WITHIN THE SIGHT TRIANGLE SHALL BE MAINTAINED BY THOSE RESPONSIBLE AS REQUIRED. OWNER SHALL ALSO CONSIDER THE FUTURE MAINTENANCE REQUIREMENTS OF THIS PROJECT TO PREVENT INJURY TO THE PUBLIC.
  14. APPLY 8-24-10 FERTILIZER @ 5 LBS. PER 1000 SQUARE FEET TO SOD.
  15. LANDSCAPE CONTRACTOR SHALL REMOVE TREE STAKES AND GUYING AFTER 1 YEAR WARRANTY PERIOD HAS ENDED.
  16. REFER TO PLANTING DETAILS SHEET OR LANDSCAPE PLAN REGARDING THE INSTALLATION OF PLANT MATERIAL.
  17. ALL BEDS TO LAID OUT WITH SPRAY PAINT AND SIGNED OFF BY LANDSCAPE DESIGNER BEFORE BEDS ARE CUT.
  18. ALL LANDSCAPE MATERIALS TO BE AUTOMATICALLY IRRIGATED.

| PLANT LIST    |      |                                      |                               |          |   |        |              |        |
|---------------|------|--------------------------------------|-------------------------------|----------|---|--------|--------------|--------|
|               | ABR. | SCIENTIFIC NAME                      | COMMON NAME                   | QUANTITY | GAL.  | CAL.   | HT @ INSTALL |        |
| TREES / PALMS | MG   | MAGNOLIA 'LITTLE GEM'                | LITTLE GEM MAGNOLIA           | 13       |  | 2" CAL | 10-12 HT     | NATIVE |
|               | MV   | MAGNOLIA VIRGINIANA                  | SWEET BAY MAGNOLIA            | 3        |   | 2" CAL | 10-12 HT     | NATIVE |
|               | LIT  | LAGERSTROMIEIA 'TONTO'               | TONTO GRAPE MYRTLE            | 23       |   | 2" CAL | 10-12 HT     |        |
|               | SM   | SABAL MINOR                          | DWARF SABAL PALM              | 6        |   |        | 38" HT       | NATIVE |
|               | SP   | SABAL PALMETTO (REGENERATED)         | REGENERATED SABAL PALM        | 28       |   |        | 10-14 HT     | NATIVE |
|               | UP   | ULMUS PARVIFOLIA                     | LASBARK ELM                   | 5        |   | 3" CAL | 10-14 HT     |        |
|               | VI   | VITEX AGNUS-CASTUS                   | VITEX                         | 10       |   |        | 10-12 HT     |        |
|               | OL   | QUERCUS LAURIFOLIA                   | LAUREL OAK                    | 7        |   | 3" CAL | 10-12 HT     | NATIVE |
|               | OP   | QUERCUS PHELLOS 'HIGH RISE'          | HIGHTOWER WILLOW OAK          | 15       |  | 4" CAL | 10-12 HT     | NATIVE |
|               |      |                                      |                               |          |   |        |              |        |
|               |      |                                      |                               |          |   |        |              |        |
| SHRUBS        | AGK  | ABELIA 'KALEIDOSCOPE'                | KALEIDOSCOPE ABELIA           | 8        |   |        | 15' HT       |        |
|               | AZC  | RHOODENDRON ENCORE 'AUTUMN CARNIVAL' | AUTUMN CARNIVAL ENCORE AZALEA | 79       |   |        | 15' HT       |        |
|               | DR   | ROSA 'DRIFT'                         | DRIFT ROSE                    | 19       |   |        | 15' HT       |        |
|               | DY   | DISTYLUM 'BLUE CASCADE'              | BLUE CASCADE DISTYLUM         | 14       |   |        | 15' HT       | NATIVE |
|               | FS   | FEIJOA SELLOWIANA                    | PINEAPPLE GUAVA               | 24       |   |        | 15' HT       |        |
|               | IG   | ILEX 'COMPACTA'                      | COMPACTA HOLLY                | 48       |  |        | 15' HT       | NATIVE |
|               | IV   | ILEX VOMITORIA DWARF                 | DWARF YAUPOIN HOLLY           | 125      |   |        | 28" HT       | NATIVE |
|               | LC   | LOROPETALUM CHINENSIS 'DARUMA'       | DWARF DARUMA LOROPETALUM      | 32       |   |        | 15' HT       |        |
|               | LL   | LOMONDRA LONGIFOLIA                  | BREEZE GRASS                  | 70       |   |        | 15' HT       | NATIVE |
|               | MC   | MUHLENBERGIA CAPILLARIS              | MULRY GRASS                   | 76       |   |        | 15' HT       |        |
|               | PM   | PODOCARPUS MACROPHYLLA               | PODOCARPUS                    | 14       |   |        | 28" HT       |        |
|               | YA   | YUCCA ALBOFOLIA                      | SPANISH BAYONET               | 2        |   |        | 38" HT       |        |
|               |      |                                      |                               |          |   |        |              |        |
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RMF ENGINEERING, INC.  
194 SEVEN FARMS DRIVE  
SUITE G  
CHARLESTON, SC 29492  
P: 843-971-9639 F: 843-971-9641  
RMF PROJECT #: 03220511.A0

AIR HANDLING UNIT SCHEDULE

| AIR HANDLING UNIT SCHEDULE |          |              |       |             |         |             |          |            |             |     |                   |      |          |      |                      |                         |             |            |      |      |       |              |                 |         |
|----------------------------|----------|--------------|-------|-------------|---------|-------------|----------|------------|-------------|-----|-------------------|------|----------|------|----------------------|-------------------------|-------------|------------|------|------|-------|--------------|-----------------|---------|
| DESIGNATION                | LOCATION | SERVICE      | CFM   | SUPPLY FAN  |         |             |          | RELIEF FAN |             |     | COOLING COIL DATA |      |          |      |                      |                         | REFRIGERANT | ELECTRICAL |      |      |       | WEIGHT (LBS) | BASIS OF DESIGN | REMARKS |
|                            |          |              |       | OUTSIDE AIR |         | ESP (IN WC) | MOTOR HP | CFM        | ESP (IN WC) | HP  | EAT (°F)          |      | LAT (°F) |      | TOTAL CAPACITY (MBH) | SENSIBLE CAPACITY (MBH) |             | V/Ø/HZ     | MCA  | MOCP |       |              |                 |         |
|                            |          |              |       | DESIGN      | MINIMUM |             |          |            |             |     | DB                | WB   | DB       | WB   |                      |                         |             |            |      |      |       |              |                 |         |
| AHU-1                      | GRADE    | FIRST FLOOR  | 7,200 | 4,135       | 1,970   | 2.0         | 10       | 4,135      | 0.50        | 2   | 79.4              | 67.0 | 52.5     | 52.0 | 325.7                | 212.4                   | R-454B      | 460/3/60   | 81.3 | 100  | 3,075 | TRANE / OAD  |                 |         |
| AHU-2                      | GRADE    | SECOND FLOOR | 6,050 | 3,300       | 1,155   | 2.0         | 7 1/2    | 3,300      | 0.50        | 1.5 | 78.1              | 65.1 | 52.5     | 52.0 | 247.5                | 168.0                   | R-454B      | 460/3/60   | 63.8 | 80   | 3,240 | TRANE / OAD  |                 |         |



BUILDING DESIGN COMMISSIONING DATA

|    |  |  |
|----|--|--|
| 1. | OUTSIDE DESIGN CONDITIONS:<br><br>SUMMER<br>SUMMER (DEHUMIDIFICATION):<br>WINTER:  | 91.2°F DB / 77.1°F WB<br>82.2°F DB / 79.9°F WB<br>27.6 °F  |
| 2. | GENERAL BUILDING CRITERIA:<br><br>WALL U-FACTOR:<br>ROOF U-FACTOR:<br>GLASS U-FACTOR:<br>GLASS SHADING COEFFICIENT:  | 0.043<br>0.048<br>0.29<br>0.287  |
| 3. | GENERAL BUILDING DESIGN LOAD REQUIREMENTS:<br><br>LIGHTING:<br>EQUIPMENT:<br>PEOPLE (OFFICE-SENSIBLE):<br>PEOPLE (OFFICE-LATENT):<br>PEOPLE (DINING-SENSIBLE):<br>PEOPLE (DINING-LATENT):<br>PEOPLE (SIM LAB-SENSIBLE):<br>PEOPLE (SIM LAB-LATENT):                            | 1.0 - 2 W/SF<br>1.5 - 2.5 W/SF<br>155 BTU/HPERSON<br>155 BTU/HPERSON<br>250 BTU/HPERSON<br>200 BTU/HPERSON<br>305 BTU/HPERSON<br>545 BTU/HPERSON |
| 4. | COMFORT HEATING:<br><br>INTERIOR SPACES  | 70°F ±2°F  |
| 5. | COMFORT COOLING:<br><br>INTERIOR SPACES  | 74°F ±2°F / 50% RH   |
| 6. | MINIMUM BUILDING POSITIVE PRESSURE:  | 0.05" WG   |
| 7. | GENERAL EXHAUST CRITERIA:<br><br>TOILETS/URINALS:<br>CUSTODIAL:  | 75 CFM/FIXTURE<br>1 CFM/SF   |
| 8. | CODES:<br><br>INTERNATIONAL BUIDING CODE, 2021<br>INTERNATIONAL MECHANICAL CODE, 2021<br>INTERNATIONAL PLUMBING CODE, 2021<br>INTERNATIONAL ENERGY CONSERVATION CODE, 2009<br>NATIONAL ELECTRIC CODE, 2020<br>NATIONAL FIRE PROTECTION ASSOCIATION STANDARDS (LATEST EDITIONS) |  |

BRANCH CONTROLLER SCHEDULE

| DESIGNATION | NO. BRANCHES | REFRIGERANT | V/Ø/Hz   | WEIGHT (LB) | REMARKS |
|-------------|--------------|-------------|----------|-------------|---------|
| BC-1        | 3            | R-454B      | 208/1/60 | 25          | 1       |

1. BRANCH CONTROLLER SHALL BE POWERED FROM OUTDOOR UNIT.

SUPPLY VAV UNIT SCHEDULE

| SUPPLY VAV UNIT SCHEDULE |               |         |         |            |             |                           |            |                                    |                          |          |                          |                         |          |                 |         |
|--------------------------|---------------|---------|---------|------------|-------------|---------------------------|------------|------------------------------------|--------------------------|----------|--------------------------|-------------------------|----------|-----------------|---------|
| DESIGNATION              | AIRFLOW (CFM) |         |         | INLET SIZE | OUTLET SIZE | MINIMUM INLET SP (IN H2O) | MAXIMUM NC | MAXIMUM AIR PRESSURE DROP (IN H2O) | HEATING COIL PERFORMANCE |          |                          |                         | V/Ø/HZ   | BASIS OF DESIGN | REMARKS |
|                          | COOLING       |         | HEATING |            |             |                           |            |                                    | EAT (°F)                 | LAT (°F) | CALCULATED CAPACITY (KW) | CONNECTED CAPACITY (KW) |          |                 |         |
|                          | MAXIMUM       | MINIMUM | MAXIMUM |            |             |                           |            |                                    |                          |          |                          |                         |          |                 |         |
| VAV-1-1                  | 1115          | 495     | 1000    | 14"ø       | 16"x15"     | 0.50                      | 30         | 0.30                               | 55                       | 80       | 7.9                      | 8.0                     | 480/3/60 | TITUS DESV      |         |
| VAV-1-2                  | 1285          | 495     | 1000    | 14"ø       | 16"x15"     | 0.50                      | 30         | 0.30                               | 55                       | 80       | 7.9                      | 8.0                     | 480/3/60 | TITUS DESV      |         |
| VAV-1-3                  | 550           | 300     | 300     | 6"ø        | 12"x8"      | 0.50                      | 30         | 0.30                               | 55                       | 80       | 2.4                      | 2.5                     | 277/1/60 | TITUS DESV      |         |
| VAV-1-4                  | 1190          | 720     | 1100    | 14"ø       | 20"x18"     | 0.50                      | 30         | 0.30                               | 55                       | 84       | 10.1                     | 10.5                    | 480/3/60 | TITUS DESV      |         |
| VAV-1-5                  | 1225          | 370     | 880     | 14"ø       | 20"x18"     | 0.50                      | 30         | 0.30                               | 55                       | 84       | 8.1                      | 8.5                     | 480/3/60 | TITUS DESV      |         |
| VAV-1-6                  | 275           | 150     | 150     | 6"ø        | 12"x8"      | 0.50                      | 30         | 0.30                               | 55                       | 80       | 1.2                      | 1.5                     | 277/1/60 | TITUS DESV      |         |
| VAV-1-7                  | 435           | 200     | 435     | 8"ø        | 14"x12"     | 0.50                      | 30         | 0.30                               | 55                       | 84       | 4.0                      | 4.0                     | 480/3/60 | TITUS DESV      |         |
| VAV-1-8                  | 695           | 300     | 695     | 10"ø       | 14"x12"     | 0.50                      | 30         | 0.30                               | 55                       | 82       | 5.9                      | 6.0                     | 480/3/60 | TITUS DESV      |         |
| VAV-2-1                  | 1590          | 480     | 930     | 16"ø       | 24"x18"     | 0.50                      | 30         | 0.30                               | 55                       | 84       | 8.5                      | 9.0                     | 480/3/60 | TITUS DESV      |         |
| VAV-2-2                  | 480           | 530     | 530     | 8"ø        | 12"x10"     | 0.50                      | 30         | 0.30                               | 55                       | 80       | 4.2                      | 4.5                     | 480/3/60 | TITUS DESV      |         |
| VAV-2-3                  | 1340          | 635     | 1335    | 14"ø       | 20"x18"     | 0.50                      | 30         | 0.30                               | 55                       | 84       | 12.3                     | 12.5                    | 480/3/60 | TITUS DESV      |         |
| VAV-2-4                  | 505           | 200     | 385     | 8"ø        | 12"x10"     | 0.50                      | 30         | 0.30                               | 55                       | 84       | 3.5                      | 4.0                     | 480/3/60 | TITUS DESV      |         |
| VAV-2-5                  | 535           | 165     | 405     | 8"ø        | 12"x10"     | 0.50                      | 30         | 0.30                               | 55                       | 84       | 3.7                      | 4.0                     | 480/3/60 | TITUS DESV      |         |
| VAV-2-6                  | 610           | 210     | 440     | 10"ø       | 14"x12"     | 0.50                      | 30         | 0.30                               | 55                       | 84       | 4.0                      | 4.5                     | 480/3/60 | TITUS DESV      |         |
| VAV-2-7                  | 890           | 270     | 310     | 16"ø       | 16"x15"     | 0.50                      | 30         | 0.30                               | 55                       | 84       | 1.0                      | 3.0                     | 480/3/60 | TITUS DESV      |         |

DIRECT EXPANSION FAN COIL UNIT SCHEDULE

| DIRECT EXPANSION FAN COIL UNIT SCHEDULE |              |                  |             |      |           |    |          |      |              |          |          |              |        |     |             |       |       |                 |         |       |
|---|--------------|------------------|-------------|------|-----------|----|----------|------|--------------|----------|----------|--------------|--------|-----|-------------|-------|-------|-----------------|---------|-------|
| DESIGNATION                             |              | MOUNTING         | FAN         |      | COIL DUTY |    |          |      |              |          |          |              |        |     | ELECTRICAL  |       |       | BASIS OF DESIGN | REMARKS |       |
| INDOOR UNIT                             | OUTDOOR UNIT |                  | NOM AIRFLOW | HP   | COOLING   |    |          |      |              | HEATING  |          |              |        |     | REFRIGERANT | VOLTS | PHASE |                 |         | HERTZ |
|   |              |                  |             |      | EAT (°F)  |    | LAT (°F) |      | SENSIBLE MBH | EAT (°F) | LAT (°F) | SENSIBLE MBH |        |     |             |       |       |                 |         |       |
|   |              |                  |             |      | DB        | WB | DB       | WB   |              |          |          |              |        |     |             |       |       |                 |         |       |
| FCU-1                                   | SSAC-1       | WALL             | 775         | 1/10 | 80        | 67 | 55       | 54.5 | 24.0         | --       | --       | --           | R-454B | 208 | 1           | 60    | TRANE | 1               |         |       |
| FCU-2                                   | SSAC-2       | WALL             | 775         | 1/10 | 80        | 67 | 55       | 54.5 | 24.0         | --       | --       | --           | R-454B | 208 | 1           | 60    | TRANE | 1               |         |       |
| FCU-3                                   | SSAC-3       | WALL             | 775         | 1/10 | 80        | 67 | 55       | 54.5 | 24.0         | --       | --       | --           | R-454B | 208 | 1           | 60    | TRANE | 1               |         |       |
| FCU-4                                   | SSHP-4       | CEILING CASSETTE | 710         | 1/10 | 75        | 62 | 55       | 54.5 | 24.0         | 70       | 84       | 3.2          | R-454B | 208 | 1           | 60    | TRANE | 1               |         |       |
| FCU-5                                   | SSHP-4       | CEILING CASSETTE | 335         | 1/15 | 75        | 62 | 55       | 54.5 | 12.0         | 70       | 84       | 1.6          | R-454B | 208 | 1           | 60    | TRANE | 1               |         |       |
| FCU-6                                   | SSHP-4       | CEILING CASSETTE | 335         | 1/15 | 75        | 62 | 55       | 54.5 | 12.0         | 70       | 84       | 1.6          | R-454B | 208 | 1           | 60    | TRANE | 1               |         |       |
| FCU-7                                   | SSHP-5       | WALL             | 190         | 1/25 | 80        | 67 | 55       | 54.5 | 4.3          | 70       | 84       | 1.6          | R-454B | 208 | 1           | 60    | TRANE | 1               |         |       |

1. INDOOR UNIT SHALL BE POWERED FROM OUTDOOR UNIT.

SPLIT SYSTEM CONDENSING UNIT SCHEDULE

| DESIGNATION | COMPRESSOR |      | TOTAL LOAD (MBH) | ELECTRICAL |       |       |      | BASIS OF DESIGN | WEIGHT | REMARKS |
|-------------|------------|------|------------------|------------|-------|-------|------|-----------------|--------|---------|
|             | RLA        | LRA  |                  | VOLTS      | PHASE | HERTZ | MCA  |                 |        |         |
|             | 7.0        | 11.0 | 24.0             | 208        | 1     | 60    | 19.0 | 26.0            | TRANE  | 155 1   |
| SSAC-2      | 7.0        | 11.0 | 24.0             | 208        | 1     | 60    | 19.0 | 26.0            | TRANE  | 155 1   |
| SSAC-3      | 7.0        | 11.0 | 24.0             | 208        | 1     | 60    | 19.0 | 26.0            | TRANE  | 155 1   |
| SSHP-4      | 19.0       | 22.0 | 48.0             | 208        | 1     | 60    | 35.0 | 50.0            | TRANE  | 275 1   |
| SSHP-5      | 7.0        | 11.0 | 6.0              | 208        | 1     | 60    | 19.0 | 26.0            | TRANE  | 155 1   |

AIR DEVICE SCHEDULE

| NUMBER | DUTY    | TYPE | CFM |     | FACE/MODULE SIZE (IN) | NOMINAL DUCT SIZE (IN) | BLOW         | MAX TOTAL AIR PD (IN H2O) | MAX NOISE CRITERIA VALUE | BASIS OF DESIGN |         | REMARKS |
|--------|---------|------|-----|-----|-----------------------|------------------------|--------------|---------------------------|--------------------------|-----------------|---------|---------|
|        |         |      | MIN | MAX |                       |                        |              |                           |                          | MANUFACTURER    | MODEL   |         |
| A1     | SUPPLY  | A    | 0   | 200 | 24"x24"               | 6"ø                    | 4-WAY        | 0.10                      | 25                       | TITUS           | OMNI    | -       |
| A2     | SUPPLY  | A    | 201 | 325 | 24"x24"               | 8"ø                    | 4-WAY        | 0.10                      | 25                       | TITUS           | OMNI    | -       |
| A3     | SUPPLY  | A    | 326 | 425 | 24"x24"               | 10"ø                   | 4-WAY        | 0.10                      | 25                       | TITUS           | OMNI    | -       |
| B1     | SUPPLY  | B    | 0   | 275 | 18"ø                  | 8"ø                    | ROUND        | 0.10                      | 25                       | TITUS           | R- OMNI | -       |
| C1     | SUPPLY  | C    | 116 | 135 | 48"x6"-8" (2 SLOT)    | 8"ø                    | ADJ FLOW BAR | 0.10                      | 25                       | TITUS           | ML      | -       |
| C2     | SUPPLY  | C    | 151 | 175 | 48"x6"-8" (3 SLOT)    | 8"ø                    | ADJ FLOW BAR | 0.10                      | 25                       | TITUS           | ML      | -       |
| C3     | SUPPLY  | C    | 211 | 230 | 48"x6"-10" (4 SLOT)   | 10"ø                   | ADJ FLOW BAR | 0.10                      | 25                       | TITUS           | ML      | -       |
| C7     | SUPPLY  | C    | 251 | 400 | 48"x6"-8" (3 SLOT)    | 12"x6"                 | ADJ FLOW BAR | 0.10                      | 25                       | TITUS           | ML      | -       |
| D1     | SUPPLY  | D    | 0   | 300 | 48"x6"-8" (2 SLOT)    | 12"x6"                 | ADJ FLOW BAR | 0.10                      | 25                       | TITUS           | FL      | -       |
| E1     | SUPPLY  | E    | 0   | 300 | 48x06x3-SLOT          | 8"ø                    | ADJ FLOW BAR | 0.10                      | 25                       | TITUS           | CT-480  | 1       |
| F1     | RETURN  | F    | 0   | 150 | 24"x24"               | 6"ø                    | -            | 0.05                      | 20                       | TITUS           | PAR     | -       |
| F2     | RETURN  | F    | 151 | 240 | 24"x24"               | 8"ø                    | -            | 0.05                      | 20                       | TITUS           | PAR     | -       |
| F3     | RETURN  | F    | 241 | 330 | 24"x24"               | 10"ø                   | -            | 0.05                      | 20                       | TITUS           | PAR     | -       |
| F4     | RETURN  | F    | 505 | 700 | 24"x24"               | 15"x15"                | -            | 0.05                      | 20                       | TITUS           | PAR     | -       |
| G1     | RETURN  | G    | 151 | 175 | 48"x6"-8" (3 SLOT)    | 8"ø                    | ADJ FLOW BAR | 0.05                      | 20                       | TITUS           | ML      | -       |
| G2     | RETURN  | G    | 211 | 230 | 48"x6"-10" (4 SLOT)   | 10"ø                   | ADJ FLOW BAR | 0.05                      | 20                       | TITUS           | ML      | -       |
| H1     | EXHAUST | H    | 0   | 150 | 24"x24"               | 6"x6"                  | -            | 0.05                      | 20                       | TITUS           | 350R    | -       |
| H2     | EXHAUST | H    | 151 | 250 | 24"x24"               | 8"x8"                  | -            | 0.05                      | 20                       | TITUS           | 350R    | -       |
| I1     | EXHAUST | I    | 151 | 175 | 48"x6"-8" (3 SLOT)    | 8"ø                    | ADJ FLOW BAR | 0.05                      | 20                       | TITUS           | ML      | -       |

1. PROVIDE WITH MANUFACTURER'S STANDARD PRIMER FINISH. DIFFUSER SHALL BE FINISHED ON SITE BY THE PAINTING CONTRACTOR.

FAN SCHEDULE

| DESIGNATION | SERVICE      | TYPE | CFM  | SP INCH H2O | APPROX RPM | MOTOR |     | DRIVE  | V/Ø/HZ   | VFD | APPROX WEIGHT (LBS) | BASIS OF DESIGN | REMARKS |
|-------------|--------------|------|------|-------------|------------|-------|-----|--------|----------|-----|---------------------|-----------------|---------|
|             |              |      |      |             |            | BHP   | HP  |        |          |     |                     |                 |         |
| GEF-1       | KITCHEN      | A    | 700  | 0.5         | 1,230      | 0.11  | 1/4 | DIRECT | 115/60/1 | YES | 45                  | GREENHECK/CUE   | 2       |
| KEF-1       | KITCHEN HOOD | B    | 3480 | 2.0         | 1,275      | 2.35  | 5   | DIRECT | 480/3/60 | YES | 215                 | CAPTIVE AIRE    | 1,2     |
| TEF-1       | TOILET       | A    | 925  | 0.75        | 1,485      | 0.25  | 1/4 | DIRECT | 115/60/1 | YES | 65                  | GREENHECK/CUBE  | 2       |

1. PROVIDE WITH MANUFACTURER'S HINGE KIT, GREASE CUP, AND UL762 LISTING.  
2. PROVIDE WITH MANUFACTURER'S FACTORY WIRED AND INSTALLED SPEED CONTROLLER.

MAKE-UP AIR SCHEDULE SCHEDULE

| DESIGNATION | SERVICE   | CFM  | NO. OF FANS | TSP (IN WG) | ESP (IN WG) | FAN RPM | MOTOR |    | DRIVE  | DB EAT (°F) | DB LAT (°F) | CALCULATED CAPACITY (KW) | CONNECTED CAPACITY (KW) | ELECTRICAL |       |       | APPROX WEIGHT (LBS) | BASIS OF DESIGN | REMARKS |
|-------------|-----------|------|-------------|-------------|-------------|---------|-------|----|--------|-------------|-------------|--------------------------|-------------------------|------------|-------|-------|---------------------|-----------------|---------|
|             |           |      |             |             |             |         | BHP   | HP |        |             |             |                          |                         | VOLTS      | PHASE | HERTZ |                     |                 |         |
| MAU-1       | MAIN HOOD | 2785 | 1           |             | 1.0         | 1,280   | 1.20  | 2  | DIRECT | 28.0        | 70.0        | 37.2                     | 40                      | 460        | 3     | 60    | 670                 | CAPTIVE AIRE    | 1       |

1. PROVIDE WITH ONE ELECTRICAL CONNECTION FOR FAN AND ONE FOR THE ELECTRIC HEATER.



## SECTION 237416.13 - PACKAGED, LARGE-CAPACITY, ROOFTOP AIR-CONDITIONING UNITS

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section includes packaged, large-capacity, rooftop air conditioning units (RTUs) with the following components:
  - 1. Casings.
  - 2. Fans, drives, and motors.
  - 3. Rotary heat exchanger.
  - 4. Coils.
  - 5. Refrigerant circuit components.
  - 6. Air filtration.
  - 7. Gas furnaces.
  - 8. UV germicidal irradiation section.
  - 9. Sound-attenuator section.
  - 10. Dampers.
  - 11. Electrical power connections.
  - 12. Controls.
  - 13. Roof curbs.
  - 14. Accessories.

#### 1.3 DEFINITIONS

- A. RTU: Rooftop unit. As used in this Section, this abbreviation means packaged, large-capacity, rooftop air-conditioning units. This abbreviation is used regardless of whether the unit is mounted on the roof or on a concrete base on ground.

#### 1.4 ACTION SUBMITTALS

- A. Product Data: For each RTU.
  - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
  - 2. Include rated capacities, dimensions, required clearances, characteristics, furnished specialties, and accessories.
  - 3. Include unit dimensions and weight.



4. Include cabinet material, metal thickness, finishes, insulation, and accessories.
  5. Fans:
    - a. Include certified fan-performance curves with system operating conditions indicated.
    - b. Include certified fan-sound power ratings.
    - c. Include fan construction and accessories.
    - d. Include motor ratings, electrical characteristics, and motor accessories.
  6. Include certified coil-performance ratings with system operating conditions indicated.
  7. Include filters with performance characteristics.
  8. Include gas furnaces with performance characteristics.
  9. Include factory selection calculations for each antimicrobial ultraviolet lamp installation.
  10. Include dampers, including housings, linkages, and operators.
- B. Shop Drawings: For each packaged, large-capacity, rooftop air-conditioning units.
1. Include plans, elevations, sections, and mounting details.
  2. Include details of equipment assemblies. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
  3. Include diagrams for power, signal, and control wiring.
- C. Delegated-Design Submittal: For RTU supports indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
1. Include design calculations for selecting vibration isolators and seismic restraints and for designing vibration isolation bases.
  2. Detail mounting, securing, and flashing of roof curb to roof structure. Indicate coordinating requirements with roof membrane system.
  3. Wind- and Seismic-Restraint Details: Detail fabrication and attachment of wind and seismic restraints and snubbers. Show anchorage details and indicate quantity, diameter, and depth of penetration of anchors.

## 1.5 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Floor plans and other details, or BIM model, drawn to scale, showing the items described in this Section, and coordinated with all building trades.
- B. Sample Warranty: For manufacturer's warranty.
- C. Seismic Qualification Data: Certificates, for RTUs, accessories, and components, from manufacturer.
1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
  2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.



3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.
  4. Restraint of internal components.
- D. Product Certificates: Submit certification that specified equipment will withstand wind forces identified in "Performance Requirements" Article and in Section 230548 "Vibration and Seismic Controls for HVAC."
1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculations.
  2. Dimensioned Outline Drawings of Equipment Unit: Identify center of wind force and locate and describe mounting and anchorage provisions.
  3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.
- E. Source quality-control reports.
- F. System startup reports.
- G. Field quality-control reports.

#### 1.6 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For RTUs to include in emergency, operation, and maintenance manuals.

#### 1.7 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
1. Filters: One set(s) of filters for each unit.
  2. Gaskets: One set(s) for each access door.

#### 1.8 WARRANTY

- A. Warranty: Manufacturer agrees to repair or replace components of outdoor, semi-custom, air-handling unit that fail in materials or workmanship within specified warranty period.
1. Warranty Period: One year(s) from date of Substantial Completion.
  2. Warranty Period for Compressor: Five years(s) from date of Substantial Completion.



## PART 2 - PRODUCTS

### 2.1 PERFORMANCE REQUIREMENTS

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by an NRTL, and marked for intended location and application.
- B. NFPA Compliance: Comply with NFPA 90A for design, fabrication, and installation of RTUs and components.
- C. ASHRAE 62.1 Compliance: Applicable requirements in ASHRAE 62.1, Section 5 - "Systems and Equipment" and Section 7 - "Construction and Startup."
- D. ASHRAE 15 Compliance: For refrigeration system safety.
- E. ASHRAE/IES 90.1 Compliance: Applicable requirements in ASHRAE/IES 90.1, Section 6 - "Heating, Ventilating, and Air-Conditioning."
- F. UL Compliance: Comply with UL 1995.
- G. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design mounting and restraints for RTUs, including comprehensive engineering analysis.
  - 1. Design RTU supports to comply with wind and seismic performance requirements.
- H. Wind-Restraint Performance:
  - 1. Refer to structural drawings for wind loading requirements.
- I. Seismic Performance: RTUs shall withstand the effects of earthquake motions determined according to ASCE 7.
  - 1. The term "withstand" means "the unit will remain in place without separation of any parts when subjected to the seismic forces specified".
  - 2. Component Importance Factor: **1.0**.

### 2.2 MANUFACTURERS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide **Trane OAD** or comparable product by one of the following:
  - 1. JCI/York
  - 2. Trane
  - 3. Valent
  - 4. **Daikin**



## 2.3 UNIT CASINGS

- A. General Fabrication Requirements for Casings: Formed and reinforced double-wall insulated panels, fabricated to allow removal for access to internal parts and components, with joints between sections sealed.
- B. Double-Wall Construction:
  - 1. Outside Casing Wall: Galvanized steel, minimum 18 gauge thick with corrosion-resistant coating, with pitched roof panels and knockouts with grommet seals for electrical and piping connections and lifting lugs.
  - 2. Inside Casing Wall: G90-coated galvanized steel, 0.034 inch thick.
  - 3. Floor Plate: G90 galvanized steel minimum 18 gauge thick.
  - 4. Casing Insulation:
    - a. Materials: Injected polyurethane foam insulation.
    - b. Casing Panel R-Value: Minimum R13.
    - c. Insulation Thickness: 2 inches.
    - d. Thermal Break: Provide continuity of insulation with no through-casing metal in casing walls, floors, or roof of unit.
- C. Airstream Surfaces: Surfaces in contact with airstream shall comply with requirements in ASHRAE 62.1.
- D. Static-Pressure Classifications:
  - 1. For Unit Sections Upstream of Fans: Minus 2-inch wg.
  - 2. For Unit Sections Downstream and Including Fans: 3-inch wg.
- E. Panels and Doors:
  - 1. Panels:
    - a. Fabrication: Formed and reinforced with same materials and insulation thickness as casing.
    - b. Fasteners: Two or more camlock type for panel lift-out operation. Arrangement shall allow panels to be opened against air-pressure differential.
    - c. Gasket: Neoprene, applied around entire perimeters of panel frames.
    - d. Size: Large enough to allow inspection and maintenance of air-handling unit's internal components. Dimensions to be at least 18 inches wide by full height of unit casing.
  - 2. Access Doors:
    - a. Hinges: A minimum of two ball-bearing hinges or stainless steel piano hinge and two wedge-lever-type latches, operable from inside and outside. Arrange doors to be opened against air-pressure differential.
    - b. Gasket: Neoprene, applied around entire perimeters of panel frames.



- c. Size: Large enough to allow inspection and maintenance of air-handling unit's internal components. Dimensions to be at least 18 inches wide by full height of unit casing.
- 3. Locations and Applications:
  - a. Fan Section: Doors and inspection and access panels.
  - b. Access Section: Doors.
  - c. Coil Section: Inspection and access panels.
  - d. Damper Section: Doors.
  - e. Filter Section: Doors large enough to allow periodic removal and installation of filters.
  - f. Mixing Section: Doors.
- 4. Service Light: 100-W vaporproof fixture with switched junction box located outside adjacent to door.
  - a. Locations: Fan section.
- F. Condensate Drain Pans:
  - 1. Location: Each type of cooling coil.
  - 2. Construction:
    - a. Single-wall, stainless steel sheet.
  - 3. Drain Connection:
    - a. Located at lowest point of pan and sized to prevent overflow. Terminate with threaded nipple on one end of pan.
    - b. Minimum Connection Size: NPS 1.
  - 4. Slope: Minimum 0.125-in./ft. slope, to comply with ASHRAE 62.1, in at least two planes to collect condensate from cooling coils (including coil piping connections, coil headers, and return bends) and from humidifiers and to direct water toward drain connection.
  - 5. Length: Extend drain pan downstream from leaving face for distance to comply with ASHRAE 62.1.
  - 6. Width: Entire width of water producing device.
  - 7. Depth: A minimum of 2 inches deep.
  - 8. Units with stacked coils shall have an intermediate drain pan to collect condensate from top coil.

## 2.4 FANS, DRIVES, AND MOTORS

- A. Fan and Drive Assemblies: Statically and dynamically balanced and designed for continuous operation at maximum-rated fan speed and motor horsepower.
- B. Supply-Air Fans: Centrifugal, rated according to AMCA 210; galvanized or painted steel; mounted on solid-steel shaft.



1. Shafts: With field-adjustable alignment.
    - a. Turned, ground, and polished hot-rolled steel with keyway.
  2. Shaft Bearings:
    - a. Heavy-duty, self-aligning, pillow-block type with an L-50 rated life of minimum 100,000 hours according to ABMA 9.
  3. Housings: Formed- and reinforced-steel panels to form curved scroll housings with shaped cutoff and spun-metal inlet bell.
    - a. Bracing: Steel angle or channel supports for mounting and supporting fan scroll, wheel, motor, and accessories.
  4. Centrifugal Fan Wheels: Inlet flange, backplate, and shallow blades with inlet and tip curved forward in direction of airflow and mechanically fastened to flange and backplate; steel or aluminum hub swaged to backplate and fastened to shaft with setscrews.
  5. Mounting: For internal vibration isolation and seismic control. Factory-mount fans with manufacturer's standard vibration isolation mounting devices having a minimum static deflection of 1 inch.
  6. Shaft Lubrication Lines: Extended to a location outside the casing.
  7. Flexible Connector: Factory fabricated with a fabric strip minimum 3-1/2 inches wide, attached to two strips of minimum 2-3/4-inch-wide by 0.028-inch-thick, galvanized-steel sheet.
    - a. Flexible Connector Fabric: Glass fabric, double coated with neoprene. Fabrics, coatings, and adhesives shall comply with UL 181, Class 1.
- C. Drives, Direct: Factory-mounted, direct drive.
- D. Condenser-Coil Fan: Variable-speed propeller, mounted on shaft of permanently lubricated ECM motors.
- E. Relief-Air Fan: Similar construction to supply fan.
- F. Motors:
1. Comply with NEMA designation, temperature rating, service factor, and efficiency requirements for motors specified in Section 230513 "Common Motor Requirements for HVAC Equipment."
  2. Motor Sizes: Minimum size as indicated. If not indicated, large enough so driven load will not require motor to operate in service factor range above 1.0.
  3. Enclosure Type: Open, dripproof.
  4. Enclosure Materials: Cast iron.
  5. Efficiency: Premium efficient as defined in NEMA MG 1.
  6. Controllers, Electrical Devices, and Wiring: Comply with requirements for electrical devices and connections specified in electrical Sections.



## 2.5 COILS

### A. General Requirements for Coils:

1. Comply with AHRI 410.
2. Fabricate coils section to allow removal and replacement of coil for maintenance and to allow in-place access for service and maintenance of coil(s).
3. Coils shall not act as structural component of unit.

### B. Supply-Air Refrigerant Coil:

1. Tubes: Copper.
2. Fins:
  - a. Material: Aluminum.
  - b. Fin Spacing: Maximum 10 fins per inch.
3. Fin and Tube Joints: Mechanical bond.
4. Headers: Seamless-copper headers with brazed connections.
5. Frames: Galvanized steel.
6. Coatings: Corrosion-resistant coating.
7. Ratings: Designed, tested, and rated according to ASHRAE 33 and AHRI 410.
  - a. Working Pressure: Minimum 300 psig.

## 2.6 REFRIGERANT CIRCUIT COMPONENTS

### A. Number of Refrigerant Circuits: Two.

### B. Compressor: Hermetic, variable speed scroll, mounted on vibration isolators; with internal overcurrent and high-temperature protection, internal pressure relief, and crankcase heater.

### C. Refrigeration Specialties:

1. Refrigerant: **R-454b or R-32.**
2. Expansion valve with replaceable thermostatic element.
3. Refrigerant filter/dryer.
4. Manual-reset high-pressure safety switch.
5. Automatic-reset low-pressure safety switch.
6. Minimum off-time relay.
7. Automatic-reset compressor motor thermal overload.
8. Brass service valves installed in compressor suction and liquid lines.
9. Low-ambient kit high-pressure sensor.

## 2.7 AIR FILTRATION

### A. Particulate air filtration is specified in Section 234100 "Particulate Air Filtration."



B. Panel Filters:

1. Description: Flat, non-pleated factory-fabricated, self-supported, disposable air filters with holding frames.
2. Filter Unit Class: UL 900.
3. Media: Interlaced glass, synthetic or cotton fibers coated with nonflammable adhesive and antimicrobial coating.
4. Filter-Media Frame: Beverage board with perforated metal retainer, or metal grid, on outlet side.

C. Adhesive, Sustainability Projects: As recommended by air-filter manufacturer and with a VOC content of 80 g/L or less.

2.8 DAMPERS

A. Dampers: Comply with requirements in Section 230923.12 "Control Dampers."

B. Outdoor- and Return-Air Dampers: Low-leakage, double-skin, airfoil-blade, galvanized-steel dampers with compressible jamb seals and extruded-vinyl blade edge seals in opposed-blade arrangement with zinc-plated steel operating rods rotating in sintered bronze or bearings mounted in a single galvanized-steel frame, and with operating rods connected with a common linkage. Leakage rate shall not exceed 4 cfm/sq. ft. at 1-inch wg and 8 cfm/sq. ft at 4-inch wg.

C. Barometric relief dampers.

D. Damper Operators: Comply with requirements in Section 230923.12 "Control Dampers."

2.9 ELECTRICAL POWER CONNECTIONS

A. RTU shall have a single connection of power to unit with unit-mounted disconnect switch accessible from outside unit and control-circuit transformer with built-in overcurrent protection.

2.10 CONTROLS

A. Interface Requirements for HVAC Instrumentation and Control System:

1. Interface relay for scheduled operation.
2. Interface relay to provide indication of fault at the central workstation and diagnostic code storage.
3. Provide BACnet compatible interface for central HVAC control workstation for the following:
  - a. Adjusting set points.
  - b. Monitoring supply fan start, stop, and operation.
  - c. Inquiring data to include outdoor-air damper position, supply- and room-air temperature and humidity.
  - d. Monitoring occupied and unoccupied operations.



- e. Monitoring constant and variable motor loads.
- f. Monitoring variable-frequency drive operation.
- g. Monitoring cooling load.
- h. Monitoring economizer cycles.
- i. Monitoring air-distribution static pressure and ventilation air volume.

## 2.11 ROOF CURBS

- A. Roof curbs with vibration isolators and wind or seismic restraints are specified in Section 230548 "Vibration and Seismic Controls for HVAC."
- B. Wind and Seismic Restraints: Metal brackets compatible with the curb and casing, painted to match RTU, used to anchor unit to the curb, and designed for loads at Project site. Comply with requirements in Section 230548 "Vibration and Seismic Controls for HVAC" for wind-load requirements.
- C. Materials: Galvanized steel with corrosion-protection coating, watertight gaskets, and factory-installed wood nailer; complying with NRCA standards.
  - 1. Curb Insulation and Adhesive: Comply with NFPA 90A or NFPA 90B.
    - a. Materials: ASTM C1071, Type I or II.
    - b. Thickness: 2 inch.
  - 2. Application: Factory applied with adhesive and mechanical fasteners to the internal surface of curb.
    - a. Liner Adhesive: Comply with ASTM C916, Type I.
    - b. Mechanical Fasteners: Galvanized steel, suitable for adhesive attachment, mechanical attachment, or welding attachment to duct without damaging liner when applied as recommended by manufacturer and without causing leakage in cabinet.
    - c. Liner materials applied in this location shall have air-stream surface coated with a temperature-resistant coating or faced with a plain or coated fibrous mat or fabric depending on service air velocity.
    - d. Liner Adhesive: Comply with ASTM C916, Type I.
- D. Curb Dimensions: Height of 36 inches.

## 2.12 ACCESSORIES

- A. Duplex, 115-V, ground-fault-interrupter outlet with 15-A overcurrent protection. Include transformer if required. Outlet shall be energized even if the unit main disconnect is open.
- B. Low-ambient kit using variable-speed condenser fans for operation down to 35 deg F.
- C. Filter differential pressure switch with sensor tubing on either side of filter. Set for final filter pressure loss.



- D. Remote potentiometer to adjust minimum economizer damper position.
- E. Return-air bypass damper.
- F. Factory- or field-installed demand-controlled ventilation.
- G. Safeties:
  - 1. Condensate overflow switch.
  - 2. Phase-loss reversal protection.
  - 3. High and low pressure control.
- H. Coil guards of painted, galvanized-steel wire.
- I. Hail guards of galvanized steel, painted to match casing.
- J. Concentric diffuser with white louvers and polished aluminum return grilles, insulated diffuser box with mounting flanges, and interior transition.
- K. Door switches to disable heating or reset set point when open.
- L. Outdoor air intake ducted connection.
- M. Service Lights and Switch: Factory installed in fan section with weatherproof cover. Factory wire lights to a single-point field connection.

## 2.13 MATERIALS

- A. Steel:
  - 1. ASTM A36/A36M for carbon structural steel.
  - 2. ASTM A568/A568M for steel sheet.
- B. Stainless Steel:
  - 1. Manufacturer's standard grade for casing.
  - 2. Manufacturer's standard type, ASTM A240/A240M for bare steel exposed to airstream or moisture.
- C. Galvanized Steel: ASTM A653/A653M.
- D. Aluminum: ASTM B209.
- E. Corrosion-Resistant Coating: Coat with a corrosion-resistant coating capable of withstanding a **10,000-hour** salt-spray test according to ASTM B117.
  - 1. Standards:
    - a. ASTM B117 for salt spray.
    - b. ASTM D2794 for minimum impact resistance of 100 in-lb
    - c. ASTM B3359 for cross-hatch adhesion of 5B.



## 2.14 SOURCE QUALITY CONTROL

### A. AHRI Compliance:

1. Comply with AHRI 340/360 for testing and rating energy efficiencies for RTUs.
2. Comply with AHRI 210/240 for testing and rating energy efficiencies for RTUs

### B. AMCA Compliance:

1. Comply with AMCA 11 and bear the AMCA-Certified Ratings Seal for air and sound performance according to AMCA 211 and AMCA 311.
2. Damper leakage tested in accordance with AMCA 500-D.
3. Operating Limits: Classify according to AMCA 99.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of RTUs.
- B. Examine roughing-in for RTUs to verify actual locations of piping and duct connections before equipment installation.
- C. Examine roofs for suitable conditions where RTUs will be installed.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 INSTALLATION

- A. Roof Curb: Install on roof structure or concrete base, level and secure, according to Manufacturer's requirements. Install RTUs on curbs and coordinate roof penetrations and flashing with roof construction specified in Section 077200 "Roof Accessories." Secure RTUs to upper curb rail, and secure curb base to roof framing or concrete base with anchor bolts. Coordinate sizes and locations of roof curbs with actual equipment provided.
- B. Equipment Mounting:
  1. Install RTUs on cast-in-place concrete equipment bases. Comply with requirements for equipment bases and foundations specified in Section 033000 "Cast-in-Place Concrete."
  2. Comply with requirements for vibration isolation and seismic control devices specified in Section 230548 "Vibration and Seismic Controls for HVAC."

### 3.3 PIPING CONNECTIONS

- A. Piping installation requirements are specified in other Sections. Drawings indicate general arrangement of piping, fittings, and specialties.



- B. Where installing piping adjacent to RTU, allow space for service and maintenance.
- C. Connect piping to unit mounted on vibration isolators with flexible connectors.
- D. Connect condensate drain pans using NPS 1-1/2, ASTM B88, Type M copper tubing. Extend to nearest equipment or roof drain. Construct deep trap at connection to drain pan and install cleanouts at changes in direction.
- E. Refrigerant Piping: Comply with applicable requirements in Section 232300 "Refrigerant Piping." Install shutoff valve and union or flange at each supply and return connection.

### 3.4 DUCT CONNECTIONS

- A. Comply with duct installation requirements specified in other HVAC Sections. Drawings indicate the general arrangement of ducts. The following are specific connection requirements:
  - 1. Install ducts to termination at top of roof curb.
  - 2. Remove roof decking only as required for passage of ducts. Do not cut out decking under entire roof curb.
  - 3. Connect supply ducts to RTUs with flexible duct connectors specified in Section 233300 "Air Duct Accessories."
  - 4. Install return-air duct continuously through roof structure.

### 3.5 ELECTRICAL CONNECTIONS

- A. Connect electrical wiring according to Section 260519 "Low-Voltage Electrical Power Conductors and Cables."
- B. Ground equipment according to Section 260526 "Grounding and Bonding for Electrical Systems."
- C. Install electrical devices furnished by manufacturer, but not factory mounted, according to NFPA 70 and NECA 1.
- D. Install nameplate for each electrical connection, indicating electrical equipment designation and circuit number feeding connection.
  - 1. Nameplate shall be laminated acrylic or melamine plastic signs as specified in Section 260553 "Identification for Electrical Systems."
  - 2. Locate nameplate where easily visible.

### 3.6 CONTROL CONNECTIONS

- A. Install control and electrical power wiring to field-mounted control devices.
- B. Connect control wiring according to Section 260523 "Control-Voltage Electrical Power Cables."



### 3.7 STARTUP SERVICE

- A. Engage a factory-authorized service representative to perform startup service.
- B. Complete installation and startup checks according to manufacturer's written instructions.
  - 1. Inspect for visible damage to unit casing.
  - 2. Inspect for visible damage to furnace combustion chamber.
  - 3. Inspect for visible damage to compressor, coils, and fans.
  - 4. Inspect internal insulation.
  - 5. Verify that labels are clearly visible.
  - 6. Verify that clearances have been provided for servicing.
  - 7. Verify that controls are connected and operable.
  - 8. Verify that filters are installed.
  - 9. Clean condenser coil and inspect for construction debris.
  - 10. Remove packing from vibration isolators.
  - 11. Inspect operation of barometric relief dampers.
  - 12. Verify lubrication on fan and motor bearings.
  - 13. Start unit according to manufacturer's written instructions.
    - a. Start refrigeration system.
    - b. Do not operate below recommended low-ambient temperature.
    - c. Complete startup sheets and attach copy with Contractor's startup report.
  - 14. Inspect and record performance of interlocks and protective devices; verify sequences.
  - 15. Operate unit for an initial period as recommended or required by manufacturer.
  - 16. Calibrate thermostats.
  - 17. Adjust and inspect high-temperature limits.
  - 18. Inspect outdoor-air dampers for proper stroke and interlock with return-air dampers.
  - 19. Start refrigeration system and measure and record the following when ambient is a minimum of 15 deg F above return-air temperature:
    - a. Coil leaving-air, dry- and wet-bulb temperatures.
    - b. Coil entering-air, dry- and wet-bulb temperatures.
    - c. Outdoor-air, dry-bulb temperature.
    - d. Outdoor-air-coil, discharge-air, dry-bulb temperature.
  - 20. Inspect controls for correct sequencing of heating, mixing dampers, refrigeration, and normal and emergency shutdown.
  - 21. Measure and record the following minimum and maximum airflows. Plot fan volumes on fan curve.
    - a. Supply-air volume.
    - b. Return-air volume.
    - c. Relief-air volume.
    - d. Outdoor-air intake volume.
  - 22. Simulate maximum cooling demand and inspect the following:



- a. Compressor refrigerant suction and hot-gas pressures.
  - b. Short circuiting of air through condenser coil or from condenser fans to outdoor-air intake.
- 23. Verify operation of remote panel including pilot-light operation and failure modes. Inspect the following:
  - a. High-temperature limit on gas-fired heat exchanger.
  - b. Low-temperature safety operation.
  - c. Filter high-pressure differential alarm.
  - d. Economizer to minimum outdoor-air changeover.
  - e. Relief-air fan operation.
  - f. Smoke and firestat alarms.
- 24. After startup and performance testing and prior to Substantial Completion, replace existing filters with new filters.

### 3.8 ADJUSTING

- A. Adjust damper linkages for proper damper operation.
- B. Comply with requirements in Section 230593 "Testing, Adjusting, and Balancing for HVAC" for air-handling system testing, adjusting, and balancing.
- C. Occupancy Adjustments: When requested within 12 months from date of Substantial Completion, provide on-site assistance in adjusting system to suit actual occupied conditions. Provide up to two visits to Project during other-than-normal occupancy hours for this purpose.

### 3.9 CLEANING

- A. After completing system installation and testing, adjusting, and balancing RTUs and air-distribution systems and after completing startup service, clean RTUs internally to remove foreign material and construction dirt and dust. Clean fan wheels, cabinets, dampers, coils, and filter housings, and install new, clean filters.

### 3.10 FIELD QUALITY CONTROL

- A. Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect components, assemblies, and equipment installations, including connections.
- B. Perform the following tests and inspections with the assistance of a factory-authorized service representative:
  - 1. After installing RTUs and after electrical circuitry has been energized, test units for compliance with requirements.
  - 2. Inspect for and remove shipping bolts, blocks, and tie-down straps.



3. Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation.
4. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

C. RTU will be considered defective if it does not pass tests and inspections.

D. Prepare test and inspection reports.

### 3.11 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain RTUs.

END OF SECTION 237416.13



## SECTION 238126 - SPLIT-SYSTEM AIR-CONDITIONERS

### PART 1 - GENERAL

#### 1.1 SUMMARY

A. Section Includes:

1. Split-system air-conditioners.

#### 1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated. Include rated capacities, operating characteristics, and furnished specialties and accessories. Include performance data in terms of capacities, outlet velocities, static pressures, sound power characteristics, motor requirements, and electrical characteristics.
- B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.
1. Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
  2. Wiring Diagrams: For power, signal, and control wiring.
- C. Samples for Initial Selection: For units with factory-applied color finishes.

#### 1.3 INFORMATIONAL SUBMITTALS

- A. Field quality-control reports.
- B. Warranty: Sample of special warranty.

#### 1.4 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For split-system air-conditioning units to include in emergency, operation, and maintenance manuals.

#### 1.5 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.



## 1.6 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. ASHRAE Compliance:
  - 1. Fabricate and label refrigeration system to comply with ASHRAE 15, "Safety Standard for Refrigeration Systems."
  - 2. ASHRAE Compliance: Applicable requirements in ASHRAE 62.1, Section 4 - "Outdoor Air Quality," Section 5 - "Systems and Equipment," Section 6 - "Procedures," and Section 7 - "Construction and System Start-up."
- C. ASHRAE/IES Compliance: Applicable requirements in ASHRAE/IES 90.1.

## 1.7 COORDINATION

- A. Coordinate sizes and locations of concrete bases with actual equipment provided. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork are specified in Section 033000 "Cast-in-Place Concrete."
- B. Coordinate sizes and locations of roof curbs, equipment supports, and roof penetrations with actual equipment provided.

## 1.8 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of split-system air-conditioning units that fail in materials or workmanship within specified warranty period.
  - 1. Warranty Period:
    - a. For Compressor: Five year(s) from date of Substantial Completion.
    - b. For Parts: Five year(s) from date of Substantial Completion.
    - c. For Labor: Five year(s) from date of Substantial Completion.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Basis-of-Design Product: Subject to compliance with requirements, provide Trane or comparable product by one of the following:
  - 1. Daikin
  - 2. Mitsubishi
  - 3. Trane
  - 4. Samsung



## 2.2 INDOOR UNITS (5 tons or Less):

### A. Indoor, exposed, wall-mounted units

1. If retaining option in "Description" Paragraph below, consult manufacturers to confirm they offer products that comply with requirement. Some products from some manufacturers may not comply.
2. Description: Factory-assembled complete unit with components, piping, wiring, and controls required for mating to piping, power, and controls field connections.
3. Cabinet:
  - a. Material: Painted steel, or coated steel frame covered by a plastic cabinet, with an architectural acceptable finish suitable for tenant occupancy on exposed surfaces.
  - b. If retaining option in "Insulation" Subparagraph below, consult manufacturers to confirm they offer products that comply with requirement. Some products from some manufacturers may not comply.
  - c. Insulation: Manufacturer's standard internal insulation, complying with ASHRAE 62.1, to provide thermal resistance and prevent condensation.
  - d. Mounting: Manufacturer-designed provisions for field installation.
  - e. Internal Access: Removable panels of adequate size for field access to internal components for inspection, cleaning, service, and replacement.
4. DX Coil Assembly:
  - a. Coil Casing: Aluminum, galvanized, or stainless steel.
  - b. Coil Fins: Aluminum, mechanically bonded to tubes, with arrangement required by performance.
  - c. Coil Tubes: Copper, of diameter and thickness required by performance.
  - d. Expansion Valve: Electronic modulating type with linear or proportional characteristics.
  - e. Unit Internal Tubing: Copper tubing with brazed joints.
  - f. Unit Internal Tubing Insulation: Manufacturer's standard insulation, of thickness to prevent condensation.
  - g. Field Piping Connections: Manufacturer's standard.
  - h. Factory Charge: Dehydrated air or nitrogen.
  - i. Testing: Factory pressure tested and verified to be without leaks.
5. Drain Assembly:
  - a. Pan: Non-ferrous material, with bottom sloped to low point drain connection.
  - b. Condensate Removal: Gravity.
    - 1) If a floor drain is not available at unit, provide unit with field-installed condensate pump accessory.
  - c. Field Piping Connection: Non-ferrous material with threaded NPT.
6. Fan and Motor Assembly:
  - a. Fan(s):
    - 1) Direct-drive arrangement.
    - 2) Single or multiple fans connected to a common motor shaft and driven by a single motor.
    - 3) Fabricated from non-ferrous components or ferrous components with corrosion protection finish.
    - 4) Wheels statically and dynamically balanced.
  - b. Motor: Brushless dc or electronically commutated with permanently lubricated bearings.
  - c. Motor Protection: Integral protection against thermal, overload, and voltage fluctuations.



- d. Speed Settings and Control: Two (low, high), three (low, medium, high), or more than three speed settings or variable speed with a speed range of least 50 percent.
- e. Vibration Control: Integral isolation to dampen vibration transmission.
- 7. Filter Assembly:
  - a. Access: Front, to accommodate filter replacement without the need for tools.
  - b. Washable Media: Manufacturer's standard filter with antimicrobial treatment.
- 8. Grille Assembly: Manufacturer's standard discharge grille with field-adjustable air pattern mounted in top of unit cabinet.
- 9. Unit Accessories:
  - a. Retain any of three subparagraphs below to provide unit with accessories required by application. Indicate units with accessories in unit equipment schedule on Drawings.
  - b. Remote Room Temperature Sensor Kit: Wall-mounted, hardwired room temperature sensor kit for use in rooms that do not have room temperature measurement.
- 10. Unit Controls:
  - a. Enclosure: Metal, suitable for indoor locations.
  - b. Thermostat integration controller for BAS provided thermostat control.
  - c. Factory-Installed Controller: Configurable digital control.
  - d. "Factory-Installed Sensors" Subparagraph below indicates requirements that may not be available on some products from some manufacturers. Consult manufacturers for availability.
  - e. Factory-Installed Sensors:
    - 1) Unit inlet air temperature.
    - 2) Coil entering refrigerant temperature.
    - 3) Coil leaving refrigerant temperature.
  - f. Retain "Field-Customizable I/O Capability" Subparagraph below for special control strategies. Requirements may not be available on some products from some manufacturers. Consult manufacturers for availability.
  - g. Communication: Network communication with other indoor and outdoor units.
  - h. Cable and Wiring: Manufacturer's standard with each connection labeled and corresponding to a unit-mounted wiring diagram.
  - i. Field Connection: Manufacturer's standard with each connection labeled and corresponding to a unit-mounted wiring diagram.
- 11. Unit Electrical:
  - a. Enclosure: Manufacturer's standard, and suitable for indoor locations.
  - b. Field Connection: Single point connection to power entire unit and integral controls.
  - c. Disconnecting Means: Factory-mounted circuit breaker or switch, complying with NFPA 70.
  - d. Control Transformer: Manufacturer's standard. Coordinate requirements with field power supply.
  - e. Wiring: Manufacturer's standard with each connection labeled and corresponding to a unit-mounted wiring diagram.
  - f. Raceways: Enclose line voltage wiring in metal raceways to comply with NFPA 70.

B. Indoor, recessed, ceiling-mounted units



1. If retaining option in "Description" Paragraph below, consult manufacturers to confirm they offer products that comply with requirement. Some products from some manufacturers may not comply.
2. Description: Factory-assembled complete unit with components, piping, wiring, and controls required for mating to ductwork, piping, power, and controls field connections.
3. Cabinet:
  - a. Material: Painted steel, or coated steel frame covered by a plastic cabinet, with an architectural acceptable finish suitable for tenant occupancy on exposed surfaces.
  - b. If retaining option in "Insulation" Subparagraph below, consult manufacturers to confirm they offer products that comply with requirement. Some products from some manufacturers may not comply.
  - c. Insulation: Manufacturer's standard internal insulation, complying with ASHRAE 62.1, to provide thermal resistance and prevent condensation.
  - d. Mounting: Manufacturer-designed provisions for field installation.
  - e. Internal Access: Removable panels of adequate size for field access to internal components for inspection, cleaning, service, and replacement.
4. DX Coil Assembly:
  - a. Coil Casing: Aluminum, galvanized, or stainless steel.
  - b. Coil Fins: Aluminum, mechanically bonded to tubes, with arrangement required by performance.
  - c. Coil Tubes: Copper, of diameter and thickness required by performance.
  - d. Expansion Valve: Electronic modulating type with linear or proportional characteristics.
  - e. Internal Tubing: Copper tubing with brazed joints.
  - f. Internal Tubing Insulation: Manufacturer's standard insulation, of thickness to prevent condensation.
  - g. Field Piping Connections: Manufacturer's standard.
  - h. Factory Charge: Dehydrated air or nitrogen.
  - i. Testing: Factory pressure tested and verified to be without leaks.
5. Drain Assembly:
  - a. Pan: Non-ferrous material, with bottom sloped to low point drain connection.
  - b. Condensate Removal: Unit-mounted pump or other integral lifting mechanism, capable of lifting drain water to an elevation above top of cabinet.
  - c. Field Piping Connection: Non-ferrous material with threaded NPT.
6. Fan and Motor Assembly:
  - a. Fan(s):
    - 1) Direct-drive arrangement.
    - 2) Single or multiple fans connected to a common motor shaft and driven by a single motor.
    - 3) Fabricated from non-ferrous components or ferrous components with corrosion protection finish.
    - 4) Wheels statically and dynamically balanced.
  - b. Motor: Brushless dc or electronically commutated with permanently lubricated bearings.
  - c. Motor Protection: Integral protection against thermal, overload, and voltage fluctuations.
  - d. Speed Settings and Control: Two (low, high), three (low, medium, high), or more than three speed settings or variable speed with a speed range of least 50 percent.
  - e. Vibration Control: Integral isolation to dampen vibration transmission.
7. Filter Assembly:



- a. Access: Bottom, to accommodate filter replacement without the need for tools.
  - b. "Media" Subparagraph below describes two filter types: "replaceable" and "washable." Replaceable filters allow for higher filter efficiency. Washable filters have lower filter efficiency. Requirements may not be available on some products from some manufacturers. Consult manufacturers for availability.
  - c. Media:
    - 1) Washable: Manufacturer's standard filter with antimicrobial treatment.
8. Discharge-Air Grille Assembly: Mounted in bottom of unit cabinet.
- a. Discharge Pattern: One-, two-, three-, or four-way throw as indicated on Drawings.
    - 1) Retain "Discharge Pattern Adjustment" or "Discharge Pattern Closure" Subparagraph below, or both, to provide grille assembly with additional features. Features indicated may not be available from all manufacturers on all products. Consult manufacturers for availability.
    - 2) Discharge Pattern Adjustment: Field-adjustable limits for up and down range of motion.
    - 3) Discharge Pattern Closure: Ability to close individual discharges of units with multiple patterns.
  - b. Retain "Motorized Vanes" or "Additional Branch Supply Duct Connection" Subparagraph below, or both, to provide grille assembly with additional features. Features indicated may not be available from all manufacturers on all products. Consult manufacturers for availability.
  - c. Motorized Vanes: Modulating up and down flow pattern for uniform room air distribution.
  - d. Additional Branch Supply Duct Connection: Sheet metal knockout for optional connection to one additional supply branch duct.
9. Return-Air Grille Assembly: Manufacturer's standard grille mounted in bottom of unit cabinet.
10. Retain "Outdoor Air Ventilation Connection" Paragraph below to provide unit with connection to a ducted outdoor air source. Feature may not be available from all manufacturers on all products. Consult manufacturers for availability.
11. Outdoor Air Ventilation Connection: Sheet metal knockout for optional connection to outdoor air ventilation duct.
12. Unit Accessories:
- a. Retain any of three subparagraphs below to provide unit with accessories required by application. Indicate units with accessories in unit equipment schedule on Drawings.
  - b. Remote Room Temperature Sensor Kit: Wall-mounted, hardwired room temperature sensor kit for use in rooms that do not have room temperature measurement.
13. Unit Controls:
- a. Enclosure: Metal, suitable for indoor locations.
  - b. Thermostat integration controller for BAS provided thermostat control.
  - c. Factory-Installed Controller: Configurable digital control.
  - d. "Factory-Installed Sensors" Subparagraph below indicates requirements that may not be available on some products from some manufacturers. Consult manufacturers for availability.
  - e. Factory-Installed Sensors:
    - 1) Unit inlet air temperature.
    - 2) Coil entering refrigerant temperature.
    - 3) Coil leaving refrigerant temperature.



- f. Communication: Network communication with other indoor and outdoor units.
  - g. Cable and Wiring: Manufacturer's standard with each connection labeled and corresponding to a unit-mounted wiring diagram.
  - h. Field Connection: Manufacturer's standard with each connection labeled and corresponding to a unit-mounted wiring diagram.
14. Unit Electrical:
- a. Enclosure: Manufacturer's standard, and suitable for indoor locations.
  - b. Field Connection: Single point connection to power entire unit and integral controls.
  - c. Disconnecting Means: Factory-mounted circuit breaker or switch, complying with NFPA 70.
  - d. Control Transformer: Manufacturer's standard. Coordinate requirements with field power supply.
  - e. Wiring: Manufacturer's standard with each connection labeled and corresponding to a unit-mounted wiring diagram.
  - f. Raceways: Enclose line voltage wiring in metal raceways to comply with NFPA 70.

## 2.3 OUTDOOR UNITS (5 TONS OR LESS):

1. Air-Cooled, Compressor-Condenser Components:
- a. Casing: Steel, finished with baked enamel in color selected by Architect, with removable panels for access to controls, weep holes for water drainage, and mounting holes in base. Provide brass service valves, fittings, and gage ports on exterior of casing.
  - b. Compressor: Hermetically sealed with crankcase heater and mounted on vibration isolation device. Compressor motor shall have thermal- and current-sensitive overload devices, start capacitor, relay, and contactor.
    - 1) Compressor Type: Scroll.
    - 2) Two-speed compressor motor with manual-reset high-pressure switch and automatic-reset low-pressure switch.
    - 3) Refrigerant: R-454b OR R-32
    - 4) Refrigerant Coil: Copper tube, with mechanically bonded aluminum fins and liquid subcooler. Comply with ARI 206/110.
  - c. Heat-Pump Components: Reversing valve and low-temperature-air cutoff thermostat.
  - d. Fan: Aluminum-propeller type, directly connected to motor.
  - e. Motor: Permanently lubricated, with integral thermal-overload protection.
  - f. Low Ambient Kit: Permits operation down to 45 deg F

### B. Accessories

- 1. Control equipment and sequence of operation are specified in Section 230923 "Direct Digital Control (DDC) System for HVAC" and Section 230993.11 "Sequence of Operations for HVAC DDC."
- 2. Thermostat:



- a. Low voltage with subbase to control compressor and evaporator fan.
- b. Wireless infrared functioning to remotely control compressor and evaporator fan, with the following features:
  - 1) Compressor time delay.
  - 2) 24-hour time control of system stop and start.
  - 3) Liquid-crystal display indicating temperature, set-point temperature, time setting, operating mode, and fan speed.
  - 4) Fan-speed selection including auto setting.
- 3. Automatic-reset timer to prevent rapid cycling of compressor.
- 4. Refrigerant Line Kits: Soft-annealed copper suction and liquid lines factory cleaned, dried, pressurized, and sealed; factory-insulated suction line with flared fittings at both ends.
- 5. Drain Hose: For condensate.
- 6. Monitoring:
  - a. Monitor constant and variable motor loads.
  - b. Monitor variable-frequency-drive operation.
  - c. Monitor economizer cycle.
  - d. Monitor cooling load.
  - e. Monitor air distribution static pressure and ventilation air volumes.

### PART 3 - EXECUTION

#### 3.1 INSTALLATION

- A. Install units level and plumb.
- B. Install evaporator-fan components using manufacturer's standard mounting devices securely fastened to building structure.
- C. Install roof-mounted, compressor-condenser components on equipment supports specified in Section 077200 "Roof Accessories." Anchor units to supports with removable, cadmium-plated fasteners.
- D. Equipment Mounting:
  - 1. Install ground-mounted, compressor-condenser components on cast-in-place concrete equipment base(s). Comply with requirements for equipment bases and foundations specified in Section 033000 "Cast-in-Place Concrete."
  - 2. Install ground-mounted, compressor-condenser components on polyethylene mounting base.
  - 3. Comply with requirements for vibration isolation and seismic control devices specified in Section 230548 "Vibration and Seismic Controls for HVAC."
  - 4. Comply with requirements for vibration isolation devices specified in Section 230548.13 "Vibration Controls for HVAC."

- E. Install and connect precharged refrigerant tubing to component's quick-connect fittings. Install tubing to allow access to unit.

### 3.2 CONNECTIONS

- A. Piping installation requirements are specified in other Sections. Drawings indicate general arrangement of piping, fittings, and specialties.
  - 1. Water Coil Connections: Comply with requirements specified in Section 232113 "Hydronic Piping" and Section 232116 Hydronic Piping Specialties." Connect hydronic piping to supply and return coil connections with shutoff-duty valve and union or flange on the supply connection and with throttling-duty valve and union or flange on the return connection.
  - 2. Remote, Water-Cooled Condenser Connections: Comply with requirements specified in Section 232113 "Hydronic Piping" and Section 232116 Hydronic Piping Specialties." Connect hydronic piping to supply and return connections with shutoff-duty valve and union or flange on the supply connection and with throttling-duty valve and union or flange on the return connection.
- B. Where piping is installed adjacent to unit, allow space for service and maintenance of unit.
- C. Duct Connections: Duct installation requirements are specified in Section 233113 "Metal Ducts." Drawings indicate the general arrangement of ducts. Connect supply[ **and return**] ducts to split-system air-conditioning units with flexible duct connectors. Flexible duct connectors are specified in Section 233300 "Air Duct Accessories."

### 3.3 FIELD QUALITY CONTROL

- A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections.
- B. Perform tests and inspections.
  - 1. Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.
- C. Tests and Inspections:
  - 1. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.
  - 2. Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation.
  - 3. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- D. Remove and replace malfunctioning units and retest as specified above.
- E. Prepare test and inspection reports.



### 3.4 STARTUP SERVICE

A. Perform startup service.

1. Complete installation and startup checks according to manufacturer's written instructions.

### 3.5 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain units.

END OF SECTION 238126

## SECTION 321400 - UNIT PAVERS

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. This Section includes the following:
  - 1. Concrete pavers set in aggregate setting bed.
  - 3. Edge restraints for unit pavers.
- B. Related Sections include the following:
  - 1. Division 3 – Site Concrete for cast-in-place concrete curbs and gutters serving as edge restraint for unit pavers.

#### 1.3 SUBMITTALS

- A. Product Data: For the following:
  - 1. Concrete pavers.
  - 2. Edge restraints.
- B. Samples for Initial Selection: Manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available for each type of unit paver indicated.
  - 1. Include similar Samples of material for joints and accessories involving color selection.
- C. Samples for Verification: Full-size units of each type of unit paver indicated; in sets for each color, texture, and pattern specified, showing the full range of variations expected in these characteristics.
  - 1. Provide Samples with joints grouted and cured, showing the full range of colors to be expected in the completed Work.
  - 2. Include Samples of exposed edge restraints.
- D. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.



#### 1.4 QUALITY ASSURANCE

- A. **Installer Qualifications:** An experienced installer who has completed unit paver installations similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.
- B. **Source Limitations:** Obtain each type of unit paver, joint material, and setting material from one source with resources to provide materials and products of consistent quality in appearance and physical properties.
- C. **Mockups:** Before installing unit pavers, build mockups for each form and pattern of unit pavers required to verify selections made under sample Submittals and to demonstrate aesthetic effects and qualities of materials and execution. Multiple Mock Ups may be required. Build mockups to comply with the following requirements, using materials indicated for the completed Work, including same base construction, special features for expansion joints, and contiguous work as indicated:
  - 1. Build mockups in the location and of the size indicated or, if not indicated, as directed by Architect.
  - 2. Notify Architect seven days in advance of dates and times when mockups will be constructed.
  - 3. Demonstrate the proposed range of aesthetic effects and workmanship.
  - 4. Obtain Architect's approval of mockups before starting unit paver installation.
  - 5. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
  - 6. Demolish and remove mockups when directed.
  - 7. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

#### 1.5 DELIVERY, STORAGE, AND HANDLING

- A. **Protect unit pavers and aggregate during storage and construction against soiling or contamination from earth and other materials.**
  - 1. Cover pavers with plastic or use other packaging materials that will prevent rust marks from steel strapping.
- B. **Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.**
- C. **Store liquids in tightly closed containers protected from freezing.**
- D. **Store asphalt cement and other bituminous materials in tightly closed containers.**

#### 1.6 PROJECT CONDITIONS

- A. Cold-Weather Protection: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen subgrade or setting beds. Remove and replace unit paver work damaged by frost or freezing.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Concrete Pavers:
    - a. **Hanover Architectural Products 4"x8" 2 3/8" thick with natural finish, color selected from manufacturer's full range. Laid in herringbone pattern.**
  - 2. Latex-Portland Cement Mortars and Grouts:
    - a. American Olean Tile Co.
    - b. Boiardi Products Corp.
    - c. Bonsal: W. R. Bonsal Company.
    - a. Bostik.
    - b. Dal-Tile Corporation.
    - c. Laticrete International, Inc.
    - d. Mapei Corp.
    - e. Or approved equal.

### 2.2 COLORS AND TEXTURES

- A. Colors and Textures: **As selected by Architect from manufacturer's full range.**

### 2.3 UNIT PAVERS

- A. Concrete Pavers: Solid, interlocking paving units, ASTM C 936, made from normal-weight aggregates in sizes and shapes indicated.

### 2.4 ACCESSORIES



- B. Precast Concrete Edge Restraints: Precast concrete curbing, made from normal-weight aggregate, in shapes and sizes indicated. Edge restraining to have rock salt finish.
- C. Job-Built Concrete Edge Restraints: Comply with requirements in Division 3 Section "Site Concrete" for normal-weight, air-entrained, ready-mixed concrete with minimum 28-day compressive strength of 3000 psi (20 MPa).

## 2.5 AGGREGATE SETTING-BED MATERIALS

- A. Sand for Leveling Course: Sound, sharp, washed, natural sand or crushed stone complying with gradation requirements of ASTM C 33 for fine aggregate.
- B. Sand for Joints: Fine, sharp, washed, natural sand or crushed stone with 100 percent passing No. 16 (1.18-mm) sieve and no more than 10 percent passing No. 200 (0.075-mm) sieve.
  - 1. Provide sand of color needed to produce required joint color.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine areas indicated to receive paving, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Vacuum clean concrete substrates to remove dirt, dust, debris, and loose particles.
- B. Remove substances, from concrete substrates, that could impair mortar bond, including curing and sealing compounds, form oil, and laitance.
- C. Proof-roll prepared subgrade surface to check for unstable areas and areas requiring additional compaction. Proceed with unit paver installation only after deficient subgrades have been corrected and are ready to receive subbase for unit pavers.

### 3.3 INSTALLATION, GENERAL

#### FINAL PAVER INSTALLATION MUST BE ADA COMPLIANT

- A. Do not use unit pavers with chips, cracks, voids, discolorations, and other defects that might be visible or cause staining in finished work.
- B. Mix pavers from several pallets or cubes, as they are placed, to produce uniform blend of colors and textures.

- C. Cut unit pavers with motor-driven masonry saw equipment to provide clean, sharp, unchipped edges. Cut units to provide pattern indicated and to fit adjoining work neatly. Use full units without cutting where possible. Hammer cutting is not acceptable.
  - 1. For concrete pavers, a block splitter may be used.
- D. Joint Pattern: As directed by Architect
  - 1. Provide joint filler, where indicated, at waterproofing that is turned up on vertical surfaces; or, if not indicated, provide temporary filler or protection until paver installation is complete.
- E. Tolerances: Do not exceed 1/32-inch (0.8-mm) unit-to-unit offset from flush (lippage) nor 1/8 inch in 10 feet (3 mm in 3 m) from level, or indicated slope, for finished surface of paving.
- F. Tolerances: Do not exceed 1/16-inch (1.6-mm) unit-to-unit offset from flush (lippage) nor 1/8 inch in 24 inches (3 mm in 600 mm) and 1/4 inch in 10 feet (6 mm in 3 m) from level, or indicated slope, for finished surface of paving.
- G. Expansion and Control Joints: Provide for sealant-filled joints at locations and of widths indicated. Provide joint filler as backing for sealant-filled joints where indicated. Install joint filler before setting pavers. Sealant materials and installation are specified in Division 7 Section "Joint Sealants."
- H. Expansion and Control Joints: Provide joint filler at locations and of widths indicated. Install joint filler before setting pavers. Make top of joint filler flush with top of pavers.
- I. Provide edge restraints as indicated. Install edge restraints before placing unit pavers.
  - 1. Install edge restraints to comply with manufacturer's written instructions. Install stakes at intervals required to hold edge restraints in place during and after unit paver installation.

### 3.7 REPAIR, CLEANING, AND PROTECTION

- A. Remove and replace unit pavers that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units as intended. Provide new units to match adjoining units and install in same manner as original units, with same joint treatment and with no evidence of replacement.

END OF SECTION 321400



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- 2-2 [Civil Drawings] Can the Civil CAD files be released\_  
a) The Civil CAD files can be released upon request and release form filled out.
- 2-3 [E-001] No labeling on cable tray on systems drawings. Specifications note two types of cable tray. Please advise on desired layout and designations of cable tray.  
a) Per specifications 270536, cable tray shown on the plans between the sleeves is 6" W x 4" D. 18" ladder tray is also specified and is to be installed in the Data Rooms around the perimeter per drawing note #3 on E-301 and E-302.
- 2-4 [E-102] Drawing note #1. Please confirm details of disconnects for the two AHUs (furnished by division 23?). There are no details on the mechanical schedule if these included disconnects are to satisfy requirements for current protection of the units or if division 26 will need to furnish additional devices for the equipment.  
a) Disconnect switch comes with the unit per Section 237416.13 Section 2.9A. Overcurrent protection is the circuit breaker.
- 2-5 [E-302] Detail #2 referent to drawing notes #1 & #2. What is the intent of asking for EMT inside of a PVC Sleeve? PVC coated conduit is only available over galvanized rigid.  
a) PVC is not required, provide EMT for the size indicated on the drawings.
- 2-6 [Electrical / Mechanical ] Typically on a project like this either the Electrical or Mechanical drawings have an equipment Schedule, which shows the following information: Who supplies the Disconnect switch or motor control (Mechanical or Electrical), amperage rating, fused or non-fused, voltage, and the phasing (single phase or 3 phase), disconnect enclosure rating (Nema1, Nema3R, or Nema4x), disconnect duty or General Duty).  
a) The electrical plans show non-fused disconnect switches, 30 amp unless otherwise noted per legend on E-001. The disconnects are specified in 262816 to be Heavy Duty, Nema 1 for indoor and Nema 3R for outdoors unless otherwise noted. If the disconnect is provided by the manufacturer then it is noted in the electrical drawings.
- 2-7 [General] Division 26 to furnish and install raceway and back boxes for access control. Who will be responsible for installing system and devices?  
a) CCU will provide devices and wiring. Scope is rough-in only.
- 2-8 [Schedule] What is the project commencement date?  
a) The work is expected to commence shortly after the protest period.

## **DRAWINGS**

| <b><u>Item No.</u></b> | <b><u>Description</u></b>   |
|------------------------|---|
| 2-9                    | <u>Sheet C-105 – HORIZONTAL CONTROL PLAN:</u><br>a) Added curb clarification note at islands.   |
| 2-10                   | <u>Sheet C-106 – HORIZONTAL CONTROL PLAN:</u><br>a) Added curb clarification note at islands.   |
| 2-11                   | <u>Sheet C-110 – DRAINAGE PLAN:</u><br>a) Added roof drain tie in clarification note. All downspouts are shown on architectural drawings and shall be connected to the storm system.            |
| 2-12                   | <u>Sheet L101 – LANDSCAPE PLAN:</u><br>a) Revised the sod in the plant list to 419 Bermuda.   |
| 2-13                   | <u>Sheet L102 – LANDSCAPE PLAN:</u><br>a) Revised the sod in the plant list to 419 Bermuda.   |
| 2-14                   | <u>Sheet L103 – IRRIGATION PLAN:</u><br>a) Replaced the entire irrigation plan with more detailed irrigation layout, head sizes, pipe information, valve information.                           |
| 2-15                   | <u>Sheet L104 – IRRIGATION PLAN:</u><br>a) Replaced the entire irrigation plan with more detailed irrigation layout, head sizes, pipe information, valve information.                           |
| 2-16                   | <u>Sheet L105 – ADD ALTERNATE #1 PATIO LANDSCAPE PLAN:</u><br>a) Added a paver detail to the sheet that shows the 12" concrete curb as per the site plan.<br>b) Revised the sod to 419 Bermuda. |
| 2-17                   | <u>Sheet A-001 – MECHANICAL SCHEDULES:</u><br>a) Updated refrigerant requirement for split systems.   |
| 2-18                   | <u>Sheet M-105 – MECHANICAL SCHEDULES:</u><br>a) Updated refrigerant requirement for split systems.   |

## **SPECIFICATIONS**

| <b><u>Item No.</u></b> | <b><u>Description</u></b>   |
|------------------------|---|
| 2-19                   | <u>SE-310 – INVITATION FOR DESIGN-BID-BUILD CONSTRUCTION SERVICES:</u><br>a) Revised bid date only. |



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- 2-20            011000 – SUMMARY:  
                  b) Clarifications to 1.18C:  
                  a. All contractors and sub-contractors shall be required to obtain Horry County business license (at no cost to the owner).
- 2-21            018113.54 – SUSTAINABLE DESIGN REQUIREMENTS – GREEN GLOBES 2021:  
                  a) Add the following to 1.1:  
                  b. The project has been registered for Green Globes and the review fees will be paid by the owner.  
                  c. The Design Team includes a sustainability consultant to assist with the overall Green Globes coordination and documentation of design related points. The Contractor is responsible to provide all documentation and support for construction related points as outlined in the documents.
- 2-22            051200 – STRUCTURAL STEEL FRAMING:  
                  a) Remove AISC Certified Plant criteria requirements.
- 2-23            102600 – WALL AND DOOR PROTECTION:  
                  a) Revision to 2.3A2.:  
                  a. Wing Size: Nominal 2 by 2 inches (50.8 by 50.8 mm).
- 2-24            237416.13 – PACKAGED, LARGE-CAPACITY, ROOFTOP AIR-CONDITIONING UNITS:  
                  a) Included Daikin as an approved manufacturer.  
                  b) Updated refrigerant requirement.
- 2-25            23816 – SPLIT-SYSTEM AIR-CONDITIONERS:  
                  a) Added specification.
- 2-26            283111 – DIGITAL, ADDRESSABLE FIRE-ALARM SYSTEM:  
                  a) Section 2.2 Manufacturers, add Siemens to the list of approved fire alarm systems and products.
- 2-27            321400 – UNIT PAVERS:  
                  a) Replace the following to 2.1.B. 1.A  
                  a. A. Basis of Design Traditional Prest Brick-Hanover Architectural Products 4"x8" 2 3/8" thick with natural finish, color selected from manufacturer's full range. Laid in a herringbone pattern.  
  
                  a) Remove all references to metal edge restraints from specification.

**END OF ADDENDUM NO. 2**