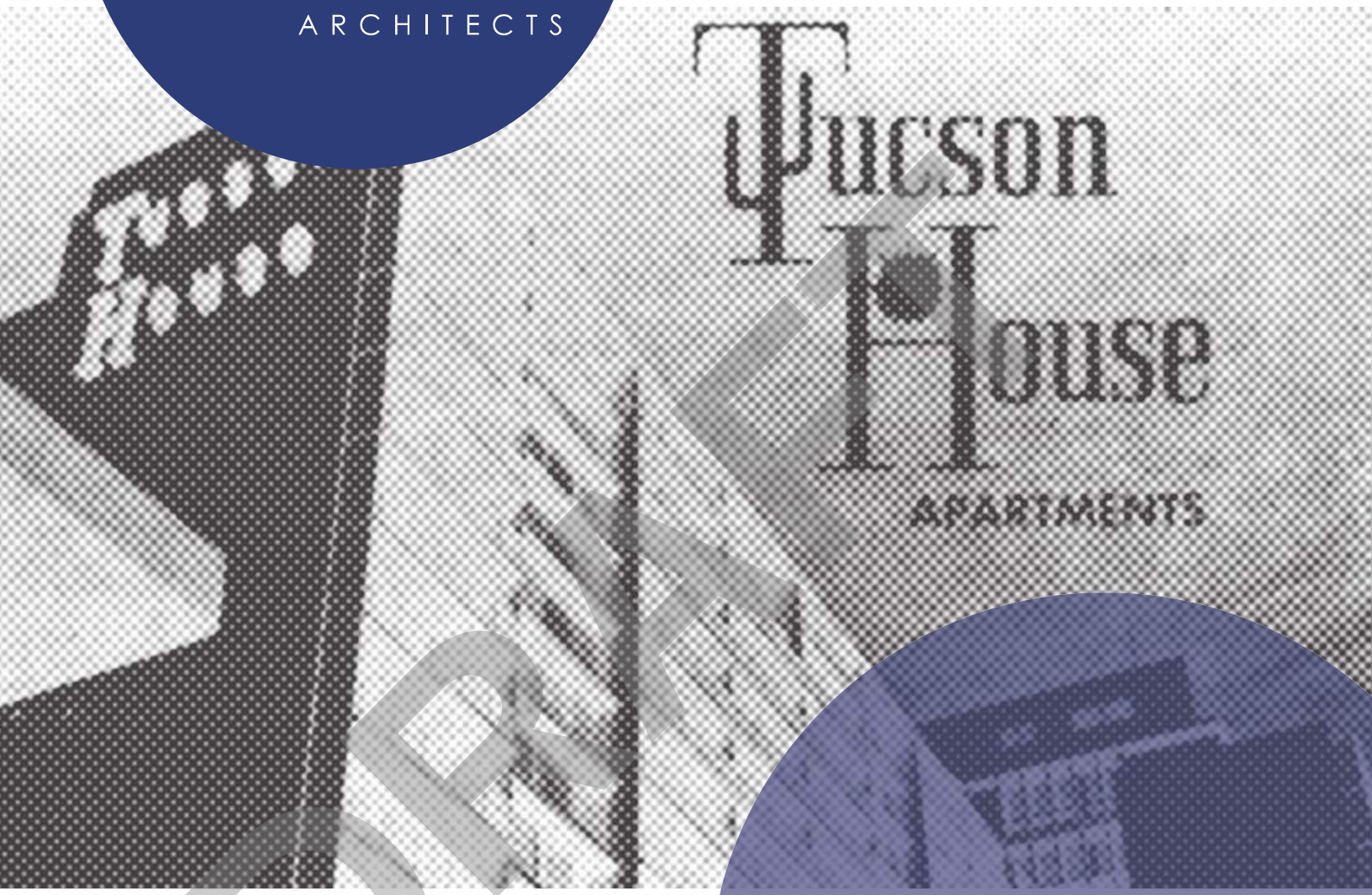
WSM

ARCHITECTS



DRAFT

Physical Needs Assessment

Housing and Community Development

City of Tucson

Table of Contents

1
Executive Summary
pg 1

2
Facility History
pg 8

3
Assessment Process
pg 15

4
Component Conditions
pg 19

5
Aggregate Capital Needs
pg 71

6
Elevator Assessment
pg 123

7
Component Assessment Forms
pg 127

8
Energy Data
pg 227

DRAFT

CITY OF TUCSON

1

2
Facility History

3
Assessment Process

4
Component Conditions

5
Aggregate Capital Needs

6
Elevator Assessment

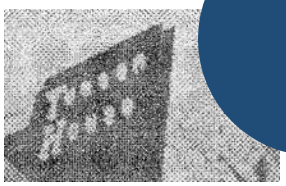
7
Component Assessment Forms

8
Energy Data

DRAFT

Executive Summary

CITY OF TUCSON



[EXECUTIVE SUMMARY]

In January of 2016 The City of Tucson (COT) Housing and Community Development Department (HCD) contracted with WSM Architects to provide a Physical Needs Assessment (PNA) of the Tucson House located at 1502 N Oracle Rd, Tucson AZ. This PNA was performed to assist HCD in the application for a HUD Choice Neighborhoods Planning Grant. Per the grant application guidelines WSM Architects physically inspected 10% of the Dwelling units and 50% of the non-dwelling spaces to establish the overall condition of the facility. WSM also consulted with local engineering firms (see Assessment Process section of this report) to assess the condition of the structural, mechanical, plumbing, fire protection electrical, and life safety systems of the facility. Refer to the Component Conditions section of this report for the detailed assessment information.

The Tucson House was building in 1962 on Miracle Mile, the main road into and out of Tucson at the time. It was originally conceived as high end apartments affording luxury modern living in the Old Pueblo. Local mid-century Architect Nicholas Sakeller was involved in the early planning and design of the facility, adding to the properties cultural significance to the Tucson community. Among the building residents were U.S. Congressman Morris K. Udall, John Wayne, and other prominent citizens of Tucson at the time. With the construction of I-10 in the late 1960's, the Miracle Mile corridor went into decline through the 1970's, leading eventually to the Tucson House bankruptcy. The US Department and Housing and Urban Development acquired the property in the late 1970's turning it over to COT HCD for use as elderly and disabled housing, the use that it currently has today. See the Facility History section of this report for more information.

It should be noted that the City of Tucson is in the process of establishing the Miracle Mile corridor as a National Historic District. Not only does the Tucson House fall within the future Miracle Mile National Historic District, but it is identified as a contributing property to the historic character of the district. This designation will protect the facility as a cultural resource to the City of Tucson, requiring the Tucson/Pima County Historic Commission to review any future redevelopment of the facility or the site ensuring that modifications are in compliance with the US Secretary of the Interior Standards for Historic Preservation. The building is also individually eligible for listing on the National Historic Register. It is recommended that the City of Tucson pursue listing the property to provide further protection for not only the cultural significance of the exterior, but as a public building the remaining interior character defining features would also be protected.

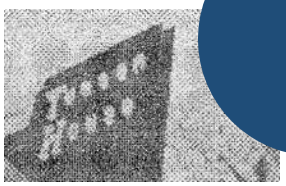
Goals

The goal of this assessment is to verify the current condition of the finishes, systems, and site components of the Tucson House, determine the critical needs, and provide cost information to guide COT HCD in the planning for either future renovations or replacement of the facility.

Component Assessment and Recommendations

In our assessment, overall we find the basic structure of the facility to be generally sound. There are some structural issues that need be addressed but these do not compromise the overall integrity of the building. There are condition issues with the finishes and fixtures that should be addressed to increase the livability and marketability of the facility to the residents, but they do not present any life/safety or building performance problem. The critical issues are the mechanical, electrical, and special systems within the building. In our analysis of these components we find serious deficiencies that have a negative impact on the facility, the HCD resource allocation of personnel, HCD financial resources, and the well being of the occupants. Below is an outline of the major issue that contribute to this structure being in a distressed condition. See the Component Assessment section of this report for detailed information.

DRAFT



a. *Architectural*

Site critical needs are as follows:

- Paving has failed and needs to be replaced throughout the parking area.
- Parking shade canopies and walkway canopies are original to the 1962 construction and need preservation.
- Accessible parking does not meet ADA standards and needs to be redesigned.

Non-Dwelling critical needs are as follows:

- All corridor ceilings are at 7'-0", the International Building Code (IBC) required minimum ceiling height is 7'-6" for egress paths, all corridor ceiling need to be raised.
- Approximately 50% of the door hardware in the non-dwelling areas in not ADA compliant and needs to be replaced.
- The Floor finishes are reaching the end of their service life and are showing signs of failure. Hall way carpeting in particular needs to be replaced with a more durable material to reduce maintenance requirements
- All the resident common areas are in need of remodeling to increase the marketability/livability of the facility
- All of the public restrooms are in need of redesign/remodeling to provide ADA compliance.
- All of the stair towers are not compliant with the IBC. The guard rails are not tall enough nor do they have the proper lateral strength. The current code also requires hand rails on both sides of the stair. It is recommended that all of the existing guard and hand rails be replaced with code compliant construction.

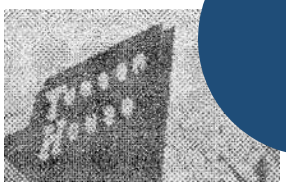
The Dwelling critical needs are as follows:

- All the residential kitchens are in need of remodeling, the majority of the appliances are out dated and the cabinetry is at the end of it's expected service life. Kitchen remodeling will increase the marketability/livability of the facility
- All the residential restrooms are in need of remodeling, the fixtures are out dated and worn, and the cabinetry is at the end of it's expected service life. restroom remodeling will also increase the marketability/livability of the facility.
- Approximately 80% of the door hardware in the dwelling areas in not ADA compliant and needs to be replaced.
- The flooring in the dwelling units is showing signs of failure due to age. The VCT has signs of shrinkage and cracking and will continue to deteriorate, replacement is recommended.
- The balcony railings are original to the 1962 construction and are in need of preservation. It is recommended that they be removed, sandblasted, repainted and reinstalled.
- The exterior window and door systems are approaching the end of their service life. It is anticipated in the next 3-5 years the insulated glazing units will begin to fail. These units should be replaced
- In most cases, due to sagging in the slabs, the balcony floors slope back into the door opening causing water to accumulate at the doors and infiltrate the building. It is recommended that small floor drains be added at these locations and tied into the storm water piping to drain these areas.

The Building Envelope critical needs are as follows:

- The exterior window and door systems are approaching the end of their service life. It is anticipated in the next 3-5 years the insulated glazing units will begin to fail.
- The roof has been recently recoated but shows signs that the under lying roofing material is deteriorating. The roofing system should be replaced

DRAFT



- If the seventeenth floor is to be utilized, the original single pane window systems should be replaced with a new thermally broken window system with insulated glazing.
- In areas where the building sealants are exposed to sunlight (primarily the South and West Facades) the sealants are showing signs of shrinkage and failure.
- The elevator equipment has been repaired and partially upgraded over time, with frequent service outages it is clear that this equipment is beyond its useful service life. Due to this, it is recommended that a full modernization be undertaken to bring the elevators into full code compliance, reduce energy use, increase travel speed, and provide a more suitable interior cab finish.

b. Structural

The Structural system critical needs are as follows:

- The first floor slab is not designed to accommodate the loading of the administrative offices. The administrative offices either need to be relocated to the ground floor, or the first floor slab in this area need to be reinforced from below to accommodate the loading.
- There is consistent cracking in the residential balconies that is allowing water to infiltrate the slabs and potentially deteriorating the reinforcing steel. These cracks need to be repaired and a water proofing surface added to the balcony floor.
- The metal fascia added to the edge of the balconies in 1997 is trapping water potentially deteriorating the reinforcing steel. This metal facial needs to be removed and the slab edge detailing changed.
- If the seventeenth floor is to be utilized, the existing floor slab will need significant structural reinforcement from both the top of the slab and from underneath. It will require the demolishing and rebuilding a significant portion of the sixteenth floor to accomplish this. We have included this cost in the estimate of probable cost. Without the reinforcement of the slabs, we recommend the seventeenth floor not be used for any purpose

c. Mechanical

The Heating and Cooling critical needs are as follows:

- The existing 2 pipe heating/cooling system is out of date and inefficient. Three options have been presented in the Component Assessment section of this report. New equipment would provide greater efficiency and an energy savings to COT HCD. It is recommended that the entire system be replaced.
- The existing mechanical piping systems are beyond their useful life and need to be completely replaced.
- The restroom exhaust system is beyond its service life and inefficient. It is recommended that this system be replaced.
- The building exhaust system is beyond its service life and inefficient. It is recommended that this system be replaced.

d. Plumbing

The Plumbing critical needs are as follows:

- Much of the sanitary sewer piping and sewer mains throughout the building are either original or were installed in the 1997 renovation. All of this piping is deteriorating and failing creating unsafe and unsanitary conditions in the building. All of the sewer piping, sewer mains, and the sewer ejection equipment in the basement should be replaced
- The Domestic water piping contains a mix of copper and original 1962 galvanized steel piping. This piping is failing and causing ongoing nearly daily issues for facilities staff. In addition, due to the age of the galvanized piping there is the possibility of lead or cadmium contamination in the water supply. It is recommended that the water be tested for contamination and that the entire domestic water supply system, including the booster pumps be replaced.

DRAFT

- The current domestic hot water system was installed in 1986 and is beyond its service life. New equipment would provide greater efficiency and an energy savings to COT HCD. It is recommended that the domestic hot water system be replaced.
- All of the plumbing fixtures in the building date from 1997 or earlier and are beyond their service life. In most of the residential restrooms the showers do not have the code required anti-scald mixing valves presenting a hazard to the residents. It is recommended that all of the plumbing fixtures be replaced

e. Fire Protection

The Fire Protection critical needs are as follows:

- The existing fire pump, jockey pump, and fire pump control panel are out dated and should be replaced.
- There is the possibility that the fire protection piping throughout the building is deteriorating, see the component assessment section of this report for more detail. It is recommended that the piping be tested for deterioration and be replaced if significant deterioration is found.

f. Electrical

The Site Lighting critical needs are as follows:

- None of the existing lighting is shielded and does not meet the Outdoor Lighting Ordinance. It is recommended at all outdoor lighting be replaced.
- All lighting at the egress doors are required to be on emergency power, they currently are not. This is a life safety issue for the residents and needs to be corrected.

The Building Power critical needs are as follows:

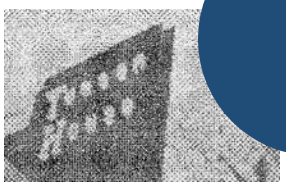
- The main service, disconnects and panels are beyond their service life and should be replaced.
- The fire pump is currently on the main building service, the National Electric Code requires that the fire pump be on an independent service from the main building and must be provided with emergency power.
- The wire type used in this facility is not allowed under the code based on the construction type and should be replaced.
- The receptacles throughout the building, while having a 3 prong outlet, do not have a ground wire connected. This is a code violation and a life safety issue that needs to be addressed. Due to this concerns, the entire building should be rewired.

The Common Area critical needs are as follows:

- The receptacles in these areas while having a 3 prong outlet do not have a ground wire connected. This is a code violation and a life safety issue that needs to be addressed.
- The corridor lighting is not adequate and does not provide the minimum lumen under the code. It is recommended that the lighting in the corridors be redesigned and replaced.
- Nearly all of the fixtures in the facility are a T-8 fluorescent fixture installed in the 1997 renovation. It is recommended that these be replaced with a LED fixture to provide significant energy savings and lower maintenance cost.

The Dwelling Units critical needs are as follows:

DRAFT



- The receptacles in these areas while having a 3 prong outlet do not have a ground wire connected. This is a code violation and a life safety issue that needs to be addressed. In addition, there are not enough circuits provided per the National Electric Code for each dwelling unit. Due to these concerns, all of the dwelling units should be rewired
- Nearly all of the light fixtures in the facility are a T-8 fluorescent fixture installed in the 1997 renovation. It is recommended that these be replaced with a LED fixture to provide significant energy savings and lower maintenance cost.
- Nearly all of the receptacles are 12" above finish floor, the code requirement is 18". As part of rewiring the units the receptacles should be relocated to the correct height.
- In many units the GFCI receptacles in the restroom are not located per the code requirements and need to be relocated.
- Receptacles on the patios are the incorrect type to meet the current code requirements and need to be replaced
- All of the devices (switches, receptacles) are beyond their useful life. Staff has indicated that when they service them they are brittle and typically fall apart. It is recommended that all of these devices be replaced

g. Special Systems

Fire Alarm

- Currently only audio alarm devices are located in the dwelling units, audio/visual devices are required. It is recommended that these be replaced.

CCTV

- The system does not have an adequate number of cameras to properly monitor the facility. The existing system equipment is not capable of expansion. It is recommended that the entire system be replaced with an IP based camera system and expanded to cover the entire facility.

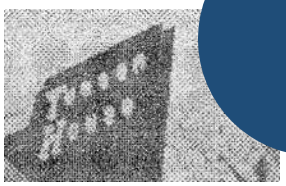
Access Control

- The head end of the access control system is adequate and can be expanded. The current implementation of the system does not completely protect the occupants from intrusion from non residents and should be redesigned. We recommend that all exterior doors be controlled by card access and that door position switches be installed to notify staff when there is an unauthorized operation of a door, or if a door has been "propped" open. This will greatly increase the security with the facility and cut down on unauthorized access.

Conclusion

Based on this observation and analysis, the facility is currently in a distressed state and has several life safety code violations that need to be addressed. Without a significant investment in its fundament infrastructure, this facility will continue to deteriorate, draining resources from COT HCD in the process. Fortunately, several of the deficiencies, when corrected, will directly benefit the long term sustainability of the property and lower the operational and maintenance expenses to COT HCD.

DRAFT



Per our Cost Summary included in the Aggregate Capital Needs section of the report, our current estimated construction cost is $43,076,800. This represents a cost per square foot of $96.80. We have also provided data in the aggregate capital needs section of this report for the overall project cost with project overhead, this figure came to $55,519,636 or a cost per square foot of $124.76. It is unlikely that either a single new facility, or multiple smaller facilities could be constructed for this amount to replace the existing 408 units, therefor it is the recommend of this report that the City of Tucson and The Housing and Community Development Department renovate the existing facility per these recommendations. This will bring the Tucson House into current code compliance and will increase the marketability/livability of the facility to the current and future residents.

One other option would be for the City of Tucson to investigate if there is interest from a private developer to purchase the property for redevelopment, in turn using the sales proceeds and other funding sources to provide an equal amount of low income housing elsewhere in the City. This report did not investigate this option.

DRAFT

Facility History

1 Executive Summary

2

3 Assessment Process

4 Component Conditions

5 Aggregate Capital Needs

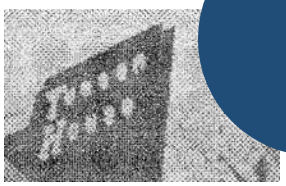
6 Elevator Assessment

7 Component Assessment Forms

8 Energy Data

DRAFT

City of Tucson



[FACILITY HISTORY]

General Description

The Tucson House has had a long history with in fabric of Tucson. The building is 17 stories with a full basement totaling approximately 445,000 sf. The lower level is dedicated to utility spaces, storage, and some community rooms. The first floor has the main offices directly adjacent to the public lobby, the remainder of the first floor and all of floors two through sixteen are dedicated to dwelling units. The seventeenth floor was originally a restaurant and lounge but due to damage to the floor slab it is currently unused. Of the dwelling units there are 172 studios, 188 one-bedroom apartment, and 51 two-bedroom apartments, spread out throughout the building. Each of the studio and one-bedroom dwelling units has a balcony, the two-bedroom units have two balconies.

The site contains the parking for the facility on the north and west sides with about half the spaces covered. The pool and landscape features are in good condition and compliment the building. Deliveries are made on the south side of the building at a dedicated loading dock, this is also where the trash compactor is located.

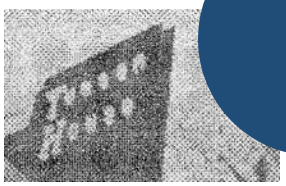
History

a. Original Construction

The Tucson House was originally built in 1962 as high end residential apartments. Located directly on Miracle Mile, the main road into Tucson, it boasted many modern amenities for its time such as CCTV from the lobby to each resident room through the building antenna system. The design is often attributed to local Architect Nick Sakellar, but the final construction documents were stamped by the Chicago firm Loewenberg & Lowenberg, it is not known how much influence Sakellar had in the final design, although it is in the same character as other similar work by Sakellar at the time.

The decline of the Tucson House started in the late 1960's with the construction of I-10 directly to the West. This diverted traffic around the Miracle Mile corridor and lead to a steady decline in the neighborhood. By the late 1970's the property was in bankruptcy.

DRAFT



b. Conversation to Public Housing

The decline of the Tucson House started in the late 1960's with the construction of I-10 directly to the West. This diverted traffic around the Miracle Mile corridor and lead to a steady decline in the surrounding neighborhood, in turn the Tucson House's popularity also declined.

By the late 1970's the property was in foreclosure. In 1977 The Department of Housing and Urban Development acquired the property, which was then acquired by The City of Tucson in 1979. Several remodeling efforts were made throughout the early 1980's to bring the property into code compliance and make it suitable for low income affordable housing. By 1984 the last phase of this work was completed.

Through the late 1980's and early 1990's much of the first floor of the Tucson House was converted to offices for what is now the Housing and Community Development Department

c. 1998 Tax Credit Improvements

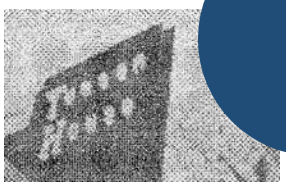
In 1994 Poster Frost Associates was hired to perform an analysis and make recommendations for the Tucson House. That report identified several critical issues that needed to be addressed based on the original construction and the use at the time.

Some of the critical issues at the time were

- Overloading of the first floor – The original construction was designed for residential use, the office use of the first floor exceeded the live load limitations and was overloading the structure
- Overloading of the seventeenth floor – The original construction was designed for residential use, the seventeenth floor at the time was used for file storage, greatly exceeding the design loads, damage was evident at the time that the floor system was failing. The space has since been emptied and has not been used.
- Several exiting issues were identified
- Balcony edge cracking significant enough to be a risk to the public
- Upgrades to the mechanical, plumbing, and electrical systems for safety and efficiency

Around 1996 Poster Frost Associates was hired to design the renovation of the Tucson House based on the recommendations of the 1994 report. Many, but not all, of the recommendations were addressed at that time as well as a full renovation of the dwelling units, including new appliances, cabinetry, and full restroom renovations. The offices were removed from the first floor and this space was reconfigured into apartments and community rooms. The seventeenth floor was abandoned per the

DRAFT



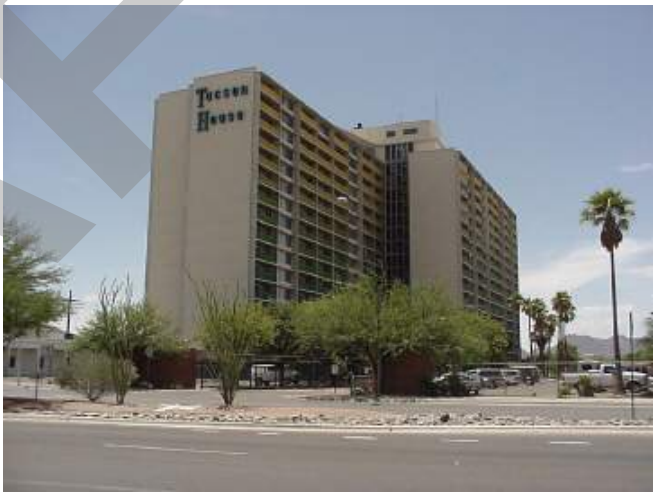
recommendations of the 1994 report. There were upgrades to the MEP systems and the balcony failure issues were addressed.

In addition, several envelope upgrades were made to improve the efficiency of the facility. The floor to ceiling glazing at the apartment units was removed and infilled with metal stud construction. The outside surface installed was EIFS, and smaller sliding glass doors were installed within the stud framing. All of the windows and doors in the facility were replaced (with the exception of the seventeenth floor) with aluminum frames and 1" insulated glazing.

Overall the 1997 renovation addressed the major issues identified in the 1994 report and has allowed the Tucson House to continue to serve the Tucson Community.

d. Current Status

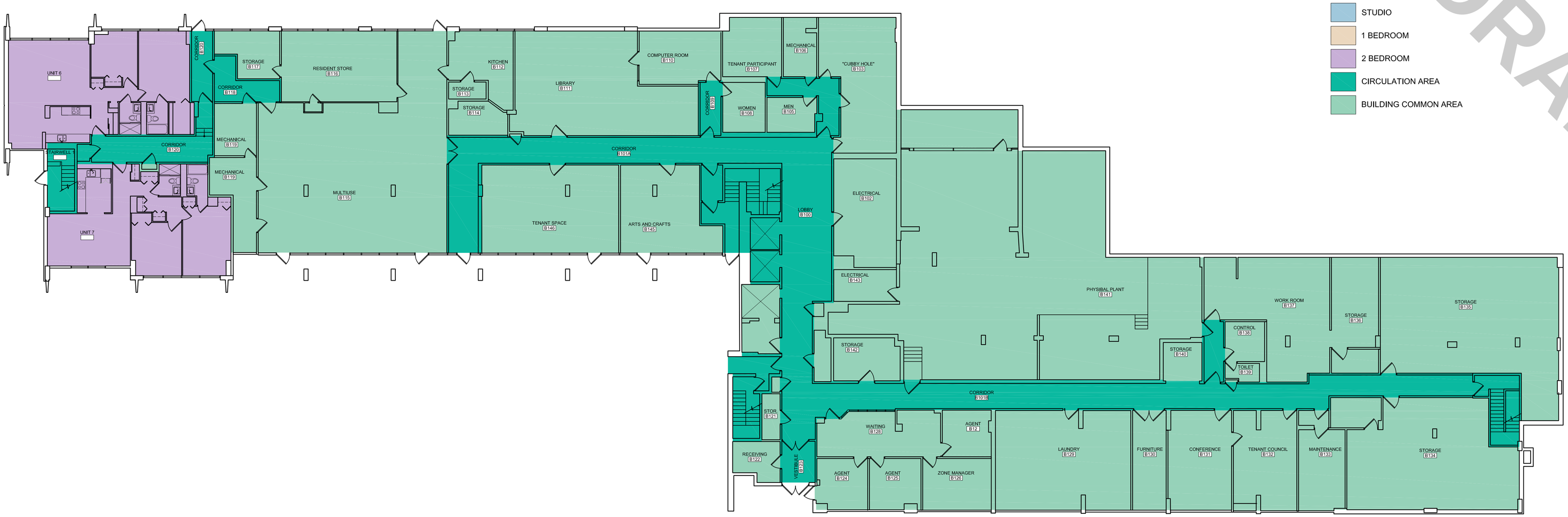
The Tucson House currently has 408 apartments restricted to Elderly and Disabled individuals who qualify for housing assistance within the Department of Housing and Community Development. There are 10 on-site staff who assist the residents, manage the property, and provide maintenance.



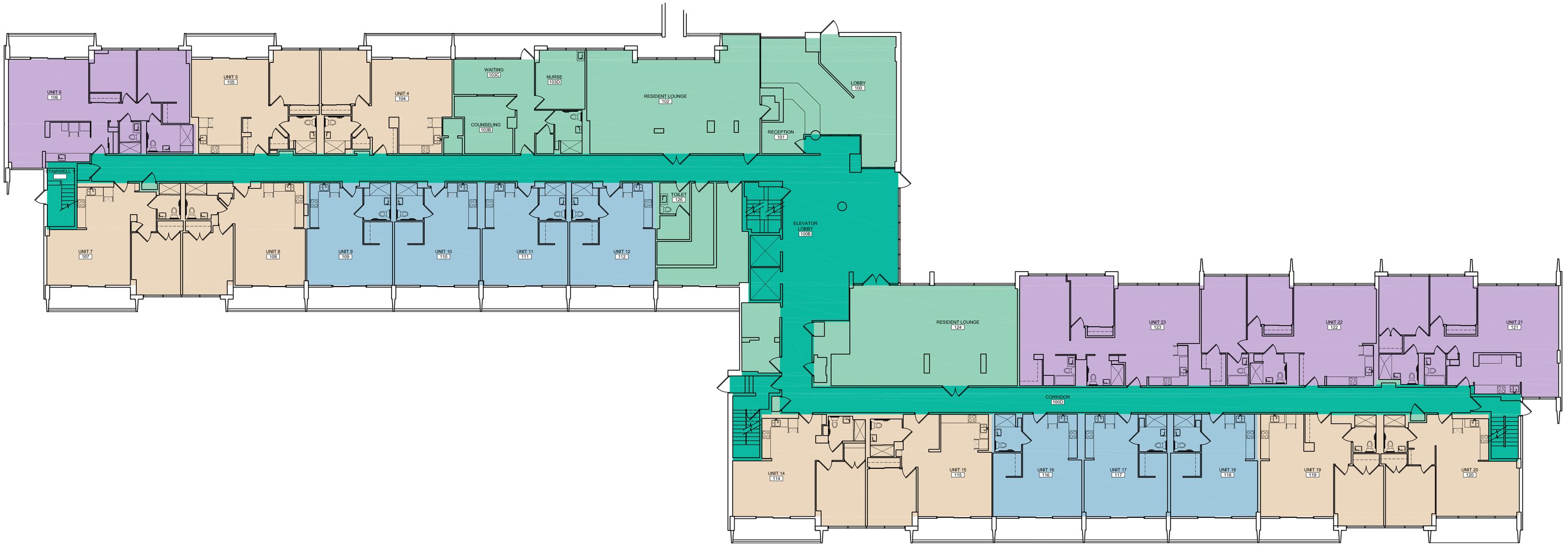
Over the past 19 years the staff has done a tremendous job of maintaining the facility. The chillers were updated in 2001 to provide higher energy performance, but other than that there have been no large renovation projects since 1997.

At this point, as the following report will illustrate, many of the building systems and components are reaching the end of their service life. Without a significant investment in the infrastructure of the building, there will ongoing maintenance issues and associated operational costs. At some point critical systems will fail and cause a loss of service to the residents.

DRAFT



1 BASEMENT FLOOR PLAN
SCALE: 3/32" = 1'-0"



1 FIRST FLOOR PLAN
SCALE: 3/32" = 1'-0"

LEGEND

- STUDIO
- 1 BEDROOM
- 2 BEDROOM
- CIRCULATION AREA
- BUILDING COMMON AREA

DRAFT

Architecture & Engineering

Department of Operations
City of Tucson

4004 S. Park Avenue, Bldg. 2
Tucson, AZ 85714

Tel: (520) 791-4724
Fax: (520) 791-5389

Project:

TUCSON HOUSE
CITY OF TUCSON
1501 N. ORACLE ROAD
TUCSON, ARIZONA

Architect:

WSM ARCHITECTS

4330 NORTH CAMPBELL AVE
SUITE NO 268
TUCSON, ARIZONA 85718

520.408.1044 TEL
520.408.1170 FAX
WSMARCH.COM WEB

COPYRIGHT BY WSM ARCHITECTS, INC - 2016

Seal:

DESIGN DEVELOPMENT SUBMITTAL

PRELIMINARY
NOT FOR CONSTRUCTION

Revision:

1	
2	
3	
4	
5	
6	
7	
8	
9	
10	

Date: MM-DD-YYYY

A&E Plan No.: #C-XX-XXX

A&E Job No.: AE XXXX

Consultant Job No.: 16-002

Sheet Title:

Sheet:

Of

CAD File No.: Plot Date:1/9/2016 12:29:30 PM

P:\XXXX Jobs\XX-XXX Job Name\ MONTH/YEAR OF PROJECT START

1 SECOND-FOURTH FLOOR PLAN
SCALE: 3/32" = 1'-0"

1 FIFTH FLOOR PLAN
SCALE: 3/32" = 1'-0"

LEGEND

- STUDIO
- 1 BEDROOM
- 2 BEDROOM
- CIRCULATION AREA
- BUILDING COMMON AREA

DRAFT

Architecture & Engineering

Department of Operations
City of Tucson

4004 S. Park Avenue, Bldg. 2
Tucson, AZ 85714

Tel: (520) 791-4724
Fax: (520) 791-5389

Project:

TUCSON HOUSE

CITY OF TUCSON
1501 N. ORACLE ROAD
TUCSON, ARIZONA

Architect:

WSM ARCHITECTS

4330 NORTH CAMPBELL AVE
SUITE NO 268
TUCSON, ARIZONA 85718

520.408.1044 TEL
520.408.1170 FAX
WSMARCH.COM WEB

COPYRIGHT BY WSM ARCHITECTS, INC - 2016

Seal:

DESIGN DEVELOPMENT SUBMITTAL

PRELIMINARY
NOT FOR CONSTRUCTION

Revision:

1	
2	
3	
4	
5	
6	
7	
8	
9	
10	

Date: MM-DD-YYYY

A&E Plan No.: #C-XX-XXX

A&E Job No.: AE XXXX

Consultant Job No.: 16-002

Sheet Title:

Sheet:

of

CAD File No.: Plot Date:/1/2016 12:28:49 PM

P:\XXXX Jobs\XX-XXX Job Name\ MONTH/YEAR OF PROJECT START

1 SECOND-FOURTH FLOOR PLAN
SCALE: 3/32" = 1'-0"

LEGEND

- STUDIO
- 1 BEDROOM
- 2 BEDROOM
- CIRCULATION AREA
- BUILDING COMMON AREA

DRAFT

Architecture & Engineering

Department of Operations
City of Tucson

4004 S. Park Avenue, Bldg. 2
Tucson, AZ 85714

Tel: (520) 791-4724
Fax: (520) 791-5389

Project:

TUCSON HOUSE

CITY OF TUCSON
1501 N. ORACLE ROAD
TUCSON, ARIZONA

Architect:

WSM ARCHITECTS

4330 NORTH CAMPBELL AVE
SUITE NO 268
TUCSON, ARIZONA 85718

520.408.1044 TEL
520.408.1170 FAX
WSMARCH.COM WEB

COPYRIGHT BY WSM ARCHITECTS, INC - 2016

Seal:

DESIGN
DEVELOPMENT
SUBMITTAL

PRELIMINARY
NOT FOR CONSTRUCTION

Revision:

1	
2	
3	
4	
5	
6	
7	
8	
9	
10	

Date: MM-DD-YYYY

A&E Plan No.: #C-XX-XXX

A&E Job No.: AE XXXX

Consultant Job No.: 16-002

Sheet Title:

Sheet:

of

CAD File No.: Plot Date:1/1/2016 12:28:21 PM

P:\XXXX Jobs\XX-XXX Job Name\ MONTH/YEAR OF PROJECT START

Assessment Process

1
Executive Summary

2
Facility History

3

4
Component Conditions

5
Aggregate Capital Needs

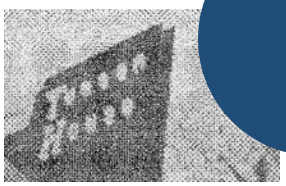
6
Elevator Assessment

7
Component Assessment Forms

8
Energy Data

DRAFT

CITY OF TUCSON



[Assessment Process]

In January 2016, the City of Tucson's Housing and Community Development Department asked WSM Architects to perform a Physical Needs Assessment of the Tucson House. The intent of the assessment was to determine the overall physical condition of the facility. In this report we have considered all of the interrelated systems within the building as well as the overall aesthetic conditions in order to make recommendations for replacement or refurbishment of existing resources.

a. Professionals involved

Prime Professional

WSM Architects
4330 N Campbell Ave
Tucson Az, 85716
(520) 408-1044

Consulting Engineers

Mechanical Engineering
PH Mechanical
335 N. Wilmot Road, Ste.460
Tucson, AZ 85711
(520) 731-2060

Electrical Engineering
Electrical Design Associates
7536 N La Cholla Blvd,
Tucson, AZ 85741
(520) 622-2196

Structural Engineering
Schneider Structural Engineers
435 East 9th Street
Tucson, AZ 85705
(520) 512-8183

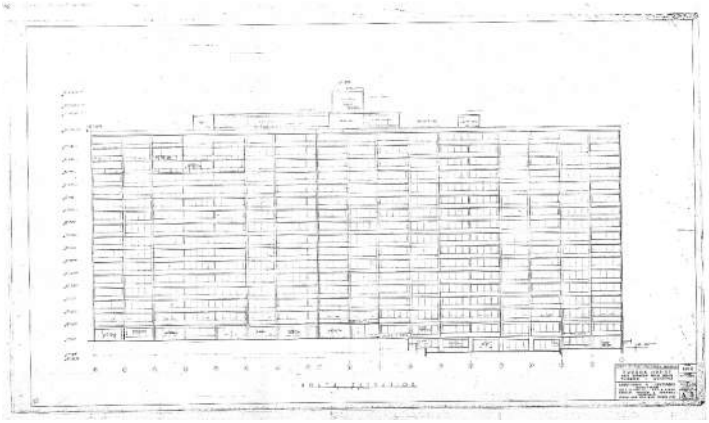
Elevator Assessment
Elevator Consulting Services, Inc.
17595 Italy Court
Lakeville, MN 55044
(952)435-2429

Cost Estimating
Compusult
5923 East Pima Street
Tucson, Arizona 85712
(520) 882-4044

b. Available Documentation

Documents

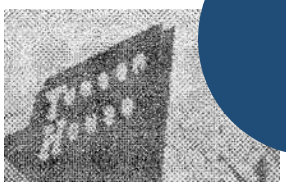
- 1962 Tucson House Original Brochure
- 1994 Analysis and Recommendations
- 2013 Oracle Area Revitalization Project
- 2014 SHC – Asbestos Materials Survey Tucson House 16th Floor only
- 2014 ThyssenKrupp Elevator – Modernization Budget
- 2015 Desert Analytical Services Air Quality Report



Existing Drawings

Most of the existing drawing sets are partially complete and in general the drawings are not in good condition. The "1997 Tucson House Tax Credit Renovation" set was the most complete and provided the best detail into the exiting conditions. Following is a list of the drawing sets used to generate this report.

DRAFT



- 1963 Tucson House Original Drawings – Architect: Loewenberg & Loewenberg
- 1981 Fire Protection Renovation – Architect: City of Tucson DOT, Architecture Division
- 1984 Tucson House Renovation, Phase IV & General Retrofit – Architect: FKM
- 1997 Tucson House Tax Credit Renovation – Architect: Poster Frost Associates Inc.
- 2001 Tucson House Chiller and Mechanical Systems Upgrades – Architect: The Architecture Company

c. Determination of Conditions

- Visual inspection

WSM Architects and our consulting engineers spent the week of January 11th on site observing and recording the conditions we found. HCD staff assisted us in our investigation and escorted us throughout the facility. Of the 408 apartments, we physically walked 44 dwelling units, in addition we reviewed more than 50% of the non-dwelling spaces in the building. See the Component Condition section of this report for the individual room assessment report and summary of conditions. Staff assistance was vital during the on-site investigations to ensure our team had a full understanding of the challenges that staff faces daily working within the facility.

- Discussions with Staff

On January 11, 2016 WSM Architects and our consulting engineers met on site with the Tucson house staff to discuss the goal of this assessment, the current condition of the facility, and to discuss the process for completing our investigations. The feedback given at this meeting was vital to our efforts and gave us clear direction as we proceeded with the assessment.

d. Components Reviewed

Site

- Paving
- Sidewalks
- Landscape
- Drainage
- Accessibility
- Parking Structures
- Site Lighting

Building Exterior

- Brick Veneer
- Concrete Structure
- EFIS infill
- Storefront Glazing Systems
- Hollow Metal Door
- Aluminum Windows
- Patio Guard Rails
- Precast Concrete building elements
- Roofing

DRAFT

Building Systems

- Structural systems
- Mechanical Systems
- Plumbing Systems
- Fire Protection Systems
- Electrical systems
- Special Systems
    - Fire alarm
    - CCTV
    - Access Control
    - Security
    - Public Address

Common Areas

- Storage
- Office
- Lobby
- Corridor
- Community spaces

Dwelling units

- Studio
- One Bedroom
- Two Bedroom

DRAFT

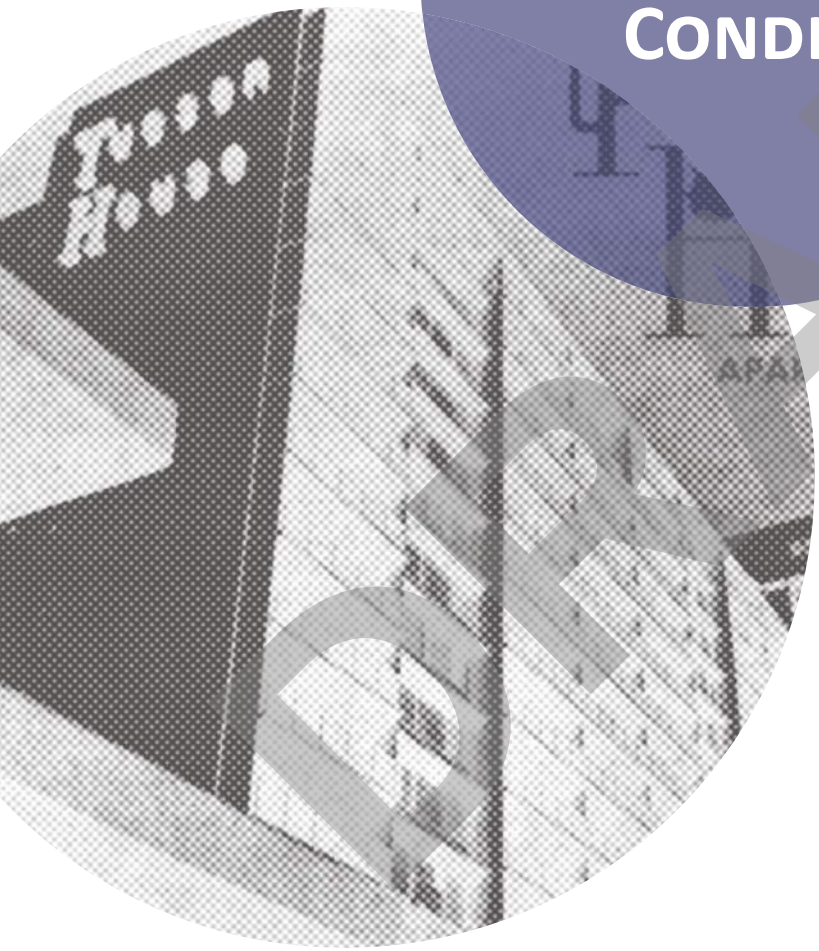
1
Executive Summary

2
Facility History

3
Assessment Process

4

Component Conditions



5
Aggregate Capital Needs

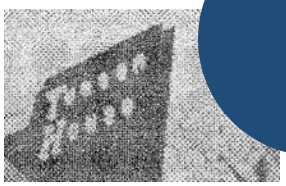
6
Elevator Assessment

7
Component Assessment Forms

8
Energy Data

DRAFT

City of Tucson



[Architectural Component Conditions]

General Conditions

In our analysis of the physical condition of all the components of the Tucson House, it was generally noted that staff does a tremendous job maintaining the facility under less than ideal circumstances. Due to the age of many of the systems, components, and infrastructure it seemed that in our time on site there were daily "emergencies" requiring immediate staff attention to address and resolve. While on site 2 elevators on separate days were down causing very long wait times to move between floors, there were multiple leaks in both the domestic water supply and the sanitary sewer piping causing damage to ceiling and walls, and we noted several concerns about the security of the facility as we witnessed people enter the facility who were not residents. For the most part the deficiencies are due to the age of the components and the overall facility. It should be noted, and will be further addressed under in this report, that the fundamental structural and architectural components of the build are sound and that as an asset to the City of Tucson, we recommend that the property be renovated so it can continue to serve the Tucson House residents and the Housing and Community Development Department.

This section of the report is intended to note the conditions and deficiencies in the Tucson House and make recommendations for remediation. The section "Capital Needs Assessment" will list the recommendations for replacement, refurbishment, or other repairs that are necessary.

a. Site Conditions

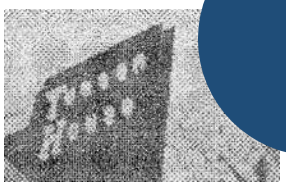
- Paving

The overall paving condition is poor throughout the site, extensive "alligator" cracking is evident. The paving has at this point failed and is allowing water to infiltrate the subgrade, some areas of ponding are noticeable, evidence that the water infiltration is damaging the subgrade and will begin to fail, creating pot holes and more deterioration of the paving.

The marked accessible spaces did not meet ADA requirements
The site appears to drain well and we did not find any major storm water issues on site

- **Replacement Recommendation**: Repave the entire site with new asphalt. Layout new striping to comply with ADA

DRAFT



requirements

- Sidewalks & Curbs

The concrete sidewalks are generally in good condition, there were some areas noted where sections of the sidewalk had heaved and grinding was necessary to prevent a tripping hazard. There are also come areas where additional heaving has taken place. We did not find any accessibility issues with the curbing or sidewalks.

The canopy that covers the side walk from Miracle Mile to the main entrance of the Tucson House is a cast in place thin shell concrete structure that is original to the 1962 construction, while it shows some signs of deflection, due to the historic status of the facility this canopy should be maintained.

- **Refurbishment Recommendation**: Patch and repair existing concrete sidewalks and stairs as necessary. Remove sections that have heaved and pour new sidewalk sections to remove tripping hazards. Clean walk way canopies and epoxy inject any cracking, paint column supports.

- Landscaping

The landscaping was in good condition throughout the site. No issues were noted in observation or from staff in regard to the irrigation systems or condition of the planting.

- **Replacement Recommendation:** No recommendations

- Parking Shade Canopies

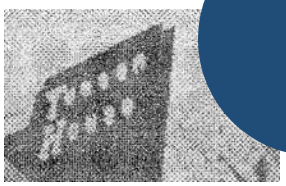
The parking shade canopies are cast in place thin shell concrete structures that are original to the 1962 construction. There has been some damage over time and the entire structure has received a parg coat of mortar wash. While these canopies show some signs of wear, due to the historic status of the facility this canopy should be maintained.

- **Refurbishment Recommendation:** Lightly bead blast existing structures to remove parge coating. Epoxy inject significant cracking per the Structural assessment. Patch chipped or broken sections of concrete.

- Pool

The pool is in overall good condition; the interior surface has been well maintained. The pool equipment is functional, but is nearing the end of its service life. The decking and concrete surfaces have some cracking but nothing that needs attention or repair. The South wall has a few stress cracks but again there are no structural issues that need to be addressed. The thin shell shade canopies show typical sag, they are original to the 1962 construction and should be retained.

DRAFT



- **Refurbishment Recommendation:** Patch and repair existing concrete pool deck as necessary. Remove sections that have heaved and pour new pool deck sections to remove tripping hazards. Clean shade canopies and epoxy inject any cracking, paint column supports. Replace existing pool equipment.

- Fencing

The site is typically fenced in an 8' chain link fence tan vinyl privacy slats. Other than some incidental damage the fencing is in good repair.

- **Refurbishment Recommendation:** Patch and repair existing fencing at damaged areas

b. Building exterior

- Wall systems

The primary structural system for the building is cast in place concrete, the east and west walls of the structure are clad in a light beige brick. Originally the North and South Façades were floor to ceiling glazing on all levels, in the 1997 renovation all of this glazing was removed and replaced in the dwelling units with a smaller sliding glass door infilling most of the opening with 4" metal studs with R-11 batt insulation and an exterior insulation and finish system on 1" insulation board.

Overall the exterior envelope is in good condition. The brick shows a few normal stress cracks that pose no structural issues. On the balconies the EFIS walls show no sign of stress or wear.

The main deficiencies involving the building envelop are the condition of the caulk in areas exposed to the elements. In these conditions the caulking has begun to shrink and crack. These locations need to be addressed. The other deficiency is the mortar connection of the pre-cast wing extensions at the balconies. In nearly all conditions these joints have cracked and have opened allowing moisture to get in-between these pre-cast concrete elements and the building structure.

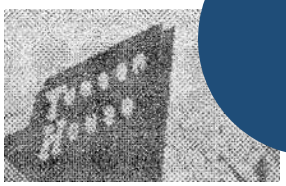
- **Refurbishment Recommendation:** Remove and replace caulking that shows signs of shrinkage and cracking. Remove mortar at all locations between the precast fins and the building concrete structure. Install backer rod and caulk at all locations.

- Window systems

There are 3 window systems used in the Tucson house:

1. Standard fixed glazing Aluminum Storefront with 1" insulated glazing, this system is primary used in the common spaces at the first floor and in the elevator lobbies. The aluminum framing system is in good condition and does not show signs of deterioration. The glazing was installed during the 1997 renovation and is approximately 19 years old. The reasonable service life for this window type is 20-25 years. It is likely that the glazing unit will begin to fail within the next 5 years.
    - **Replacement Recommendation:** Replace all storefront glazing with new 1" insulated glazing units
2. Operable aluminum windows and sliding glass doors with 1" insulated glazing, this system is used throughout the dwelling units. Overall the aluminum is in good condition but the rollers and other working parts are beginning to

DRAFT



fail. These windows and glazing were installed during the 1997 renovation and are approximately 19 years old. The reasonable service life for this window type is 20-25 years. It is likely that the glazing unit will begin to fail within the next 5 years.

- **Replacement Recommendation:** Replace all window and sliding glass door units with new aluminum units with 1" insulated glazing

3. Fixed aluminum windows with single plane glazing. These are found on the 17th floor. The aluminum frames are not thermally broken and the glazing is not tempered. These units were not replaced in the 1997 renovation assuming the 17th floor would not be used. If the 17th floor is going to be reopened, these units will need to be addressed.
   - **Replacement Recommendation:** Replace all single pane window systems with a thermally broken store front window system with 1" insulated glazing

- Roofing system

The roof is a multiply SBS modified roofing system applied over the existing concrete deck. The roof has been recoated recently and appears to be sound. There is evidence that the ends of the laps are beginning to peel, causing minor ponding at the joints in the roofing system. No data exists to determine when the roof was last replaced. Based on our visual inspection, while the roof has been maintained it is older and will likely need replacement in the next 5-7 years.

- **Replacement Recommendation:** Completely remove existing roofing system and replace with 3-ply SBS modified roofing with a white cap sheet.

c. Common Areas

The common areas throughout the building are well maintained but also shows signs of high use and abuse. The renovation should address this by specifying products that will be sustainable under the conditions at this facility. All of the finishes show signs of wear and are reaching the end of their service life.

- **Main Entrance**

As the front door for the facility residents and guests, the main entrance lobby should be welcoming and warm and offer seating for visitors waiting for residents to greet them. The space also needs to be abuse resistant. The service window should be replaced with a level 3 bullet resistant glazing and an electronic talk box for the receptionist to speak to the public.

- **Replacement Recommendation:** Complete renovation of the space per the following

i. Flooring:

- LVT or VCT in the circulation paths and heavy duty carpeting in the waiting area

ii. Ceiling:

- 24 x 24 tegular edge ACT with some gypsum board soffits

iii. Walls:

- Painted gypsum board with all protection to 48" and corner guards

DRAFT

iv. Doors:

- Aluminum automatic sliding entrance doors tied into the access control system
- All hardware to be accessible

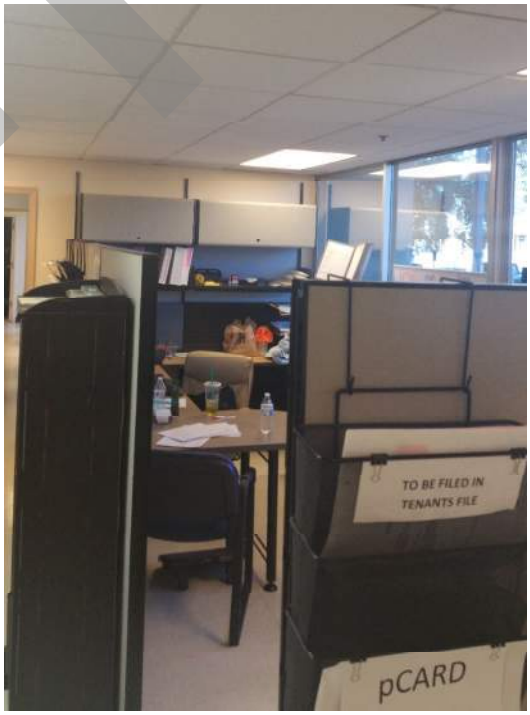
v. Window:

- Thermally broken aluminum storefront with 1" insulated glazing and a low-e coating

vi. Furniture:

- Heavy use furniture, Landscape Forms or Similar

- **Administrative Offices**



The Administrative office area of Tucson House is a small space that is not currently well organized. It appears that several smaller spaces have been opened into one another creating situations where access from one space to another can be through someone's office. Per the Structural Assessment the elevated floor slabs throughout the building are not designed to accommodate office loading. We recommend either the offices be relocated to the basement or the floor slab in this area be reinforced from below. In either case a full renovation of this area is recommended to create a more efficient and healthy working environment that can better interface with the building residents. Integration of a dedicated conference room would also be ideal for this spaces

- **Replacement Recommendation:** Complete renovation of the space per the following

i. Flooring:

- Carpeting throughout with VCT or VLT in the circulation paths to minimize maintenance

ii. Ceiling:

- 24 x 24 tegular edge ACT with some gypsum board soffits

iii. Walls:

- Painted gypsum board

iv. Doors:

- Hollow metal frames with solid wood doors
- All hardware to be accessible

v. Window:

- Thermally broken aluminum storefront with 1" insulated glazing and a low-e coating

vi. Furniture:

- Systems furniture

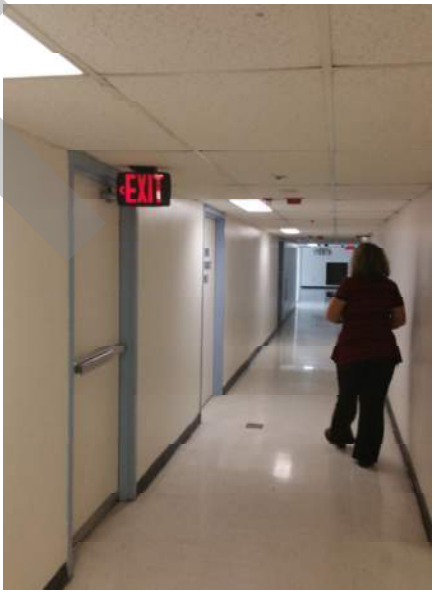
- **Basement Corridor**

While the basement corridor is more of a utility space, it is the floor with the most community spaces, conference spaces, library and other resident amenities. In their current state the corridors offer little in the way of wayfinding or place making. Simple design details in the door opening and the ceilings would create a better environment in these spaces. This would also

DRAFT

be an ideal location for grinding and sealing the existing concrete floors to provide the final finish. This floor finish would provide the best value over time. The ceiling height in these and all corridors is 7'-0", this is a code violation, ceiling along a means of egress are required to be 7'-6". Reconfiguration of the interstitial space will be required to rectify this issue.

- **Replacement Recommendation:** Complete renovation of the space per the following
  - *i. Flooring:*
    - Grind and seal existing concrete
  - *ii. Ceiling:*
    - 24 x 24 tegular edge ACT with some gypsum board soffits
  - *iii. Walls:*
    - Painted gypsum board with wall protection up to 4'. Full height corner guards
  - *iv. Doors:*
    - Existing to remain hollow metal frames and existing wood doors
    - All hardware to be accessible
  - *v. Window:*
    - None
  - *vi. Furniture:*
    - None



- **Floors 1 – 16 Corridors**

In their current state the corridors offer little in the way of wayfinding or place making. Simple design details in the door opening and the ceilings would create a better environment in these spaces. The carpeting on floors 2 through 16 should be removed and replaced with a resilient material that will be more easily maintained. The ceiling height in these and all corridors is 7'-0", this is a code violation, ceiling along a means of egress are required to be 7'-6". Reconfiguration of the interstitial space will be required to rectify this issue.

- **Replacement Recommendation:** Complete renovation of the space per the following
  - *i. Flooring:*
    - VLT or VCT
  - *ii. Ceiling:*
    - 24 x 24 tegular edge ACT with some gypsum board soffits
  - *iii. Walls:*
    - Painted gypsum board with wall protection up to 4'. Full height corner guards
  - *iv. Doors:*
    - Existing to remain hollow metal frames and existing wood doors
    - All hardware to be accessible
  - *v. Window:*
    - None
  - *vi. Furniture:*

DRAFT

- None

- **Elevator Lobbies**

As the primary and most heavily used common areas of the building, the elevator lobbies should again be warm inviting spaces with comfortable furniture encouraging residents to interact and to help build a stronger community within the building. Currently the ceilings 7'-0" height does not meeting the IBC requirements for the egress path of 7'-6" and will need to be raised. Through the use of comfortable furniture, lighting, ceiling design and color, these spaces could be a more integral part of the building community.

- **Replacement Recommendation:** Complete renovation of the space per the following

i. Flooring:

- VLT or Ceramic Tile in the circulation paths and heavy duty carpeting in the sitting areas
- *Ceiling:*
- 24 x 24 tegular edge ACT with some gypsum board soffits

ii. Walls:

- Painted gypsum board with wall protection up to 4'.

iii. Doors:

- Existing to remain hollow metal frames with hollow metal doors
- All hardware to be accessible

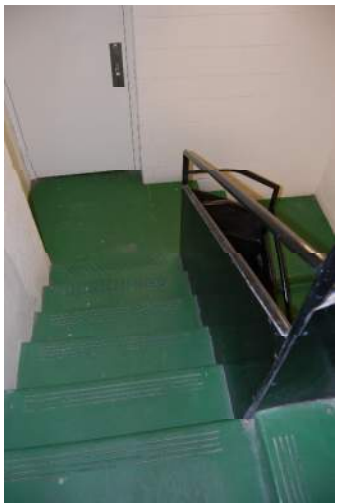
iv. Window:

- Thermally broken aluminum storefront with 1" insulated glazing and a low-e coating

v. Furniture:

- Heavy duty commercial waiting room furniture

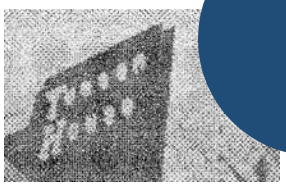
- **Stairs**



The stairs are fairly utilitarian in nature and should remain so. The floors, stairs and landing will be refinished with a coat of epoxy paint. Guard rails with be built with a 2 x 2 tube steel frame with a translucent resin panel insert. Stainless Steel hand rails are required on both sides of the stair

- **Replacement Recommendation:** Complete renovation of the space per the following

DRAFT



i. ***Flooring:***
- Epoxy Paint existing concrete

ii. ***Ceiling:***
- Paint existing concrete

iii. ***Walls:***
- Patch and repair existing CMU and Concrete - Paint

iv. ***Doors:***
- Existing to remain hollow metal frames and Hollow metal doors
- Provide new hardware throughout

v. ***Window:***
- None

vi. ***Furniture:***
- None

- **File Storage**

The file storage room is in the basement and used to store records for the residents and programs at the Tucson House. Better shelving would improve the overall quality of this space for by the staff.

- **Replacement Recommendation:** Complete renovation of the space per the following=

i. ***Flooring:***
- Grind and seal existing concrete

ii. ***Ceiling:***
- 24 x 24 tegular edge ACT with some gypsum board soffits

iii. ***Walls:***
- Paint existing gypsum board. Full height corner guards

iv. ***Doors:***
- Existing to remain hollow metal frames and Hollow metal doors
- Provide new accessible hardware throughout

v. ***Window:***
- Provide new Thermally broken aluminum storefront with 1" insulated glazing and a low-e coating

vi. ***Furniture:***
- Provide standardized shelving for storage of files, investigate possibility of high density storage.

- **Building Storage and Maintenance areas**

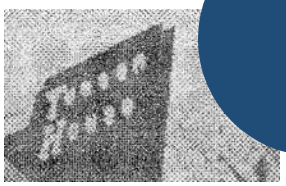
The building storage and maintenance areas are utilitarian in finish. The ceiling is exposed underside of the first floor deck, with exposed mechanical and electrical equipment. These rooms require minimal remodeling to continue to serve their purpose

- **Refurbishment Recommendation:** Minimal renovation

i. ***Flooring:***
- Clean and seal existing concrete

ii. ***Ceiling:***

DRAFT



- Exposed deck no work required

iii. ***Walls:***

- Exposed CMU and Concrete, where Gypsum Board partitions occur, patch and repair. Provide 4' high wall protection and full height corner guards

iv. ***Doors:***

- Existing to remain hollow metal frames and Hollow metal doors
- Provide new accessible hardware throughout

v. ***Window:***

- Provide new Thermally broken aluminum storefront with 1" insulated glazing and a low-e coating

vi. ***Furniture:***

- Provide standardized shelving for storage of files, investigate possibility of high density storage.

▪ **Elevators**

See the attached elevator assessment. Due to the age of the equipment, doors, and cabs a full modernization is recommended at this time.

d. Community Spaces

There are a variety of community spaces throughout the facility serving residents, and guests. Like the rest of the building, these areas are well maintained but are worn from use and age. A full renovation is recommended at this time.

▪ **Conference Rooms**

There is one conference room in the basement, it is located on the north side of the building with north facing windows and can accommodate groups up to about 18 people. There is no white board or any AV systems in this space. Adding A/V capabilities would greatly increase the usefulness of this space

- **Replacement Recommendation:** Complete renovation of the space per the following

i. ***Flooring:***

- VLT or VCT

ii. ***Ceiling:***

- 24 x 24 tegular edge ACT with some gypsum board soffits

iii. ***Walls:***

- Painted gypsum board with wall protection up to 4'. Full height corner guards

iv. ***Doors:***

- Existing to remain hollow metal frames and Hollow metal doors
- Provide new accessible hardware throughout

v. ***Window:***

- Thermally broken aluminum storefront with 1" insulated glazing and a low-e coating

vi. ***Furniture:***

- Flexible conference room furniture that can be rearranged for informal meetings or training sessions

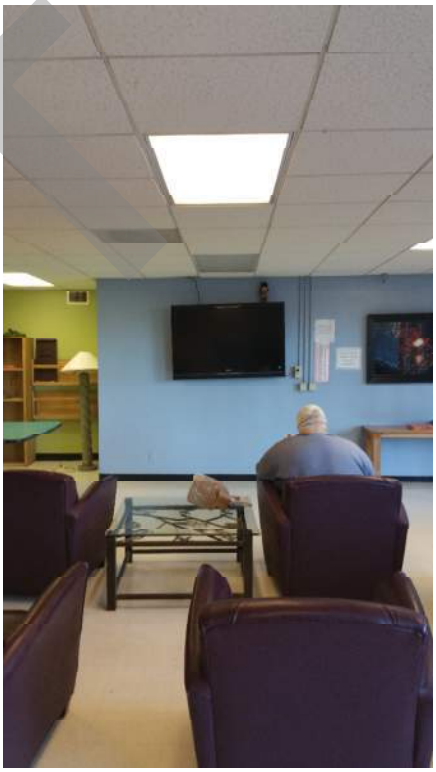
vii. ***Equipment:***

DRAFT

- Projector and Screen, or a large wall mounted panel display, integrated into a floor box to allow for connection from the conference table.

- **Community Rooms**

There are currently 2 dedicated community rooms in the facility. The Carriage room in the basement and the lounge off the first floor elevator lobby. Both are in similar condition and consistent with the rest of the facility



- **Replacement Recommendation:** Complete renovation of the space per the following
  - *i. Flooring:*
    - VLT or VCT
  - *ii. Ceiling:*
    - 24 x 24 tegular edge ACT with some gypsum board soffits
  - *iii. Walls:*
    - Painted gypsum board with wall protection up to 4'. Full height corner guards
  - *iv. Doors:*
    - Existing to remain hollow metal frames and Hollow metal doors
    - Provide new accessible hardware throughout
  - *v. Window:*
    - Thermally broken aluminum storefront with 1" insulated glazing and a low-e coating
  - *vi. Furniture:*
    - Carriage room - Flexible conference room furniture that can be rearranged for informal meetings or training sessions
    - Lounge – Comfortable seating for small groups or individuals
  - *vii. Equipment:*
    - Carriage room - Projector and Screen
    - Lounge - large wall mounted panel display

- **Craft Room**

The craft room appears that it does get a fair amount of use and is crowded with supplies. Better shelving, tables and seating would improve the overall quality of this space for the residents

- **Replacement Recommendation:** Complete renovation of the space per the following
  - *i. Flooring:*
    - Grind and seal existing concrete

DRAFT

ii. ***Ceiling:***

iii. 24 x 24 tegular edge ACT with some gypsum board soffits

iv. ***Walls:***

- Paint exisiting gypsum board.

v. ***Doors:***

- Existing to remain hollow metal frames and Hollow metal doors
- Provide new accessible hardware throughout

vi. ***Window:***

- Thermally broken aluminum storefront with 1" insulated glazing and a low-e coating

vii. ***Furniture:***

- Flexible shelving and storage cabinets for supplies. Cleanable tables and chairs.

- **Library**

Like the craft room, the library appears that it does get a fair amount of use and is crowded with books and material. Better shelving, tables and seating would improve the overall quality of this space for the residents. This space also has a small computer room that does not appear utilized. The equipment is antiquated and with the proliferation of smart phones and other devices is not likely used often. The room would be better used if it were to have 2 computer stations and allow the remaining space to go back into the library allowing for more storage of materials.

- **Replacement Recommendation:** Complete renovation of the space per the following

i. ***Flooring:***

- Grind and seal existing concrete

ii. ***Ceiling:***

- 24 x 24 tegular edge ACT with some gypsum board soffits

iii. ***Walls:***

- Paint existing gypsum board.

iv. ***Doors:***

- Existing to remain hollow metal frames and Hollow metal doors
- Provide new accessible hardware throughout

v. ***Window:***

- Thermally broken aluminum storefront with 1" insulated glazing and a low-e coating

vi. ***Furniture:***

- Cleanable tables and chairs.

- **Laundry**

DRAFT

The laundry is likely the most used community space in the building, it has had several modifications and alterations over time and has not worn well. There is a variety of equipment of differing ages. There is also not adequate seating space for those waiting for their laundry. A full renovation of this space is recommended.

- **Replacement Recommendation:** Complete renovation of the space per the following=

i. ***Flooring:***

- Grind and seal existing concrete

ii. ***Ceiling:***

- 24 x 24 tegular edge ACT with some gypsum board soffits

iii. ***Walls:***

- Painted gypsum board with wall protection up to 4'. Full height corner guards

iv. ***Doors:***

- Existing to remain hollow metal frames and Hollow metal doors
- Provide new accessible hardware throughout

v. ***Window:***

- Thermally broken aluminum storefront with 1" insulated glazing and a low-e coating

vi. ***Furniture:***

- Cleanable tables and chairs.

- Clean Storage

The condition of the storage areas is consistent throughout the facility, with exposed

- Utility and Building Storage

DRAFT

e. Dwelling Units

In our review of 44 of the dwelling units we found that they were very consistent in their overall condition and finish. While HCD staff has done a tremendous job in maintaining all of the units and keeping them up to similar standards, in general many of the finishes, fixtures, and appliances are simply reaching the end of their service life and need to be replaced. While we did find some ADA violations in the accessible units, these were minor and would be corrected in the renovation of the restrooms and kitchens. The exterior sliding glass door and window units were serviceable for the most part with some of the rollers beginning to fail. The glazing units typically have a service life of 20 to 25 years. It is likely that these glazing units will begin to fail and should be replaced.

- **Replacement Recommendation:** Complete renovation of the space per the following:

i. Flooring:

- Living area – VCT
- Bedrooms area – VCT
- Circulation area – VCT
- Restrooms- CT

ii. Ceiling:

- Painted existing concrete

iii. Walls:

- Living areas, bedrooms, and circulation- Painted existing gypsum board/plaster – some minor patching is required
- Restrooms – CT full height

iv. Doors:

- Existing to remain hollow metal frames and solid wood doors for the corridors, hollow core doors on the interior. Paint
- Provide new accessible hardware throughout
- Provide new aluminum sliding glass door with 1" insulated glazing and a low-e coating

v. Window:

- Thermally broken aluminum storefront with 1" insulated glazing and a low-e coating

vi. Balcony:

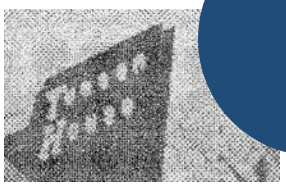
- Epoxy inject 20 lf of cracking for ½ of the units. Clean and paint all of the guardrails. Caulk all of the joints between the precast units and the concrete wall.

DRAFT

f. 17th Floor

The 17th floor has not been used since sometime between the 1994 needs assessment and the 1997 renovations. The floor on the east side of the building clearly shows structural damage from slab overloading when the space was used for file storage. In its present condition it is still recommended that the space not be occupied.

Under the structural assessment portion of this report recommendations are given on how to rehabilitate the floor structure of the 17th floor so that it would again be an occupied space. We have broken this cost out separately in the cost estimate and the aggregate capital needs as the repair of this area would require the demolition of the apartments below in order to fully reinforce the underside of the slab, adding considerably to the cost of the repair. If the slab were to be repaired we would recommend remodeling this space for community use as an assembly area, community room, conference center, or other shared use.



The 17th also retains some character defining features of the original 1962 construction that should be preserved and highlighted in the renovation. These include some original light fixtures, original soffits, exposed brick walls, and other historic features.

- **Replacement Recommendation:** Complete renovation of the space per the following
  - *i. Flooring:*
    - Conference rooms/community rooms – Carpeting
    - Halls, elevator lobby - LVT
  - *ii. Ceiling:*
    - Painted soffits and exposed concrete
  - *iii. Walls:*
    - Painted gypsum board.
    - Retain original finishes where practical
  - *iv. Doors:*
    - Existing to remain hollow metal frames and Hollow metal doors
    - Provide new accessible hardware throughout
  - *v. Window:*
    - Replace original single pane aluminum windows, provide thermally broken aluminum storefront with 1" insulated glazing and a low-e coating
  - *vi. Furniture:*
    - Conference areas - Flexible conference room furniture that can be rearranged for informal meetings or training sessions
    - Lounge – Comfortable seating for small groups or individuals
    - Elevator Lobby - Heavy duty commercial waiting room furniture
  - *vii. Equipment:*
    - Conference rooms and lounge - large wall mounted panel display

DRAFT

[FACILITY CODE REVIEW]

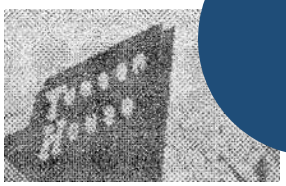
The facility was reviewed for compliance with various codes currently adopted by the City of Tucson, including:

2012 IBC

2012 IEBC

2012 IPC

2011 NEC



The facility was also reviewed for compliance with the 2010 Standards of the Americans with Disabilities Act.

a. Overview

- The facility is primarily an R-2 Occupancy Type, with miscellaneous other uses. Some incidental use areas were observed in the basement of the building, and accessory use areas occur mostly on the Ground Floor and on the 17th Floor. There were no violations or concerns noted regarding the use of the facility.
- The building appears to be construction using Type I construction, and as such, it was allowed unlimited area. The facility is 17 stories tall, plus a basement level (which opens to grade on the south side of the building).

b. Requirements for R-2 Occupancies

- Walls separating dwelling units within the same building as well as walls separating sleeping units within the same building are required to be constructed as fire partitions (IBC 420.2). While it is likely that these were built appropriately during the original building construction, the required fire rating may not have been maintained with subsequent repair and renovation work. In order to maintain the proper fire rating, all penetrations require fire blocking or caulking with a rating equal to that of the partition.
- Floor assemblies separating dwelling units and/or sleeping units within the same building, as well as floor assemblies separating dwelling or sleeping units from other occupancies are required to be constructed as horizontal assemblies (IBC 420.3). While it is likely that these were built appropriately during the original construction, the required fire rating may not have been maintained with subsequent repair and renovation work. In order to maintain the proper fire rating, all penetrations require fire blocking or caulking with a rating equal to that of the horizontal assembly.

c. Interior Finishes

- R-2 Occupancies require Class C finishes throughout when equipped with an automatic sprinkler system. This is the lowest required rating and it is not likely that existing or new finishes are would be in violation.

d. Fire Protection Systems

- An automatic sprinkler system was observed throughout the facility, which meets the requirements for this type of construction and occupancy.
- Portable fire extinguishers are required to be accessible within a 75' travel distance from anywhere within the facility (IBC 906.3). Extinguishers were observed on each floor in the elevator area, but their locations do not meet these minimum requirements for access travel distance.

e. Means of Egress

- Ceiling heights throughout the corridors in the building were found to be 4 to 6 inches below the minimum ceiling height in a means of egress – 7'-6" minimum ceilings are required (IBC 1003.2).
- Throughout the common areas, due to the low ceilings, exit signage and other wall and ceiling mounted accessories were often creating violations as "protruding objects", violating both the IBC and the ADA (IBC 1003.3 and ADA 307).

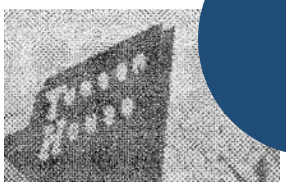
f. Stairways

- The three egress stairways lack proper handrails and guards. The existing width of these stairwells is narrow, but sufficient for the required rails and protection to be added without violating the required width for the stairs.

g. *Requirements for High Rise Buildings*

- The existing building almost certainly does not meet today's requirements for seismic resistance, given the age of the facility and considering the common issues with buildings from this period. However, if the International Existing Building Code is applied in this situation, the seismic resistance is acceptable.
- The International Fire Code required that the water supply for the fire suppression system come from no fewer than two water mains located in different streets (IFC and IBC 403.3.2). There is an exception that would allow the two connections to come from the same

DRAFT

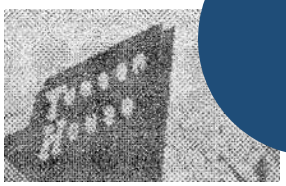


main if valves are installed such that an interruption can be isolated to avoid an interruption in the required flow. It appears that this Code requirement does not exist in the existing facility in either configuration.

h. *Site Concerns*

- There are various code and ADA issues that exist. These concern mostly the lack of proper landings at some of the ramps and stairs, and also non-compliant handrails on some of the stairs. A more comprehensive investigation will need to be conducted to measure the slopes of ramps to verify that they exist within allowable tolerances.

DRAFT



[Structural Component Conditions]

Original Construction

The original building was constructed in the early 1960's. The structural review of the original building is based upon Schneider Structural Engineers' observations of visible portions of the building and structural permit drawings from the City of Tucson. A renovation of the original building was completed in the late 1990's. Structural drawings for the 1990's renovation were also obtained from the City of Tucson.

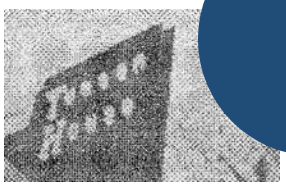
Cast-in-place concrete construction was utilized for the existing building. The floors typically consist of 7" thick mildly reinforced concrete flat slabs with no drop panels at columns. At the first floor, near the main entrance at the west wing, 8" and 10" thick slabs were also utilized. The existing roof / 17th floor typically consists of 7" mildly reinforced concrete slabs, with slab thickness increasing to 8" at the Solarium (east wing). Slab thickness varies from 7" to 13" at the eastern end of the west wing roof / 17th floor. The roof over the 17th floor consists of a 7" mildly reinforced concrete slab over the west wing / elevator core area and an 8" mildly reinforced concrete slab over the Solarium at the east wing. There is a mechanical penthouse above the elevator core area at the 17th floor. Floor and roof slabs are supported by cast-in-place concrete columns. Foundations consist of belled concrete caissons.

The lateral force resisting system consists of rigid concrete roof and floor diaphragms, laterally supported by cast-in-place concrete shear walls at the elevator core / lobby and at the end of each wing.

The original construction also features grade-level cast-in-place concrete parking and walkway shade structures ancillary to the building which are supported by concrete spread footings. There is an in-ground pool and shade structure at the south side of the building. The south side of the pool shade structure is built on top of a concrete retaining wall.

As part of the 1997 renovation, structural repairs were made to the handrails at the typical units. The structural drawings for the renovation contain details for balcony floor slab repairs, but it appears that the damaged portion of the balcony slabs were saw-cut and removed in lieu of making the repairs indicated on the structural drawings.

DRAFT



a. *Balconies*

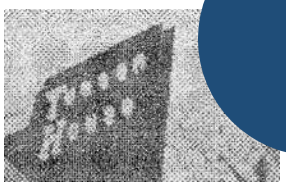
- Cracks up to 1/16" were observed at the balconies of the typical units, which allow water to infiltrate the existing concrete slab. These cracks appear in a rectangular pattern and are believed to be associated with inadequate clear concrete coverage at the existing reinforcing. Per the permit drawings for the existing building, the reinforcing has only 1/2" clear cover at the top and bottom of the slab. Per ACI 318-11, concrete exposed to weather requires a minimum of 1 1/2" clear cover over reinforcing. Long-term water infiltration will lead to rust on the surface of the rebar, which will exert pressure on the existing concrete and worsen the cracks.
    - **Refurbishment Recommendation**: We recommend epoxy injection of cracks wider than 0.03" at existing balcony slabs. Upon completion of epoxy injection, we advise applying a flexible waterproof surface treatment or membrane over the entire balcony slab surface to prevent water infiltration into smaller cracks and any future cracks that may develop. The waterproof treatment or membrane should be continuous across the entire horizontal surface of the balcony slab and should continue down the vertical face at the edge of the balcony.

- During a prior renovation, ends of the existing balcony slabs were cut off, leaving the ends of the reinforcing exposed. A metal fascia was attached to the cut edge, but appears to be trapping water and increasing the potential for water infiltration at the exposed rebar (see photo). This furthers the potential for rebar rust and worsening concrete cracks as noted above.
    - **Refurbishment Recommendation**: We recommend removal of the existing metal fascia to prevent water from being trapped behind it and to allow application of a waterproof treatment as noted above to be applied to the vertical surface at the edge of the balcony.

- Minor cracks (approximately 1/32") were observed at the balconies at the mortar joint between existing precast wall elements and existing concrete columns (see photo).
    - **Refurbishment Recommendation**: We recommend that minor cracks at the balconies at the mortar joint between existing precast wall elements and existing concrete columns be filled with a flexible waterproof sealant to prevent water infiltration into the crack.

b. *Slabs*

DRAFT



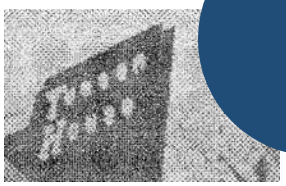
- The floor slabs are experiencing significant vertical displacement (sag) at mid-span primarily in the east-west direction likely due to a combination of deflection and long term creep. The east-west floor slab vertical displacement is especially apparent at the balconies of the typical units. Vertical displacement across the typical balconies measured in the east-west direction ranged from 9/16" to 1 1/2". The slab profile measured in the north-south direction at the balconies varied from no slope to a 1/16" drop toward the building envelope over the length of the balcony. We checked a typical exterior slab bay via structural calculation. Our calculation does not show an overstressed condition, but does show significant deflection, as expected based upon our observations. The inadequate slope causes water to pond on the balcony, increasing the potential for water infiltration into cracks as noted above.
    - **Refurbishment Recommendation**: Re-sloping the balcony slab is not possible due to weight concerns and the need for a stepped surface between the interior and the exterior of the units. However, a possible remedy to drainage issues at the balcony is the addition of a floor drain. It is structurally acceptable to core drill a small hole (less than 4" diameter) for a floor drain provided that no rebar is cut during the core drilling operations.

- At the interior of the units, vertical displacement at mid-span (also likely due to deflection and long term creep) in the east-west direction varied from 3/8" to 1 1/2". Vertical displacements in the north-south direction varied from 1/16" to 3/4". We checked a typical interior slab bay via structural calculation. Our calculation does not show an overstressed condition, but does show significant deflection, as expected based upon our observations. Deflection in the north-south direction at the interior of the building leads to upwards deflection of the balcony at the outermost edge and is the believed to be the reason for the inadequate slope at the balconies.
    - **Refurbishment Recommendation**: Leveling the interior concrete slab at the typical units is not recommended due to the additional weight that would be applied to the floor as a result of the leveling process. Any additional weight applied to the existing floor will exacerbate deflection problems.

c. *Vertical Structure*

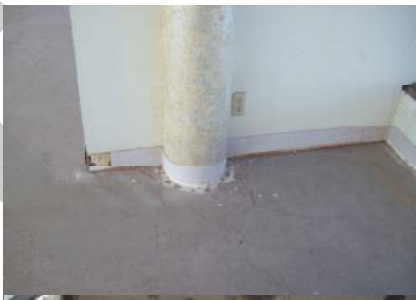
- Cracks and minor spalling were observed in the mortar joint between the existing concrete shear wall and the masonry veneer at the west end of the west wing. Crack width is estimated at 1/16" to 1/8".
    - **Refurbishment Recommendation**: We recommend the removal and patching of any loose, spalling material at the mortar joint between the existing concrete shear walls and the masonry veneer at the end of the building wings (see photo 6). Stable cracks should be filled with a flexible waterproof sealant to prevent water infiltration in to the cracks. According to a 1995 report by Poster Frost Associates, Inc., similar cracks were present at that time. It appears that the cracks were repaired and have reappeared. Recurring cracks in this mortar joint allow ongoing infiltration of water and may lead to deterioration of the shelf angles supporting the masonry veneer. Therefore, we recommend an

DRAFT



inspection of the existing masonry veneer attachment system to verify its structural integrity in accordance with section A113.7 of the 2012 International Existing Building Code.

d. 17th Floor



- The floor slab at the 17th floor Solarium appears to have suffered structural damage resulting from past overloading of the floor (according to a report from 1995 by Poster Frost Associates, Inc., the Solarium was at one time used for storage). Significant cracks were observed in the floor slab at the Solarium. Crack widths range from 1/8" to 1/4". Cracks are concentrated most heavily around the existing concrete columns. The floor slab has experienced significant vertical displacement. Vertical displacements varying from 1" to 1 5/8" were measured over spans of approximately 20'-0" between existing columns. Vertical displacements of 1" to 1 5/8" were also measured over the approximately 6'-0" distance from the southernmost columns to the exterior glass at the south side of the Solarium. The worst vertical displacement appeared to occur in the southeast corner of the Solarium. This displacement has resulted in cracking of the exterior brick wall nearby. It appears that a significant portion of the overall displacement occurs near the columns indicating a probable punching shear failure of the existing slab. It is also possible that the existing slab reinforcing has yielded due to flexural overstress. We checked a typical slab bay via structural calculation. Our calculation reveals that the live load capacity of the existing slab is limited by punching shear to approximately 85 psf. This further supports our suspicions of a punching shear failure as storage requires a design live load of 125 psf.
    - **Refurbishment Recommendation**: We recommend that the cracks in the floor slab at the 17th floor Solarium be repaired with epoxy injection. Upon completion of epoxy injection, we recommend that a fiber reinforced polymer (FRP) be applied to the top and bottom of the slab to act as external reinforcing due to concerns about possible yielding of the existing reinforcing. Further repair via steel framing or additional reinforced concrete below the slab in the vicinity of the columns is recommended to ensure adequate punching shear capacity. We recommend that any efforts to level the slab be made with a lightweight system such as plywood over wood sleepers, which could be shimmed level

- In the corridor of the 17th floor near the elevators, a ½" vertical translation was noted across the building joint. The translation is concentrated near the end of the joint adjacent to a chase. It is believed that due to the opening for the chase, the slab has reduced stiffness, leading to higher local deflection. Similar deflection was noted at other floors, but to a lesser degree.
    - **Refurbishment Recommendation**: We recommend that the ½" translation across the building joint at the 17th floor be monitored. If

DRAFT

the floor at the east wing continues to settle relative to the floor at the west wing, a structural repair may be required.

e. Stairs

- Cracks up to 1/8" wide were observed at a re-entrant corner at intermediate landings of the west stair.
    - **Refurbishment Recommendation**: We recommend epoxy injection of cracks wider than 0.030" at the landings. Cracks may reappear due to the nature of concrete to crack at re-entrant corners.

- A minor crack (less than 1/32") was observed in the existing masonry wall at the landing between the sixth and seventh floors at the west stair.
    - **Refurbishment Recommendation**: This minor crack is not a structural concern at this time.

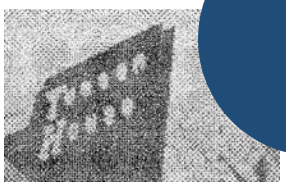
f. Site Elements

- Spalling of the surface finish was observed at the shade structure over the parking at the north side of the building.
    - **Refurbishment Recommendation**: We recommend that the spalling surface finish be removed from the parking shade structure. Once the surface finish has been removed, any cracks in the concrete wider that 0.030" should be repaired via epoxy injection.

- Deflection of the existing cast-in-place concrete walkway canopies was observed.
    - **Refurbishment Recommendation**: The deflection of the existing cast-in-place concrete walkway canopies does not appear to be a structural concern at this time.

- Displacement of the existing masonry was noted at the retaining wall on the south side of the pool. The displaced masonry occurs above finished grade on the south side of the wall. Above finished grade, the retaining wall transitions to a non-structural two-wythe unreinforced brick wall. The columns for the existing shade structure at the south side of the pool are attached to the top of the existing concrete retaining wall and are hidden in the non-structural brick wall. The displacement of the brick is most pronounced at the top of the wall near the columns. The likely cause is rotation of the retaining wall, causing the non-structural brick to rotate as well. The existing shade structure and columns

DRAFT



do not appear to have rotated, and as the brick wall rotated towards the column, the brick near the column was displaced.

- **Refurbishment Recommendation**: The displacement of the existing masonry above the retaining wall on the south side of the pool is not a structural concern. The masonry that has been displaced is non-structural. The existing masonry wall supporting the displaced masonry does not appear to be distressed, but should be monitored for signs of further rotation. It should be noted that area on the retained earth side of the retaining walls is currently used as a community garden. If overwatering occurs, the retained soil could become saturated, which could lead to problems with the retaining wall. Care should be taken not to saturate the retained soil.

[Structural Code Review]

a. Live Loads

- According to the permit structural drawings for the existing building, the floors are designed for 40 psf live load. Per the 2012 IBC, the following areas shall be designed for live loads in excess of 40 psf: Lobbies (100 psf), Assembly Areas (100 psf), Offices (50 psf plus 15 psf for partitions), First Floor Corridors (100 psf). A review of building code live load design criteria from the era of construction yields similar design live load requirements. Therefore, it is likely that areas designated as Lobbies, Assembly Areas, Offices and Corridors on the original drawings were designed for the appropriate live loads, but were not labeled as such on the structural drawings. No signs of structural distress were observed in the Lobbies or Corridors.
- Some portions of the building have changed use such that the new use requires a higher design live load requirement than the original intended use. These areas are the offices at the first floor and the two resident lounges at the first floor. Schneider Structural Engineers estimated the live load capacity of the typical 7" mildly reinforced concrete slab present in these areas to be approximately 60 psf maximum, beyond which an overstressed condition develops. However, per our analysis and per our observations, deflections are undesirably high even at the typical residential use areas having 40 psf live loading.
    - **Recommendation**: We recommend that office uses and resident lounges be moved to the basement where the existing slab on grade is capable of adequately supporting the heavier live loads.

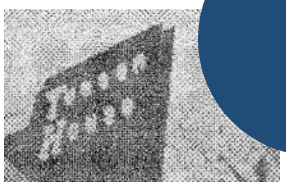
b. Wind Loads

- The wind design criteria per the 2012 International Building Code (IBC) currently in effect are different than those in the 1961 Uniform Building Code (UBC) in effect at the time of the original design. The current wind design criteria result in higher wind design forces at parapets, corner zones and individual components, but the total wind load acting on the Main Wind Force Resisting System may not be significantly higher than that wind load originally designed for.
    - **Recommendation**: Portions of the components and cladding and main wind force resisting system may not meet current wind design criteria, but provided that no change of occupancy occurs, the building does not need to comply with current criteria per the International Existing Building Code.

c. Seismic Loads

- The seismic design criteria per the 2012 IBC are more stringent than those in the 1961 UBC. The minimum seismic design forces are higher and the detailing requirements are greater for elements of the lateral force resisting system.

DRAFT



- **Recommendation**: The seismic force resisting system most likely does not meet current criteria, but provided that no change of occupancy occurs, the building does not need to comply per the International Existing Building Code.

d. Concrete Detailing

- The concrete reinforcing requirements per ACI 318-11 are more stringent than those in effect at the time of the original construction.
  - **Recommendation**: The reinforcing detailing used on the original drawings likely does not meet current codes. However, as with the wind and seismic force resisting systems, the building does not need to comply unless there is a change in occupancy.

e. Masonry Veneer Attachment

- Significant advances in masonry veneer attachment have been made since the construction of the building and code requirements for the attachment of veneer have changed.
  - **Recommendation**: The masonry veneer attachment may not meet current code requirements. As noted above, we recommend further investigation of the masonry veneer attachment system due to concerns about possible deterioration.

DRAFT

[HVAC System Component Conditions]

The building is equipped with central heating and cooling. The central plant has the following installed capacities: 500 tons of cooling and 12.6 million Btu's of heating. The central plant piping/pumping distribution system is a "2-pipe" system as opposed to a more modern "4-pipe" system that would allow on demand heating and cooling. The central plant and associated equipment is all beyond its useful life and in need of replacement. This report will be looking at three options for the replacement of the central plant equipment.

- **Option 1**: Replace Central Plant Equipment with "like for like" equipment.
- **Option 2**: Replace equipment with more appropriately sized equipment, and employing energy conservation strategies.
- **Option 3**: Replace Central Plant Equipment with a combination of Variable Flow Refrigerant Systems and standalone "Ductless" units for the resident rooms. No central cooling or heating with this option.

a. Condenser Water System:

- In 1962 the building was originally designed with a single 2-cell 660 ton (1,980 gpm) cooling tower. In 2001 in the latest tower replacement, two 305 ton cross flow towers as manufactured by Marley model AV6601C were installed. For a total of 610 tons of capacity. The towers are located on an adjacent single story building on the east side of the main building. The towers are 15 years old and are in good condition. However, the life span of cooling towers in the southwest is roughly 10 years. Therefore, the towers are beyond their useful life and should be replaced.
  - **Replacement Recommendation Option 1**: Replace with (2) 305 ton cooling towers with VFD fan control and stainless steel basins with sweeper systems.
  - **Replacement Recommendation Option 2**: Same has option 1.
  - **Replacement Recommendation Option 3**: No towers necessary for this option.

- The condenser water pumps are located in the basement of the building. The two pumps are 990 gpm at 88 feet of head model 411BF 5x6x11A as manufactured by Aurora. The pumps appear to be the original pumps and have been rebuilt throughout the years. The pumps are in need of complete replacement.
  - **Replacement Recommendation Option 1**: Replace with (2) 990 gpm 30 HP pumps with VFD pump control.
  - **Replacement Recommendation Option 2**: Same has option 1.
  - **Replacement Recommendation Option 3**: No pumps necessary for this option.

- The most of the condenser water pipe is roughly 54 years old and main valves are also very old. The piping and valves in the system are beyond their useful life.
  - **Replacement Recommendation Option 1**: Replace condenser water pipe and valves.
  - **Replacement Recommendation Option 2**: Same has option 1.

DRAFT

- **Replacement Recommendation Option 3**: No piping & valves necessary for this option.

- The existing condenser water system has water treatment provided by a 3rd party vendor. Currently there appears to be no problems with the water treatment system.
  - **Replacement Recommendation Option 1**: Maintain current 3rd party condenser water treatment.
  - **Replacement Recommendation Option 2**: Same has option 1.
  - **Replacement Recommendation Option 3**: No water treatment necessary for this option.

- The building is not equipped with a water side economizer. The IECC 2012 (International Energy Conservation Code) requires economizer systems to be employed in large central systems. A practical and widely used economizer system would be to use a "low-temperature" water economizer system also known as "Free Cooling". Typically waterside economizers utilize cooling towers and plate & frame heat exchanger to indirectly cool the chilled water loop, which is used to reject heat from the building via the hydronic coils. Fundamentally a water economizer allows the chilled water system to operate without operating the chillers. Therefore this saves electrical energy since chillers are the largest consumers of electricity in the central cooling system. This allows the chillers to operate with less annual run hours which increases the life span of the chillers and saves on maintenance cost of the chillers. The historical data shows that water side economizer retrofits have a 1 to 4 year payback cycle.
  - **Recommendation Option 1**: No work for this option.
  - **Recommendation Option 2**: Provide (2) 990 gpm plate & frame heat exchangers and all the associated condenser pipe modifications.
  - **Recommendation Option 3**: No water side economizer necessary for this option.

b. *Chilled Water System:*

- In 1962 the building was originally served by a single 565 ton chiller located in the basement mechanical room. In 1979 the chiller was replaced with (2) 265 ton Westinghouse chillers. In 2001 the chillers were replaced with a 350 ton centrifugal chiller and a 150 ton screw chiller. Both chillers are manufactured by Trane. The 350 ton chiller is model CVHE450 and has 0.53 KW/ton efficiency. The chiller uses 640 lbs of R-123 refrigerant. The 150 ton chiller is model RTHB150ALF and utilizes R-22 refrigerant. R-22 has been one of the refrigerants that the EPA has been phasing out over the years.

  It's unusual to have two mismatched chillers in central plant system. If the larger chiller goes down for maintenance the smaller chiller cannot carry the load of the building. Also having the larger chiller base loaded and only using the smaller

DRAFT

chiller to handle the peak loads, operates the larger chiller at a lower efficiency because it is operating at a higher capacity. Understand part loading and trying to operate the chillers in part loading efficiencies saves money overtime. It would be a better match for the system to have (2) 250 ton chillers installed so when it is required to operate both chillers could operate in their part load efficiency range.

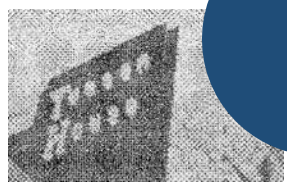
- **Replacement Recommendation Option 1**: Replace (1) 350 ton chiller and (1) 150 ton chiller.
- **Replacement Recommendation Option 2**: Replace with (2) 250 ton VFD chillers, and modify chiller piping mains as required.
- **Replacement Recommendation Option 3**: No chillers necessary for this option.

- The chilled water pumps which are the "system pumps" meaning they are the same pumps in winter and summer because currently it's a "2-pipe" system are beyond their useful life and are need of replacement. The pumps are ITT AC model 6x4x12L, 600 gpm, 30 hp. The pumps were installed in 1993, and their motors were replaced in 2001.
  - **Replacement Recommendation Option 1**: Replace "like for like" with (2) 600 gpm pumps with VFD's.
  - **Replacement Recommendation Option 2**: Replace with (2) 500 gpm pumps with VFD's.
  - **Replacement Recommendation Option 3**: No pumps necessary for this option.

- The chilled piping system is 54 years old. The chilled water piping in the piping chases to the resident rooms is wearing out. According to the onsite facility staff the piping frequently leaks throughout the building. The pipes are beyond their useful life and the building is need of being re-piped.
  - **Replacement Recommendation Option 1**: Replace all chilled water piping throughout the building. There are roughly 27 pipe chases routing from the basement to the 16th floor that will need to have the pipes replaced, plus all the pipes in the basement and in the penthouse will need to be replaced.
  - **Replacement Recommendation Option 2**: Same as option 1.
  - **Replacement Recommendation Option 3**: No chilled water piping necessary for this option.

- The chilled water valves, expansion tanks, and pot feeders appear to be a mixture of original and replaced as required. Many of the valve stems are rusted over and the maintenance personal are afraid to exercise the valves in fear of breaking the valves. The system components are beyond their useful life and are in need to be replaced.
  - **Replacement Recommendation Option 1**: Replace valves throughout system, expansion tank, and pot feeders.

DRAFT



- **Replacement Recommendation Option 2**: Same as option 1.
- **Replacement Recommendation Option 3**: No work necessary for this option.

c. *Heating Water System:*

- In 1962 the building was originally served by a two 350 hp 15 psi steam boilers located in the basement mechanical room. In 1985 the steam boilers were replaced with (2) 6.3 million Btu heating water boilers. Currently both 1985 heating water boilers are still installed and are 31 years old. The age of the steel tube boilers is beyond their useful life and should be replaced. The existing heating water system is divided up into two separate zones, north and south. There are secondary pumps and shell and tube heat exchangers for each zone. Having the building zoned between North and South was important when it was a "2-pipe" system. But for a "4-pipe" system it is recommended that the shell and tube heat exchangers and secondary pumps not be replaced since they are not required.

The proposed heating water system will consist of two condensing boilers, 3,000 MBH each, with 95% certified thermal efficiency. The boilers will be equipped with fully modulating firing rate control with 5:1 turndown. This will allow the boilers to better match firing rate output to the real-time demand of the system with minimal wasted energy. Using the above combination system to generate heating hot water and domestic hot water will result in overall system efficiency well over 90%, which is approximately a 20-25% increase over the current system efficiency.

  - **Replacement Recommendation Option 1**: Replace "like for like" 6.3 million 80% efficient steel tube boilers, (4) shell & tube heat exchangers, and (4) secondary heating water pumps.
  - **Replacement Recommendation Option 2**: Replace with (2) condensing/modulating 3 million Btu 95% efficient boilers.
  - **Replacement Recommendation Option 3**: No boilers necessary for this option.

- Since the building will be provided with a "4-pipe" system new heating water pumps and piping will be required.
  - **Replacement Recommendation Option 1**: Provide (2) 150 gpm secondary pumps with VFD's, along with the boiler's primary pumps.
  - **Replacement Recommendation Option 2**: Same as option 1.
  - **Replacement Recommendation Option 3**: No pumps necessary for this option.

- Currently the "2-pipe" arrangement causes a lot of operational issues with the residents according to the onsite facility staff. The "2-pipe" system is not that

DRAFT

affective in the southwest because there are many days throughout the year where heating might be required during the middle of the night or in the morning, but in the late morning to afternoon air conditioning is required. It is proposed to provide a dedicated set of heating water pipes to improve the performance of the system and to help satisfy the occupant's needs.

- **Replacement Recommendation Option 1**: Provide all new heating water pipes. There are 27 pipe chases that the new piping will be routed in and throughout the building.
- **Replacement Recommendation Option 2**: Same as option 1.
- **Replacement Recommendation Option 3**: No heating water piping necessary for this option.

- New heating water valves, expansion tanks, and pot feeders will be required for the new piping system.
  - **Replacement Recommendation Option 1**: Provide valves throughout system, expansion tank, and pot feeders.
  - **Replacement Recommendation Option 2**: Same as option 1.
  - **Replacement Recommendation Option 3**: No work necessary for this option.

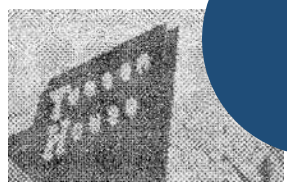
d. Common Area Air Distribution System:

- The building has 4 main air handlers (AHU's) and 15 fan coil units (FCU's) serving the common areas. All of the AHU's and FCU's were replaced in 1997. The equipment is 19 years old and is approaching the end of its useful life. The site inspection didn't reveal any obvious deficiencies but the useful life for FCU's is 15 years and for AHU's 20 years.
- The corridors lobbies are served throughout the building by a single 18,000 cfm, 100% outside air, constant volume AHU (AHU-4) located in the penthouse mechanical room. The original unit was replaced after 18 years of service in 1980, and then it was replaced again after 17 years of service in 1997. It is currently 19 years old and is in need of replacement. However, there is 74,500 cfm of mechanical exhaust and 19,950 cfm of mechanical make up air not including the resident rooms fresh air intakes. There appears initially to be a great imbalance in the make-up air to exhaust air ratio. But the bulk of the exhaust is exhausted out of the resident rooms and the make-up air comes in through the resident fan coil units. Therefore, the need to provide 18,000 cfm of 100% outside into the corridors doesn't seem necessary anymore. Seems like AHU-4 could be down sized to roughly 2,000 cfm of 100% outside air to meet the IMC ventilation guidelines.

  Also AHU-4 has a total current cooling capacity of 848,000 Btu's of cooling. However, it takes roughly 1,250,000 Btu's of cooling to properly dehumidify 18,000 cfm of outside air. Currently the AHU-4's cooling coil is 37% undersized. Since the cooling coil is undersized, on humid days in Tucson the building gets pumped full of humid air which makes the air uncomfortable for residents, causes moisture problems with the building finishes, and construction materials.

  The West corridor on every floor is served from a constant volume 10,000 cfm AHU-2 located in the basement. The East corridor on every floor is served from a constant volume 10,200 cfm AHU-3 located in the basement. The original units were replaced after 18 years of service in 1980, and then they were replaced again after 17 years of service in 1997. Currently the AHU's are 19 years old and are in need of replacement. The supply and return air ducts travel up and down duct shafts located in the basement.

DRAFT



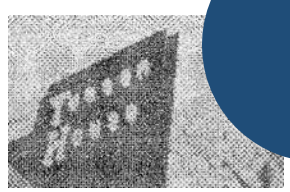
Currently AHU-3 is using part of the basement corridor as a return air plenum. When AHU-3 was installed this condition was not against the mechanical code. But now this condition violates the 2012 IMC. The IMC does not allow the corridor to be used as return air plenum. To correct the situation a new return air duct will need to be provided from the return air shaft on the Northside of the basement corridor and travel to the Southside of the corridor to connect to AHU-3. This will result in reconfiguring the mechanical room.

Option 3 will use variable refrigerant flow (VRF) technology. VRF systems allow one outdoor condensing unit to be connected to multiple indoor fan-coil units (FCUs). Each FCU can be individually controlled allowing increased occupant comfort. The outdoor unit can vary the operating speed which allows for substantial energy savings. The efficiencies approach SEER ratings near 20 compared to 14 SEER for normal high efficient equipment. VRF systems will allow for greater comfort, higher efficiency, and less outdoor equipment. The VRF system will have the capability of simultaneous heating and cooling with the ability for heat recovery. This means for example, on a cool spring morning the South side of the building receiving the warm sun could have cooling while the North side of the building could receive heating. Additionally the heat removed from the spaces being cooled can help warm the spaces in need of heating. This saves energy there by saving substantial operating cost. The Tucson House has predominantly North and South-facing exposures. Consequently, there are many hours on an annual basis where South-facing apartments need cooling while North-facing apartments need heating. VRF systems allow for sharing of energy through a common water loop. Systems on the South side of the building in cooling mode reject heat to the loop making it warmer while systems on the North side of the building are extracting heat from the loop. Another advantage of the VRF concept is it is an extremely efficient heating system. In fact, it can be much more economical to operate than gas-fired heating equipment.

- **Replacement Recommendation Option 1**: Replace "like for like" 18,000 cfm 100% outside air except increase the cooling capacity from 825 MBH to 1,250 MBH. Replace 10,000 cfm AHU-2 and 10,200 cfm AHU-3 with 100% recirculating AHU's.
- **Replacement Recommendation Option 2**: Replace AHU-2, AHU-3, and AHU-4 with 2,000 cfm 100% outside air AHU's and provide (2) 3.5 ton 4-pipe fan coil units per floor for corridor cooling and heating and (1) 5 ton 4-pipe fan coil unit per floor for lobby cooling per floor.
- **Replacement Recommendation Option 3**: Provide (3) 2,000 cfm DX AHU in penthouse, and (2) in the basement. Provide (16) 12 ton outdoor VRF units mated with (2) 3.5 ton VRF fan coil units per floor and provide (1) 5 ton VRF fan coil unit per floor for lobby cooling/heating.

- The basement is served by 5,300 cfm AHU-1 and FCU's 1 through 10 all located in the basement. The original units were replaced after 18 years of service in 1980, and then they were replaced again after 17 years of service in 1997. Currently the AHU's are 19 years old and are in need of replacement

DRAFT



- **Replacement Recommendation Option 1**: Replace "like for like" 5,300 cfm AHU constant volume 4-pipe and replace (10) 2-pipe FCU's with 4-pipe FCU's.
- **Replacement Recommendation Option 2**: Same as option 1.
- **Replacement Recommendation Option 3**: Replace AHU-1 with (5) VRF FCU's and coupled with (1) 12 ton VRF outdoor unit. Replace the (10) FCU's with (10) VRF FCU's and coupled with (2) 10 ton VRF outdoor units.

- The 1st floor common areas are served by FCU's 11 through 16 which are all located above the 1st level ceiling. The original units were replaced after 18 years of service in 1980, and then they were replaced again after 17 years of service in 1997. Currently the AHU's are 19 years old and are in need of replacement
  - **Replacement Recommendation Option 1**: Replace "like for like" replace (5) 2-pipe FCU's with 4-pipe FCU's.
  - **Replacement Recommendation Option 2**: Same as option 1.
  - **Replacement Recommendation Option 3**: Replace with (5) VRF FCU's and coupled with (1) 10 ton VRF outdoor unit.

e. Room Air Conditioning System:

- The building has (172) Studio apartments, (188) 1-Bedroom apartments, and (51) 2-Bedroom apartments. Currently the apartments are cooled with floor mounted 2-pipe FCU's. The Studio apartments are cooled/heated with a (1) 1-1/2 ton FCU. The 1-Bedroom apartments are cooled/heated with (1) 1-1/2 ton FCU and (1) ¾ ton FCU. The 2-Bedroom apartments are cooled/heated with (1) 1-1/2 ton FCU and (3) ¾ ton FCU's.

  Since the residents rooms will have new chilled water pipes and new heating water pipes installed the most efficient method of re-piping resident rooms would be by using "Floor to Floor" FCU's. This type of FCU allows multiple rooms to be served from one FCU and the pipe chases are built into the FCU.

  - **Replacement Recommendation Option 1**: Replace "like for like" replace (411) 2-pipe 1-1/2 ton FCU's with 4-pipe FCU's and replace (341) 2-pipe ¾ ton FCU with 4-pipe FCU's.
  - **Replacement Recommendation Option 2**: Replace floor mounted FCU's with "Floor to Floor" FCU's. Provide (51) ¾ ton, (51) 1 ton, (223) 1-1/2 ton, and (188) 2 ton Floor to Floor FCU's.
  - **Replacement Recommendation Option 3**: The (172) Studio's would be provided with ductless 1-1/2 ton wall mounted FCU's with (172) 1-1/2 ton outdoor unit mounted on the balcony. The (188) 1-Bedrooms would be provided with ductless 1-1/2 ton wall mounted FCU's and a ¾ ton wall mounted FCU's with (188) 2 ton VRF outdoor unit mounted on the balcony. The (51) 2-Bedrooms would be provided with ductless 1-1/2

DRAFT

ton wall mounted FCU's with (153) ductless 3/4 ton wall mounted FCU's coupled with (51) 4 ton VRF outdoor units mounted on the balcony.

f. Exhaust Air System:

- The building's Toilet exhaust is collected and exhausted out by (3) rooftop exhaust fans. There are (1) 13,850 cfm 5 hp and (1) 11,400 cfm 5 hp exhaust fan located on the west wing roof. There is (1) 11,650 cfm 5 hp exhaust fan located on the east wing roof. The fans are 19 years old and were last replaced in 1997. The fans are beyond their useful life and are in need of replacement. The resident toilet rooms exhaust ducts feed into a common toilet exhaust shafts. The residents and onsite facility staff stated the toilet exhaust systems don't work well for the tenants. They don't exhaust enough and smells from other rooms come through the exhaust grilles located in the restrooms. It appears that the toilet exhaust system is poorly balanced and some resident rooms are getting more exhaust while others are getting less. The toilet exhaust fans run continuously.

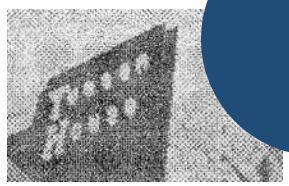
A viable option would be to eliminate the large exhaust fans on the roof and provide in restroom exhaust fans that are controlled by the tenant. The exhaust ducts would be connected into the existing toilet exhaust duct shaft, and a single exhaust fan would be on the roof and would be controlled to just maintain a constant negative pressure in the exhaust shaft. The toilet room exhaust fan controller can be set up so that when the occupant energizes the fan, the fan turns off automatically after a ½ hour of operation. This system would ensure each resident gets the exhaust when they want it. It would minimize the possibility of stray odors coming through the exhaust duct, and it would reduce electrical cost since the exhaust fans wouldn't be running continuously.

  - **Replacement Recommendation Option 1**: Replace "like for like" replace (3) 13,850 cfm, 11,400 cfm, and 11,650 cfm (5 hp/ea) roof mounted exhaust fans and rebalance the entire exhaust system.
  - **Replacement Recommendation Option 2**: Provide (462) 50 cfm ceiling restroom exhaust fans and duct to the existing duct shafts. Provide (3) rooftop exhaust fans to just maintain a negative pressure in the exhaust shaft.
  - **Replacement Recommendation Option 3**: Same as option 2.

- The building's resident kitchen exhaust is collected and exhausted out by (2) rooftop exhaust fans. There is (1) 14,020 cfm 5 hp exhaust fan located on the west wing roof. There is (1) 24,480 cfm 10 hp exhaust fan located on the east wing roof. The fans are 19 years old and were last replaced in 1997. The fans are beyond their useful life and are in need of replacement. The resident kitchen exhaust ducts feed into a common kitchen exhaust shafts. The resident stove top hoods are not ducted to the kitchen exhaust system. Each kitchen has a wall mounted kitchen exhaust grille mounted above the cabinets several feet away from the stove top hood. It appears that the kitchen exhaust system is poorly balanced and visible grease trails can be seen around the exhaust grilles. The kitchen exhaust fans run continuously.

A viable option would be to eliminate the large exhaust fans on the roof and provide kitchen hood exhaust fans that are controlled by the tenant and are directly connected to the kitchen exhaust duct main. The exhaust ducts would be

DRAFT



connected into the existing kitchen exhaust duct shaft, and a single exhaust fan would be on the roof and would be controlled to just maintain a constant negative pressure in the exhaust shaft. This system would ensure each resident gets the exhaust during cooking, eliminate the visible grease trails near the exposed exhaust grille, and it would reduce electrical cost since the exhaust fans wouldn't be running continuously.

- **Replacement Recommendation Option 1**: Replace "like for like" replace (1) 14,020 cfm (5 hp) and 24,400 cfm (10 hp) roof mounted exhaust fans and rebalance the entire exhaust system.
- **Replacement Recommendation Option 2**: Provide (411) kitchen hood exhaust fans and duct to the existing duct shafts. Provide (2) rooftop exhaust fans to just maintain a negative pressure in the exhaust shaft.
- **Replacement Recommendation Option 3**: Same as option 2.

- The building's smoke evacuation exhaust is collected and exhausted out by (2) rooftop exhaust fans. There is (1) 3,600 cfm 3 hp exhaust fan located on the west wing roof and (1) 3,600 cfm 3 hp exhaust fan located on the east wing roof. The fans are 19 years old and were installed in 1997. The fans are beyond their useful life and are in need of replacement.

There are multiple combination fire/smoke dampers that are located on every floor and in duct shafts. All of these dampers need to be tested and replaced/repaired as required.

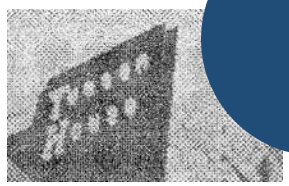
- **Replacement Recommendation**: Replace "like for like" replace (2) 3,600 cfm (3 hp) smoke evacuation fans and test and repair the entire fire/smoke dampers in the ventilation system.

g. Laundry Room:

- The laundry is located in the basement. A single 750 cfm, ½ hp, ground mounted exhaust fan exhaust the multiple dryers in the laundry room. During the site inspection the exhaust fan motor was spinning but the fan belt was broken so the fan was not working. Because of the location and improper configuration a large amount of dryer lint is discharged on the ground. The exhaust fan should be replaced it is beyond its useful life. The fan should be relocated to the fire pump building, and a lint trap shall be installed to capture the lint before it is exhausted to the outdoors.

  - **Replacement Recommendation:** Replace 750 cfm dryer exhaust fan, reconfigure ductwork, and provide duct mounted lint trap.

DRAFT



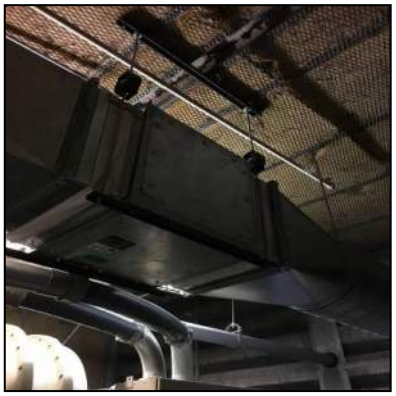
h. *Elevator Machinery Room:*

- The elevator machinery room is located on top of the penthouse mechanical room. It is currently cooled by a 5 ton DX split system FCU and chilled water FCU. All of the elevator controller panels were left open so that the electronic components don't over heat. Currently the (2) FCU's don't provide enough cooling in the room. The machinery room is a non-insulated room located on the roof. The room experiences high thermal heat gains and along with high internal heat load due to the equipment. The DX FCU and the Chilled water FCU are in disrepair and warrant replacement. However, the chilled water FCU doesn't meet the elevator code since it is part of the building cooling system. The elevator code requires standalone cooling equipment to cool machinery rooms.
    - **Replacement Recommendation:** Provide (3) 5 ton ductless wall mounted units with their associated outdoor units installed on the roof.

i. *Central Plant Emergency Exhaust:*

- The central plant was identified in Poster Frost 1994 report as being deficient as far as the code required emergency exhaust in case of accidental refrigerant leak. In 1997 the emergency exhaust was installed however, the installation didn't meet all the code requirements as set forth in the IMC section 1105.

  The emergency exhaust fan was installed, the refrigerant leak controller, and refrigerant leak detectors but the automatic natural gas shut-off valve was not installed, and the audible/visual alarms on both sides of all mechanical room entry doors were not installed as required by the IMC.
    - **Replacement Recommendation:** Provide all necessary components as required by IMC section 1105, and test entire system.



DRAFT

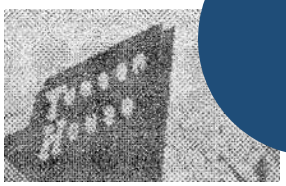
j. Building Control System:

- In 1997 the existing Robert Shaw building control system was replaced with a Trane Tracer Summit system. The Tracer system control panel is out of room for expansion, it is an outdated proprietary control system. Also the Tracer system does not meet the Bacnet protocol control requirements. The system computer is out of date and not all the equipment at the Tucson House is controlled and monitored by the EMCS system.

  A building of this size with the amount of mechanical equipment should be controlled through a modern DDC control system. The EMCS system should be connected to the City's Wide Area Network (WAN) so that the building can be controlled and monitored from the City's central system. Also a new front end computer should be provided for the onsite facility staff.

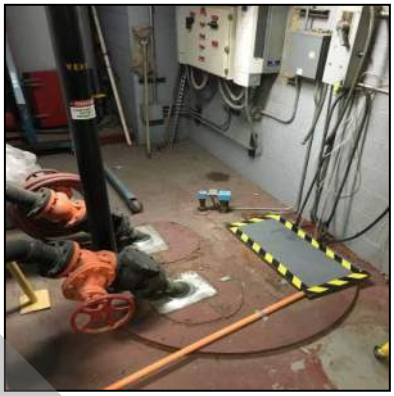
  - **Replacement Recommendation:** Provide a complete DDC EMCS system for the building and connect it to COT's WAN system.

DRAFT



[Plumbing System Component Conditions]

The plumbing system for the Tucson House was original constructed in 1962. The only major plumbing renovation occurred in 1997 where the plumbing for the basement through the 5th floor was modified. However, throughout the years plumbing fixtures and piping has been repaired and replaced as needed.



a. Sanitary Sewer and Vent System:

- The Basement plumbing fixtures drain into a sewer ejector system located in the mechanical room. The ejector's basin is 5 feet in diameter and 7 feet deep (4,100 gallon) basin. The model of the ejector is Peabody Barnes Model #SE203.

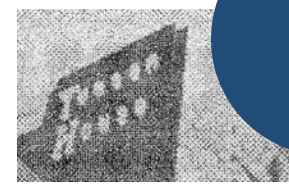
  The ejector system has (2) 250 gpm pumps rated at 28 feet of head. The motors are 3 hp at 208 volt 3 phase. The pumps and basin have had repair work as required through the years but they have never been complete replaced. According to the records the ejector pumps were rebuilt back in 1992 (24 years ago). At the time of the inspection the level sensor and pump switches were not operating properly. The basin and pump rails are showing signs of rust and deterioration. The ejector has a 4 inch force main which pumps the basement sewer into the 10 inch gravity drain line located over head in the basement.

  - **Replacement Recommendation**: Replace ejector basin, pumps, and associated valves. At a minimum the basin should be cleaned free of surface rust and epoxy coated if there are no major structural rust damage.

- The sewer from the plumbing fixtures exit out of the building at several locations at the ground floor via gravity drainage. The West wing has a 10-inch, 6-inch, and 4-inch draining out the south side and a 10-inch draining out the north side of the building. The East wing has a 10-inch draining out the south side and an 8-inch and 4-inch draining out the north side. The above mentioned sewer mains are located overhead in the basement. Over the years the cast iron piping has been failing. All of the sewer mains appear to be the original sewer mains which have exceeded the 50 years' service life for the cast iron piping.
  - **Replacement Recommendation:** Replace all the exposed sewer mains located overhead in the basement with new piping.

- The building has sewer and vent stacks running vertically up through the building. In 1997 there was a major renovation to the 1st floor through the 5th floor to the sewer stacks. The restrooms are serviced by "back to back" stacks and the kitchen sinks are serviced by "back to back" stacks. There are a few odd ball stacks because of some unique room configurations. Essentially there are 16 (5-inch) sewer restroom stacks and 20 (3-inch) sewer stacks routed from the 1st floor up to the 16th floor. The field inspection has shown that original stacks along with the renovated stacks are failing. Essentially the cast iron piping in the pipe shafts is falling apart and deteriorating.

DRAFT



In the 1994 Poster Frost report, it was noted that original plumbing engineer didn't take into account "Suds Pressure Zones" and as a result the sewer vents and waste stacks are improperly sized. It was also pointed out in the report the original design also didn't design in the proper amount of sewer cleanouts to properly unclog sewer lines when required. To make matters worse during the original construction "tee" fittings were used in lieu of sanitary sweep tees. This type of fitting leads to clogging and difficulty of cleaning out the clogged lines

The short comings in the sewer and vent piping system were to be corrected in the 1997 sewer stack renovation. At the time of the site visit the facility personnel pointed out that they were still having problems with grease accumulation in the sewer pipes, inadequate ability to clean the sewer piping, and straight "tees" still existed in the piping system. A chemical pumping injection system had been employed to break the grease clogs. Currently the biocide was being interjected at the 17th floor through a mop sink. The biocide was noticeably providing some relief in the breaking up the accumulated grease. However all of these pipes are beyond their service life and need to be completely replaced.

- **Replacement Recommendation**: Replace all the sewer and vent stacks in the building to include the portions of the stacks replaced in 1997.

b. *Storm Sewer System:*

- The building was originally designed to have interior rain water drainage. During the course of the life of the building the storm water system was converted to collect the rain water at the perimeter of the roof. From that point the rainwater leaders were routed vertically exposed through each balcony system. The piping system appears to be 4 inch steel pipe with mechanical joints. The majority of the rainwater is collected and drained to the nearby wash on site via gravity, or is collected in the rainwater sump located in the west parking lot and is pumped to the wash.

The 1994 Poster Frost report identified the need of the rainwater sump pump and it appears to have been installed, in the late 90's but at this time the pumping system is beyond 15 years old and has exceeded its useful life and should be replaced. It should be noted that all the room fan coil unit condensate drains are connected to each 4 inch rainwater conductor installed vertically through each balcony system.

- **Replacement Recommendation**: Replace the rainwater pumps in the sump below the west side parking lot. The sizes of the pumps are unknown at this time. There are no installation drawings, and at the time of the site visit access into the confined space was not allowed. Remove any surface rust from the exposed rainwater pipes and repaint

DRAFT

all the exposed piping.

- Around the early 1980's a 15,000 gallon water storage tank was installed on the south side of the building. The storage tank was required at the time for "On-site" fire water storage. Since then the tank is no longer used for fire water storage but instead it is part of the rain water collection system. Some of the rainwater pipes on the south side of the building are routed to the 15,000 gallon tank and then it is pumped to the tenant garden just south of the pool area. An interior tank inspection was not conducted during the site visit but the exterior inspection revealed no obvious leaks or major deterioration. The tank is equipped with an above ground simplex pumping system protected by a weather cover.

  - **Replacement Recommendation:** Replace the simplex pumping system, level controls, paint the exterior of the tank, and epoxy coat the inside of the tank.

c. *Domestic Water System:*

- The site domestic water comes to the building near the southwest side of the building. The 6 inch city water main and 4 inch water meter is located just south of the pool area and east of the tenant garden area. The 4 inch water meter identification number is 08002142A. The water meter appears to have been installed in 1991 along with the (2) 4 inch RPBP (Reduced Pressure Backflow Preventers). The RPBP's and water meter are inspected annually. There is a 2 inch RPBP just north of the water meter and east of the pool area. It appears this 2 inch water line feeds the irrigation systems at the building.

  - **Replacement Recommendation:** Provide the proper insulating blanket around the 2 inch RPBP and vandal proof cage.
- The 6 inch city water line feeds into the basement where the domestic water booster station is located. The domestic water booster station consists of two pressure controlled water pumps. The pumps are the original Aurora model 411BF 4x5x15 pumps. They have been rebuilt through the years but essentially the main pump parts haven't been replaced in roughly 54 years. The pumps are far beyond their useful life. The pumps are rated at 520 gpm at 229 feet of head, 50 hp and 208 volts/3 phase. One of the pumps has been rebuilt in the last 5 years but the other pump has not been rebuilt in the last 20 years. The booster system is capable of boosting the pressure 100 psi. The street pressure is roughly 60 psi and currently the booster station is lifting the building pressure up to 120 psi.

  - **Replacement Recommendation:** Replace both booster pumps, VFD's, and pressure control system.

DRAFT

- According to the 1994 Poster Frost report all domestic water piping 2-1/2 inches and smaller was replaced in 1986. However, at the time of the inspection, the onsite facility staff showed many instances where the 1986 copper piping was connected to the 1962 galvanized water piping without dielectric unions, which is resulting in galvanic corrosion and deteriorating of the piping joint. The facility staff battle leaky water piping daily and there is little to no access to the piping that needs to be repaired and replaced. There were multiple leaks throughout the building the day of the site visit. It appears nowhere in the domestic water system is there complete water pipe riser that doesn't contain some galvanized pipe. Therefore there are 54 year old galvanized pipe parts and pieces throughout the water system, and it's potentially leaching metal into the domestic water system. The concern is not for zinc or iron that may be leaching from the pipe, but for lead and cadmium, two heavy metals that may be present as impurities in the zinc which was used for the galvanizing process. The primary drinking water standards for lead and cadmium are 0.015 and 0.005 mg/L, respectively. The water was not tested so there is not a current baseline for the lead or cadmium content in the water at the building, but historically these are problems that occur in galvanized water piping that is 54 years old.

  - **Replacement Recommendation:** Replace all the domestic water piping throughout the building to include all the domestic water piping stacks located in the 36 different pipe chases.

d. *Domestic Hot Water System:*

- The building's hot water system is feed from a 4 inch domestic water line located in the basement. The hot water system was renovated in 1986 and all the equipment is original from the 1986 renovation. Therefore, all the equipment below is 30 years old and is beyond its useful life. The domestic hot water system consist of the following pieces:
  i. (2) Shell & Tube heat exchangers model Armstrong W-185-46S
  ii. (2) Heating water pumps Allis-Chalmers type 2000, 2-1/2x2x6-1/2, 167 gpm at 88 feet of head
  iii. (2) Hot water recirc pumps Allis-Chalmers 2x2x9, 88 gpm at 65 feet of head
  iv. (1) Domestic water boiler, manufacture Industrial Boiler Co. model PFDW100GAS, 4200 cfh gas input.

  - **Replacement Recommendation:** Replace the entire domestic hot water system and install a modern high energy efficient package tankless plate & frame hot water system with all the associated controls to provide 7,600 gallons/hour (130 gpm) of domestic hot water recovery. The system would be similar to the Harsco Patterson Kelly water to water indirect domestic hot water system model D2DW-80D. The system would be complete with (2) 88 gpm hot water return pumps. This system would save energy, therefore reducing the cost of ownership and is made to be installed in retrofit situations. This system will have DDC controls that will need

DRAFT

to be wired to the new building DDC control system. Significant piping modifications will be required in the central plant as well.

e. Condensate Piping System:

- The building has roughly 750 in room fan coil units, 15 above ceiling fan coil units, and 4 air handlers. As part of the HVAC recommendations the air distribution equipment will be replaced. Since the equipment is being replaced the condensate drain piping shall also be replaced. During the site inspection several of the condensate pipes for the AHU's were notice to be leaking and in need of repair or replacement. The new condensate piping shall be installed with copper DWV style piping. The 750 in room fan coil units drain to the roof drain conductors passing through the balconies.
    - **Replacement Recommendation:** Provide new condensate piping for all the replaced air distribution equipment. Condensate piping above finished ceilings shall be insulated.

f. Natural Gas Piping System:

- The building is equipped with a high pressure natural gas meter located near the loading dock. A 6 inch gas line enters the building at the loading dock and is routed to the central plant where it provides natural gas for the (3) gas driven boilers. A 2 inch gas line branches from the 6 inch main and is routed to the pool equipment room near the pool. However, the pool heating equipment was abandon sometime in the early 90's. Originally when the building was heated with steam there was a much larger gas load for the building. Plus with the reduction of the pool equipment, other gas driven equipment removed from the load, and considering the piping is 54 years old the piping should be resized and replaced. The new heating water boilers will consume less gas therefore the pipes can be reduced in size. Also since the new fire pump will be installed in the fire pump building just south of the main building, a new gas meter should be provided and relocated to next to the fire pump building.

    - **Replacement Recommendation:** Provide new high pressure gas meter adjacent to the existing fire pump building, and remove all gas piping and provide properly sized gas piping to the new heating equipment in the central plant.

f. Building (Warming) Kitchen:

- The building at the basement level has a small kitchen available to the residents that is near the multipurpose room. The kitchen is equipped with a 3-compartment sink and a grease trap below the sink. At the time of the inspection the grease trap was leaking waste water onto the floor. The 3-compartment sink was not equipped with the code required flow control device, and the kitchen didn't appear to have a dedicated hand sink as required by Pima County Health.

DRAFT

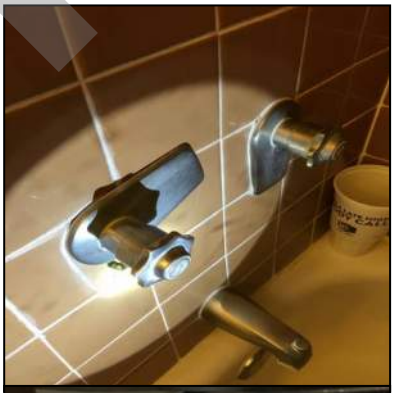
- **Replacement Recommendation:** Provide new grease trap sized properly for the fixtures in the kitchen, provide a flow control device on the 3-compartment sink, and provide hand sink as required by the health department.

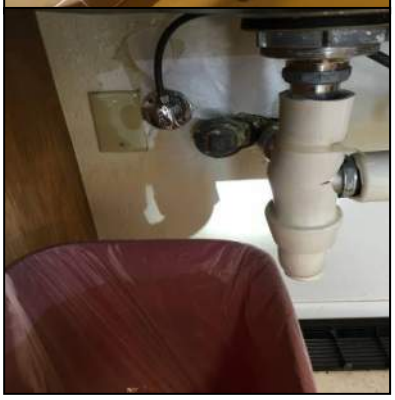
g. *Plumbing Fixtures:*

- The building plumbing fixtures have been replaced through the years as they have been in need of repair. Over the last few years the building maintenance crew has replaced roughly 50 toilets with toilets with a larger diameter throat to minimize down time due to clogging. In 1997 the resident room restroom lavatories and faucets on the 1st through the 4th floors were replaced. The room kitchen sinks were replaced on the 1st through 16th floors.

  However, the showers, bathtubs, and toilets were not replaced during the 1997 renovation. Plumbing fixtures throughout the resident rooms and the common areas of the building are need of replacement, even the 19 year old plumbing fixtures that were replaced in 1997 are in need of replacement. The fixtures should be replaced where applicable ADA accessible fixtures, and plumbing fixtures that meet the current water usage "low flow" requirements. Also the shower valves are unsafe, because they are not installed with "pressure-temperature" compensating shower valves. Without these types of valves the residents are at risk of scalding.

  - **Replacement Recommendation:** Provide all new plumbing fixtures throughout the resident rooms, and common areas.





DRAFT

[Fire Protection System Component Conditions]

The fire protection system for the Tucson House was original constructed in 1962. The building was partially sprinkled originally. The basement had sprinklers and the stairwells were equipped with dry stand pipes. The 500 gpm (50 hp) fire pump and jockey pump were located in the basement. In 1982 a new 6 inch fire line was brought into the building and it appears at that time the building had a complete wet pipe fire sprinkler system installed, and a larger fire pump 1,000 gpm installed. The building is divided up into two towers, a west and east tower. Each tower has a separate fire protection feed. Also each floor has its respective zone valve located in the stairwell.

a. Fire Pump System:

- Currently an electric 1,000 gpm at 225 feet of head and 75 hp fire pump is installed in the basement. The fire pump controls and jockey pump are also installed adjacent to the fire pump. The fire pump is beyond its useful life and also needs to be relocated to the outdoor fire pump building to meet current electrical code. To minimize the electrical load on the emergency generator it has been requested that the new fire pump be natural gas driven as opposed to electrically driven.
    - **Replacement Recommendation**: Provide new 1,000 gpm gas driven fire pump, new jockey pump, and new fire pump controls. New 6 inch fire protection piping will need to be reconfigured to relocate the fire pump from the basement to the fire pump building on the south side of the main building.

b. Piping System:

- The piping system is a combination of screwed black steel and mechanical joints. The pipes are roughly 36 years old. Because of the condition of Tucson water and soils, normal life expectancy of fire protection piping is below the national average of 50 years. The local soils are slightly acetic which attacks the ductile iron pipe. There are microbes that are in the local ground water that have flourished with the introduction of CAP (Central Arizona Project) water. The microbes attack the carbon that bonds the steel together in the pipe. This is known as microbial induced corrosion (MIC). NFPA 13 describes the issues surrounding MIC.

  In the past sections of fire protecting piping has been replaced, and according to the fire protection contractor it showed presence of MIC in the pipe. The piping had nodules inside the pipe which is a sign of MIC. However there were no outwardly signs of corrosion. Included is a photograph of typical MIC nodules in a piping segment. This pipe section was not taken from the Tucson House it is just a representative sample to help understand MIC.

DRAFT

There are a couple tests that can be done to determine the condition of the pipe. First is to separate some sections and simply look inside the pipe for evidence of corrosion. Second is to do a wall thickness test to determine how much of the pipe is still in place.

- **Replacement Recommendation**: Provide wall thickness test on representative samples throughout the building and if the walls are thinning and MIC is present; replace the fire protection piping in the building as required.

c. *Sprinklers System:*

- After 50 years it's mandatory to have the entire fire protection sprinkler head system tested. During the visual inspection no deficiencies were noticed with the sprinkler heads. However, the sprinkler heads are 36 years old and are 14 years away from their mandatory testing. During a potential building renovation, it would be a good time to have the sprinkler heads tested and replaced as required.

  - **Replacement Recommendation:** Test all fire protection sprinkler heads as required by NFPA if it is decided that the building will have its plumbing and mechanical piping replaced; then replace the sprinkler heads at the same time.

DRAFT

[Electrical Component Conditions]

Site Conditions

The majority of the existing site lighting does not meet current outdoor lighting codes, is not energy efficient and does not distribute well. Parking canopies are provided on the west and north sides of the facility. The fixtures, based on the previous assessment and observation, are surface-mounted 70-watt high-pressure sodium type. The fixtures provide lighting under the canopies; however, the physical size and profile allow for easy damage from high-profile vehicles.

The back patio has similar fixtures as well as flood lights mounted under the 1st floor canopy.

The pool enclosure has unshielded floodlights as well as under canopy lights similar to the parking canopies.

DRAFT

All lights on sight are unshielded and do not meet the Outdoor Lighting Ordinance. Recommend replacement of all existing exterior lighting to include updated layouts, revised fixtures and updated controls. Under canopy lights for the parking area and pedestrian, shall be surface mount low profile, fully shielded LED fixtures. All lights shall provide a minimum of pathway lighting to exit the building as well as to maneuver from the parking lot to the building.

Per the IBC, all exit egress doors must have lights on emergency power to provide a minimum of 1fc from the egress door to the parking area. The existing exterior lights are not on EM power and do not provide the required illumination per the IBC.

Building Systems

a. Electrical Systems

- The main service is located to the south of the building and east of the loading dock. The existing TEP utility transformers are located in a vault between the building and the electrical service entrance equipment. TEP has plans to relocate the transformers to above grade, but the schedule is not known.
    - **Replace exterior SES**
    - **Replace all floor by floor electrical panels for apartment loads**
    - **Replace all disconnects original to the building**
- The SES for this facility is a General Electric AV-Line Switchboard, 4000amps, 120/208V-3phase-4wire. The existing housing is rusted and the doors do not open or close smoothly. There is evidence of water entry at the base of the gear.

- There is no main breaker and the switchboard has the following six fused disconnects that serve as the facility main disconnects:
    - 2000/3 Interior Distribution Panel
    - 1000/3 Chiller #1
    - 1000/3 Chiller #2
    - 800/3 Transfer Switch
    - 800/3 Fire Pump
    - 30/2 Panel DDM

- The inclusion of the fire pump on the main service is a violation of NEC 695 which requires that the disconnecting means for fire pumps is not located within the same switchboard that supplies loads other than the fire pump. The service to the fire pump must be independent and fed separately from the utility transformers.

DRAFT

- The previous survey indicated that ground-fault protection at the main service entrance switchgear should be investigated. The NEC requires ground fault protection on disconnecting means rated 1000amps or greater. This gear currently is still lacking ground fault protection.

- Replacement of this switchgear is recommended. The gear is beyond life and has signs of deterioration. With the replacement, a fault current study to provide proper bracing should be conducted and new gear should have a main breaker with ground fault protection.
    - The service size of 4000amps for this facility may or may not be adequate. A 30-day meter reading during the summer months of July or August is recommended to determine the actual loading on the system.
    - The floor by floor distribution system is not efficient and has been varied over the years. The building dwelling units are fed by three fused disconnects such that the facility is divided into east, west and center. Each floor has (3) electrical closets with a disconnect, panel and a pull box. For example, two pumps are served by step-up transformers to provide 480V to these pumps. The cooling towers are located in an adjacent non-connected facility and the service may be from DP-3 or may be a separate feed from the utility.
    - The floor by floor distribution is fed from the Interior Distribution Panel in the physical plant electrical room. This panel is a 2000amp Square D QED Switchboard 120/208V-3phase-4wire and feeds the following:
    - 800/3 Panel DP-2
    - 800/3 Panel DP-3
    - 800/3 East Wing Riser
    - 800/3 Center Riser
    - 800/3 West Wing Riser
    - 400/3 Sump Pumps
    - 30/3Surge Suppressor
- Pool equipment room: The electrical equipment on the north wall in this room appears to be original and beyond useful life. The equipment on the south wall appears to be more recent and currently is in acceptable condition. However, the location of the adjacent pool equipment will degrade the electrical equipment quickly due to the chemicals involved. Recommend relocating either the electrical equipment or the pool equipment, or providing a dividing wall within this room if space permits.

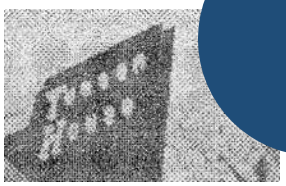
DRAFT

- Mechanical unit rooms: There are three air handling unit rooms at the basement level as well as one at the penthouse level. The existing disconnects an wireways are original to the building and beyond life.

- The trash compactor area and electrical gear is exterior of the building, not shielded from the elements and is showing signs of degradation due to exposure to the elements.

- Comments based on previous electrical assessment:
  - Electrical loads for Tucson House are not clearly known. The 1992 assessment indicated that the loading was increased due to the addition of computers in offices. The later assessment in 1994 indicated that the offices might become residential units which would alleviate the overloading by the office computers.
  - Excerpts from the last assessment that are still issues:
    - The 1992 report identified that the existing distribution panelboard is not braced for the available fault current and is a potential hazard. This condition still exists and should be corrected. Available fault current is analogous to pressure. If a hose or pipe is not built to handle the water pressure to which it could be exposed, it can burst. As long as the pressure is below the rating of the device, the device should not burst. Available fault current is the current that the power company's electrical distribution system can provide in the event of a major short circuit. Tucson Electric Power (TEP) has advised that the available fault current at their transformer is 90,246 amps. As the fault progresses through the building electrical distribution system, the available fault current is attenuated by the impedance on the wiring system. This is similar to the water pressure in a hose decreasing as more lengths of hose are added. The calculated available fault current at the original electrical distribution panelboard in the basement is approximately 53,980 amps. No records are available on this distribution panelboard, but the manufacturer advises that it is probably braced for 10,000 to 25,000 amps.

DRAFT



- In various renovations, some of the electrical load on this panelboard has been diverted to newer electrical distribution equipment. The remaining loads consist of HVAC system pumps, cooling towers, and distribution to electrical panels on each floor which provide power to the apartments. Facility maintenance personnel advise that the cooling tower circuit trips on hot days. The room housing this old electrical distribution system is poorly ventilated causing a heat buildup in the room which possibly affects the sensitivity of the overcurrent tripping devices. The electrical distribution system divides the building vertically into thirds. Replacing the old main distribution panelboard with a new one with adequate fault bracing would require rerouting the existing feeders to the new equipment. The previous report assumed that all power to the existing panelboard would be cut off, the old panelboard removed, and a new one installed in the old location. This would require an extended outage. The 1992 report also assumed that the existing electrical feeders were old rubber insulation (type RHW). RHW conductors this old are usually serviceable unless they are handled or moved. Once disturbed, the old, dried rubber insulation cracks and falls off, requiring that the feeder be replaced. However, contrary to the 1992 report, the feeder insulation actually installed at Tucson House is a thermoplastic (THW) that typically does not experience this problem. The panelboard replacement could be phased to reduce the extent and length of power outages. A new panelboard could be installed at a different location and energized. The existing feeders could then be reconnected to the new distribution panelboard one at a time. Due to the electrical distribution system configuration, one third of the building would be without power during each feeder replacement. Each power outage would be approximately 6 to 8 hours as the feeders were reconnected. This could be done at night when fewer occupants would be affected. This panelboard replacement would require careful planning and coordination between the engineer, the contractor, the City and the occupants.

- Based on the previous assessment, the major portion of wiring is type NMC cable (Romex). The current NEC does not allow Romex in structures unless the construction is Type III, IV or V. This facility is Type 1A. Romex is only allowed in raceways within this type structure. Therefore, the installation of Romex in this facility does not meet current codes.

- There is a greater potential of fire from overloaded Romex, especially as the conductor insulation ages and deteriorates. Replacement of the existing Romex with conduit and conductor will require cutting and patching a multitude of walls and ceilings which may affect existing asbestos conditions.

b. Special Systems

- Fire Alarm System:
  - The existing fire alarm system is a simplex 4100v.
  - Per IBC 907.2.9.1 a manual fire alarm system is not required for this facility under Exception 2. Exception 2 state that manual fire alarm boxes are not required where the building is equipped throughout with an automatic sprinkler system and the occupant notification appliances will automatically activate throughout upon a sprinkler water flow. This facility complies and therefore existing manual pull stations are not required.
    - Exception: At the FACP, a manual pull station is required.
  - Smoke detectors are required in all sleeping rooms and in hallways or areas outside sleeping rooms. This facility has the required smoke detectors.
  - Based on a review of the IBC, smoke detectors are not required in hallways for R2 occupancies.

DRAFT

- IBC does require audio/visual alarms in all areas such that occupants and users are notified in the event of a fire. These areas include office areas, maintenance/storage, multipurpose and corridors. Additionally, visual only devices are required in all public restrooms and meeting rooms. Based on observations, the required devices appear to be in place.
- If the dwelling units are modified or if the fire alarm system is modified, visual devices will be required in the dwelling units.

- CCTV: Closed-circuit television cameras monitor all but one ground level entry location. Video monitors are located at the main entry security desk. Cameras should be added to the stairwells (one per level) to monitor traffic within the stairwells and to prevent transient inhabitation. All cameras should be adjusted to provide an appropriate level of surveillance with the help of the vendor. IP cameras and a digital video recording system are the best solution for this type of facility. In order to add the required number of cameras, the system would require a significant upgrade/replacement.

- Access Control: The existing system is a Lenal system. The building is a controlled-access facility. The main entry has card access proximity readers for the two sliding doors. Although the system appears to function well, the level of traffic and the proximity of the doors to each other allow unauthorized users access to the facility. It is recommended to modify the system to provide revised entry accessibility that will prevent unauthorized users entrance.

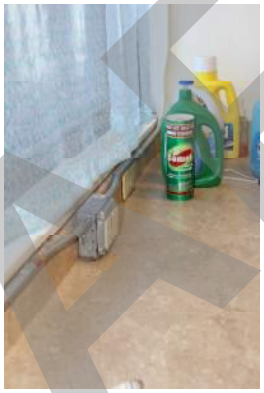
- Public Address: The building is provided with a house intercom system that used to allow calls between apartments within the building. This system is obsolete. Many handsets are no longer operational and based on the previous assessment, parts are no longer available. The system should be abandoned or replaced. With the availability of cell phones and regular telephones, this house intercom system may not be necessary.

c. *Common Areas*

- Storage: The storage areas have many porcelain sockets with screw-in type compact fluorescent lamps. The lamps do not provide uniform lighting and in some mechanical rooms do not provide adequate lighting. These should be replaced with appropriate LED strip lights (Lithonia #ZL1F).
- Office: The office has 2x4 lensed fluorescent lamps that should be replaced with an equivalent LED fixture. Receptacles are spaced throughout, but in some cases, additional ones are needed. Fire alarm audio/visual devices are provided, but do not provide adequate coverage based on the partitions.

DRAFT

- Corridor
  The corridor and stairway lighting is operating 24 hours a day. The existing fixtures are standard fluorescent technology. These fixtures should be replaced with LED lamping to provide energy savings and to reduce maintenance due to re-lamping and ballast replacements. Corridors typically have 1x4 2lamp fixtures (approximately 64watts per fixture). Extrapolating information from existing drawings to provide quantities, and utilizing an LED 1x4 fixture of 30W (Lithonia #ALL Series) in just the corridors can provide up to 132,000 kilowatt hours of electricity per year.
- In a few locations, there are wall-mounted corridor light fixtures with an integral switch. This switch is too high and too small for some residents to operate. The fixture does not offer adequate coverage for the corridor. These fixtures should be removed and automatically controlled fixtures should be provided for nighttime use.
- Kitchen: The kitchen has surface mounted receptacles that are open to exposure from water. Recommend that the weatherproof, gasketed back boxes be provided to protect against water entry.



d. *Dwelling Units*

The 2014 NEC requires the following for all dwelling units:

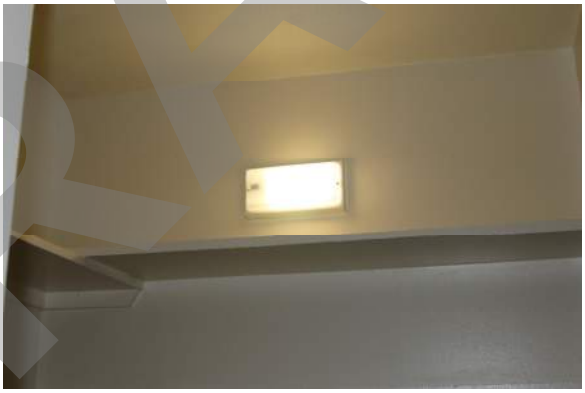
- GFCI receptacles in bathrooms, kitchen, for outlets supplying dishwashers, within 6' of sinks, bathtubs or shower stalls, in laundry areas and outdoors
- Two small-appliance branch circuits for kitchens with no other outlets connected to this circuit
- Kitchen receptacles shall be spaced at 4' on-center above countertops for any section 12" and wider, and shall be no more than 24" from the end of the counter
- One bathroom branch circuit with no other outlets connected to this circuit
- General dwelling unit receptacles shall be spaced at 12' on center and a maximum of 6' from any opening
- Arc-Fault Circuit Interrupter Protection for all 120-volt, 15 and 20amp branch circuits supplying outlets or devices installed in dwelling unit kitchens, family rooms, dining rooms, living rooms, bedrooms, closets, hallways or similar areas
- Exterior receptacle shall have WP with plug inserted covers
- NEC 410.16 (C) dictates the locations for all closet light fixtures
- Each dwelling unit is to have a separately switched light for patio areas.

Based on the previous assessment, three electrical circuits are provided for each efficiency apartment, and four circuits for each one- or two-bedroom apartment. Based on observations, one of those circuits is for the HVAC unit located in the living room which is 120V and the remainder serve the kitchen, bathroom, and general lights and receptacles. This circuiting arrangement does not meet current NEC requirements. Adequate circuits are not available for kitchen appliances such as garbage disposals, dishwashers, refrigerators and cooktops/ovens (if electric). Not all units have a receptacle within 2' of the

DRAFT

sink. The GFCI receptacles do not have dedicated circuits per code and are located within the bathrooms are frequently a part of the lighting switch and on a wall not affiliated with the sink.

Most rooms have switched receptacles for lighting. The kitchen, entry and closet have switched ceiling light fixtures. The bathrooms have some ceiling mount fixtures and some integral to the medicine cabinets located above the sinks. It is standard practice to only provide switched receptacles for lighting in many residences. The closet light fixture is located directly above a closet shelf and therefore does not comply with current NEC requirements.



Within most bathrooms, surface mounted junction boxes and wiremold are blanked off from removed pull cords. Since these systems are no longer in use, they should be removed in their entirety. NEC 640.6 (C).

DRAFT

In discussions with maintenance staff, the existing receptacles have a ground prong on the device, but there is no ground wire as a part of the conductors feeding the receptacle. All receptacles must be grounded per NEC. Additionally, when a receptacle goes bad, they have found that the receptacles fall apart in their hands. All devices within the dwelling units are beyond useful life and require replacement.

Exterior patio receptacles frequently have permanently connected appliances, lights or equipment. Exterior receptacles are required to be WP with plug inserted per NEC 460.9 (A) (2) (a)

DRAFT

Aggregate Capital Needs

DRAFT

1 Executive Summary

2 Facility History

3 Assessment Process

4 Component Conditions

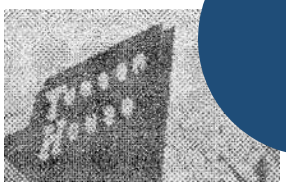
5

6 Elevator Assessment

7 Component Assessment Forms

8 Energy Data

City of Tucson



[Aggregate Capital Needs]

Based on the findings in the Component Assessment section of this report, WSM engaged with Compusult to generate a estimate of probable construction cost for the improvements recommended in this report. See the attached Compusult estimate for detailed cost information. WSM has also included a Cost Summary that includes in addition to the direct construction costs, estimates of other overhead expenses that would typically be associated with a project of this size. Per the Choice Neighborhoods Planning Grant Application, we have not included life cycle cost as a part of this assessment, but only the cost of the current rehabilitation needs. We also have not included an escalation factor since it is unknown when the renovation would take place. A 2% per year escalation factor would be appropriate for planning purposes

Project Costs:

The Compusult estimate attached does not include all of the costs necessary to execute the project but only the construction costs that would be under contract with a general contractor. The Compusult estimate includes contractor overhead, profit, general conditions, bond, insurance, and taxes within the line item estimates, to simplify the process of evaluating individual component costs. Also included is a 15% design contingency within the estimate, this is necessary when the documentation is schematic in nature and will accommodate renovation needs not specifically delineated in this report. What is not included is the general project overhead, these are project costs that are not typically paid by the contractor. The attached Cost Summary lays out a budget for those costs and they are defined below.

a. Project Contingency

Typically, for a renovation project of this scale, it is recommended to carry a project contingency of 10%-15% on the overall project cost. This contingency is intended to cover unforeseen costs that may arise during construction.

b. City of Tucson Communications Infrastructure Costs

Due to the age of the facility, the IT infrastructure for the Tucson House will required upgrades. Typically in City of Tucson Projects this work is performed by the City of Tucson Information Technology Department and is paid for outside of the contractors scope.

c. Furniture, Fixtures, and Equipment

The City of Tucson has open contracts with the major furniture vendors in the area. The City of Tucson Architecture and Engineering Division typically assists in the procurement of these components outside of the contractors scope, saving the project the contractors overhead and profit markups.

d. Utility Upgrades from the Utility Services

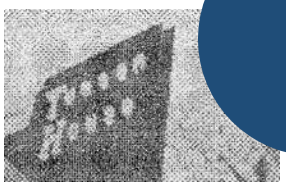
Based on the assessment there will likely be upgrades necessary to the electrical utility, and the water utility to meet the building demand and the code requirements. At this stage in planning we are not able to get firm costs from the utility's for these components and have included an allowance

e. Permit Fees

Building Permit fees are paid for by the owner, an allowance has been included in the Cost Summary

f. Material Testing & Special Inspection Fees

DRAFT



As part of the quality control protocol for any project the owner will engage a testing agency to provide quality control/quality assurance for materials provided for the project. It is also required by the building code that certail portions of the work are inspected by an independent agency for conformance with the construction documents. This is a cost to the owner and an allowance is included in the Cost Summary

g. LEED Design and Engineering

In 2006 the City of Tucson adopted a Sustainable Energy Standard to promote sustainable design throughout the City infrastructure. The Sustainable Energy Standard requires that all new construction and renovation projects over 5000 sf achieve at minimum LEED Silver Certification. The renovation at the Tucson House will be required to meet this standard. The replacement systems we have proposed in this report will help to achieve this goal, but the sustainability goals will need to be integrated into the renovation design from the beginning of the project. The additional design and engineering efforts necessary for this effort are included in the Cost Summary.

h. Fundament & Enhanced Commissioning

As part the Sustanable Energy Standard, the LEED Certification process, and as part of the standard Architecture and Engineering Division process all building construction projects are required to have third party commissioning. The commissioning agent is responsible for reviewing the design documents for conformance with the standard of practice and compliance with the Sustainable Energy Standard. The Commissioning Agent also reviews construction of the building systems and performs functional testing to ensure the systems meet the requirements of the design documents and the final product meets the energy goals. The commissioning agent is hired independently by the owner. An estimate for this fee has been included the Cost Summary

i. Professional Design Fees

Professional Design services including Architectural and Engineering design fees are not included in the contractor's scope. Typically for a project of this size and complexity a fee of 8% for basic services would be appropriate and has been included in the Cost Summary. There may be additional services the City would request of the design team that have not been included.

j. City Staff Review and Management Costs

The renovation of the Tucson House would be managed by the City of Tucson General Services Department working with the Architecture and Engineering Division coordinating with Facilities & Communications Maintenance and other City departments. Past projects has shown that the cost to the end using department for A&E Division services is approximately 4%. This has been included in the Cost Summary

k. Resident Relocation and Temporary Housing Costs

We have assumed in our cost model that one of the two towers of the Tucson House will be renovated at time. This means that approximately 204 apartments will need to be vacated and the residents relocated during the construction period of approximately 12 months per tower. We have not included an allowance to accommodate for this cost.

DRAFT

		Preliminary Budget	Comments
Project Budget Analysis			
Permits		35,000	
Legal & finance- Acquisition & Building Purchase		n/a	
Wastewater Fees		n/a	
COT A/E Project Management / Constr.		500,000	
COT Facilities		30,000	
Construction Materials Testing		25,000	
Geotechnical Investigation & Report		n/a	
Water Service upgrade		85,000	
Electrical Service upgrade		75,000	
Environmental Costs		15,000	
Reimbursable Expenses		30,000	
SUBTOTAL		**795,000**	
SITE WORK & BUILDING COSTS			
Basement & First Floor		1,850,400	
Common areas - Coordidors - Stairs Floor 2-16		3,673,600	
17th Floor		1,273,300	
Studio Apartments - 172		8,839,200	
One Bedroom - 188 Units		11,780,300	
Two Bedroom - 51 Units		4,481,100	
Site Work		303,000	
Plumbing systems		2,271,400	
Fire Protection		1,667,100	
HVAC Systems		4,097,800	
Electrical Systems		874,800	
Roofing		594,000	
Elevator Modernization		1,370,800	
SUBTOTAL		**43,076,800**	Per Compusult Estimate
Total building area 445,000			
Cost per SF $96.80			
FURNITURE, & STORAGE SYSTEMS			
Furniture Budget	Office Furniture	150,000	Systems Furniture
	Lounge Furniture	225,000	High abuse resistant
	Storage systems	50,000	Does not include high density storage systems
SUBTOTAL FURNITURE & STORAGE		**425,000**	
SUBTOTAL BLDG & FURNITURE		**43,501,800**	
Telephone / Data Installation		75,000	city installed phone/data systems
Fiber / WAN routing to building		250,000	COT Communications
SUBTOTAL		**325,000**	
Other costs			
Relocation Costs Residents	Not included	0	
Public Art (constr & a/e)	Not included	0	
LEED engineering/ submittals		75,000	
Fundamental commissioning		80,000	
Enhanced commissioning		55,000	
Design Contract A/E (estimated at 8% of Construction c		3,446,144	
SUBTOTAL OTHER COSTS		**3,656,144**	
ESTIMATED PROJECT COST AT COMPLETION		**48,277,944**	
OWNER CONTINGENCY	15%	**7,241,692**	
TOTAL PROJECT BUDGET		**55,519,636**	
Total building area 445,000			
Cost per SF $124.76			

Exclusions:
Asbestos abatement & prevailing wages
Seismic upgrades to building structure
No escalation is included
Reloation costs for current residents

Notes
Construction costs include
15% - Design contingency
12% General Conditions
5% - Contractors fee
2% Bond and Insurance
5.27% - Sales Tax

DRAFT

Compusult

Construction Cost Consulting
5923 East Pima Street
Tucson, Arizona 85712
520•882•4044 voice
520•323•0544 fax

DRAFT

Statement of Probable Cost

City of Tucson Housing & Community Development
Tucson House Physical Needs Assessment

Tucson, Arizona

by Compusult, Inc.

February 1, 2016

Compusult applies diligence and judgment in locating and using reliable sources of information. This Statement of Probable Cost is made on Compusult's knowledge of the project and experience. Compusult has no control over the costs of labor, equipment or materials or over the contractor's method of pricing. Compusult makes no warranty expressed or implied as to the accuracy of such opinions as compared to the bid or actual costs.

Harold H. McGrath III, LCPE
Compusult, Inc.

City of Tucson Housing & Community Development
Tucson House
Tucson, Arizona
Physical Needs Assessment Estimate
February 1, 2016

Compusult, Inc.
5923 East Pima Street
Tucson, Arizona 85712
520-882-4044

Project Summary

Summary of Areas	Project GSF:	376,500	Cost/GSF
1. Basement & 1st Floor		$1,850,400	$61.07
2. Common Areas - Corridors 2-16 & Stairs -15 Floors		$3,673,600	$80.21
3. 17th Floor		$1,273,300	$212.22
4. Studio - 172 Units		$8,839,200	$108.19
5. One Bedroom - 188 Units		$11,780,300	$90.16
6. Two Bedroom - 51 Units		$4,481,100	$83.28
7. Site Work		$303,000	$0.80
8. Plumbing Systems		$2,271,400	$6.03
9. Fire Protection		$1,667,100	$4.43
10. HVAC Systems		$4,097,800	$10.88
11. Electrical Systems		$874,800	$2.32
12. Roofing		$594,000	$1.58
13. Upgrade Elevators per ECS Report		$1,370,800	$3.64
Total Building Construction		**$43,076,800**	**$114.41**

DRAFT

Assumptions & Exclusions

Includes Davis-Bacon Wages, all contractor markups and phased construction.

Excludes asbestos abatement, escalation, soft costs and FFE.

Construction Cost Breakdown by Area

Basement & 1st Floor			GSF:	30,300
Remove Flooring/New LVT	9,513	SF	7.48	71,143
Remove Replace RB	4,507	LF	2.98	13,417
Grind/Seal Concrete Floors	7,734	SF	6.03	46,608
New 2x2 ACT	16,362	SF	5.45	89,100
Lower Cabinet w/ Solid Surface Top	25	LF	384.82	9,620
Upper Cabinet	14	LF	210.56	2,948
Exterior Single Al Door	10	EA	1,960.40	19,604
Exterior Double Al Door	1	EA	3,775.58	3,776
Exterior Al Auto Slider	3	EA	8,712.87	26,139
Interior WD/HM Dr/Frm/Hrdwr	13	EA	1,597.36	20,766
Accessible Door Hardware	86	EA	225.08	19,357
Paint Door	86	EA	94.39	8,117
Bullet Resistant Transaction Window	1	EA	5,082.51	5,083
Al Storefront	3,720	SF	55.18	205,275
GWB Partition	2,456	SF	8.71	21,399
Carpet	1,849	SF	6.17	11,411
Remodel Restroom	363	SF	58.09	21,085
Epoxy Paint Floor	837	SF	3.85	3,221
Paint Walls	41,448	SF	0.65	27,085
Paint Ceiling	7,176	SF	0.80	5,731
New Guard/Handrail	580	LF	181.52	105,281
Washer	10	EA	1,815.18	18,152
Dryer	10	EA	2,178.22	21,782
Refrigerator	1	EA	2,323.43	2,323
Microwave	1	EA	363.04	363
Projection Screen	4	EA	1,161.72	4,647
Patch Cracks @ Stairs	10	EA	653.47	6,535
Patch Cracks @ Balconies	163	LF	7.99	1,302
Remove Balcony Fascia/WP	326	LF	5.08	1,657
Waterproof Balconies	1,733	SF	4.36	7,550
Patch Wing Wall	16	EA	72.61	1,127
Paint Railing	326	LF	14.52	4,734
Wall Protection	8,414	SF	7.62	64,146
Corner Guard	28	EA	137.95	3,863
Fire Extinguisher	8	EA	254.13	2,033
General Plumbing Allowance	30,300	Sqft	3.40	102,960
Air Handler, 5,300 CFM	1	Each	29,087.04	29,087
Fan Coil Unit	16	Each	5,477.61	87,642
Grilles & Registers	30,300	Sqft	1.70	51,480
Ductwork Modifications	1	Lsum	14,441.58	14,442
Chilled Water Piping	1,020	Lnft	61.06	62,284
Chiller Water Insulation	1,020	Lnft	18.69	19,063
Heating Water Piping	1,020	Lnft	53.26	54,329
Heating Water Insulation	1,020	Lnft	17.84	18,196
Test & Balance Systems	1	Lsum	8,495.05	8,495
Mechanical Demolition	1	Lsum	61,877.93	61,878
Replace Fan Coil Unit	30,300	SF	1.45	44,000
Replace Light Fixtures	30,300	SF	5.52	167,200
Replace Receptacles	30,300	SF	0.94	28,600
Telecom/CATV	30,300	SF	1.60	48,400

DRAFT

Basement & 1st Floor (continued)

A/V and Fire Alarm	30,300	SF	3.41	103,400
Access Control/CCTV	30,300	SF	2.25	68,200
Electrical Demolition	30,300	SF	0.15	4,400
Total Basement & 1st Floor				**1,850,435**

Common Areas - Corridors 2-16 & Stairs	**Unit GSF:**	**3053**	**Total GSF:**	**45,800**
Remove Flooring/New LVT	2,615	SF	7.48	19,556
Remove Replace RB	795	LF	2.98	2,367
New 2x2 ACT	2,615	SF	5.45	14,240
Accessible Door Hardware	10	EA	225.08	2,251
Paint Door	10	EA	94.39	944
Al Storefront	168	SF	55.18	9,270
Epoxy Paint Floor	433	SF	3.85	1,666
Paint Walls	1,568	SF	0.65	1,025
Paint Ceiling	433	SF	0.80	346
New Guard/Handrail	232	LF	181.52	42,112
Patch Cracks @ Stairs	4	EA	653.47	2,614
Patch Cracks @ Balconies	274	LF	7.99	2,184
Remove Balcony Fascia/WP	547	LF	5.08	2,780
Waterproof Balconies	2,813	SF	4.36	12,255
Patch Wing Wall	26	EA	72.61	1,888
Paint Railing	547	LF	14.52	7,943
Wall Protection	3,003	SF	7.62	22,894
Corner Guard	8	EA	137.95	1,104
Fire Extinguisher	1	EA	254.13	254
General Plumbing Allowance	3,053	Sqft	1.70	5,187
Air Handler, 2,000 CFM	0.20	Each	11,634.82	2,327
Fan Coil Unit, 3.5 Tons	2	Each	4,288.30	8,577
Fan Coil Unit, 5 Tons	1	Each	5,817.41	5,817
Grilles & Registers	3,053	Sqft	1.70	5,187
Ductwork Modifications	0.07	Lsum	40,776.23	2,732
Chilled Water Piping	128	Lnft	61.06	7,816
Chiller Water Insulation	128	Lnft	18.69	2,392
Heating Water Piping	128	Lnft	53.26	6,818
Heating Water Insulation	128	Lnft	17.84	2,283
Test & Balance Systems	0.07	Lsum	40,776.23	2,732
Mechanical Demolition	0.07	Lsum	64,759.45	4,339
Replace Fan Coil Unit	3,053	SF	0.36	1,108
Replace Light Fixtures	3,053	SF	7.62	23,275
Replace Receptacles	3,053	SF	1.02	3,103
A/V and Fire Alarm	3,053	SF	2.90	8,867
Access Control/CCTV	3,053	SF	1.45	4,433
Electrical Demolition	3,053	SF	0.07	222
Total Common Areas - Corridors 2-16 & Stairs		**Cost per Floor**		**244,910**
		Total Cost for 15 Floors		**3,673,645**

DRAFT

17th Floor			GSF:	6,000
Remove Flooring/New LVT	4,565	SF	7.48	34,140
Remove Replace RB	574	LF	2.98	1,709
New 2x2 ACT	4,505	SF	5.45	24,532
Exterior Single Al Door	1	EA	1,960.40	1,960
Accessible Door Hardware	8	EA	225.08	1,801
Paint Door	8	EA	94.39	755
Al Storefront	2,264	SF	55.18	124,931
Remodel Restroom	255	SF	58.09	14,812
Epoxy Paint Floor	129	SF	3.85	496
Paint Walls	5,056	SF	0.65	3,304
Paint Ceiling	129	SF	0.80	103
New Guard/Handrail	58	LF	181.52	10,528
Patch Cracks @ Stairs	1	EA	653.47	653
Fire Extinguisher	1	EA	254.13	254
Patch Cracks/FR Polymer	15,658	SF	36.30	568,442
Rework Partitions @ 16th Floor	7,829	SF	8.71	68,213
General Plumbing Allowance	6,000	Sqft	16.99	101,941
Ductless Split System, 5 Tons	3	Each	6,962.54	20,888
Refrigerant Piping	180	Lnft	31.60	5,688
Refrigerant Insulation	90	Lnft	12.74	1,147
Replace HVAC System	6,000	Sqft	33.98	203,881
Mechanical Demolition	1	Lsum	10,805.70	10,806
Replace Fan Coil Unit	6,000	SF	1.45	8,713
Replace Light Fixtures	6,000	SF	5.66	33,980
Replace Receptacles	6,000	SF	0.80	4,792
Telecom/CATV	6,000	SF	1.45	8,713
A/V and Fire Alarm	6,000	SF	1.89	11,327
Access Control/CCTV	6,000	SF	0.73	4,356
Demolition	6,000	SF	0.07	436
Total 17th Floor				**1,273,301**

Studio	Unit GSF:	475	GSF:	81,700
Remove Flooring/New VCT	385	SF	3.12	1,202
Remove Replace RB	122	LF	2.98	363
Lower Cabinet w/ Solid Surface Top	11	LF	384.82	4,233
Upper Cabinet	11	LF	210.56	2,316
Shelf/Rod	14	LF	36.30	508
Vanity w/ Solid Surface Top	3	EA	94.39	283
Exterior Sliding Glass Door	1	EA	1,379.54	1,380
Accessible Door Hardware	4	EA	225.08	900
Paint Door	4	EA	94.39	378
Ceramic Tile Floor	25	SF	13.80	345
Ceramic Tile Base	20	SF	14.52	290
Ceramic Tile Wall	140	SF	15.25	2,135
GWB Patch @ Piping	1	EA	145.21	145
Paint Walls	915	SF	0.65	598
Paint Ceiling	410	SF	0.80	327
Mirror	1	EA	123.43	123
Towel Bar	2	EA	36.30	73
TP Holder	1	EA	21.78	22
Grab Bars	2	EA	65.35	131

DRAFT

Studio (continued)

Stove	1	EA	798.68	799
Oven	1	EA	1,161.72	1,162
Hood	1	EA	283.17	283
Refrigerator	1	EA	1,379.54	1,380
Water Closet	1	Each	864.80	865
Lavatory, CS	1	Each	949.75	950
Bath Tub	1	Each	1,824.74	1,825
Kitchen Sink	1	Each	1,299.74	1,300
Remove Fixtures	4	Each	180.10	720
Remove Piping	160	Lnft	9.00	1,441
Domestic Cold Water Piping	40	Lnft	32.45	1,298
Domestic Hot Water Piping	40	Lnft	28.10	1,124
Piping Insulation, HW	40	Lnft	11.04	442
Waste & Vent Piping	80	Lnft	43.90	3,512
Fan Coil Unit, 1.5 Tons Vertical	1	Each	3,863.55	3,864
Ceiling Exhaust Fan, 50 CFM	1	Each	652.42	652
Kitchen Hood Exhaust	1	Each	784.94	785
General Exhaust Duct	1	Lsum	169.90	170
OSA Duct & Intake	1	Lsum	307.52	308
Replace Fan Coil Unit	475	SF	1.52	724
Replace Light Fixtures	475	SF	11.76	5,587
Replace Receptacles	475	SF	6.39	3,035
Telecom/CATV	475	SF	2.40	1,138
A/V and Fire Alarm	475	SF	4.43	2,104
Demolition	475	SF	0.36	172

Total Studio — **Cost per Unit** **51,391**
Total Cost for 172 Units **8,839,191**

One Bedroom — **Unit GSF:** **695** — **GSF:** **130,660**

Remove Flooring/New VCT	569	SF	3.12	1,776
Remove Replace RB	198	LF	2.98	589
Lower Cabinet w/ Solid Surface Top	12	LF	384.82	4,618
Upper Cabinet	12	LF	210.56	2,527
Shelf/Rod	20	LF	36.30	726
Vanity w/ Solid Surface Top	3	EA	94.39	283
Exterior Sliding Glass Door	1	EA	1,379.54	1,380
Accessible Door Hardware	3	EA	225.08	675
Paint Door	3	EA	94.39	283
Ceramic Tile Floor	26	SF	13.80	359
Ceramic Tile Base	21	SF	14.52	305
Ceramic Tile Wall	147	SF	15.25	2,241
GWB Patch @ Piping	1	EA	181.52	182
Paint Walls	1,386	SF	0.65	906
Paint Ceiling	595	SF	0.80	475
Mirror	1	EA	123.43	123
Towel Bar	2	EA	36.30	73
TP Holder	1	EA	21.78	22
Grab Bars	2	EA	65.35	131
Stove	1	EA	798.68	799
Oven	1	EA	1,161.72	1,162

DRAFT

One Bedroom (continued)

Hood	1	EA	283.17	283
Refrigerator	1	EA	1,379.54	1,380
Water Closet	1	Each	864.80	865
Lavatory, CS	1	Each	949.75	950
Bath Tub	1	Each	1,824.74	1,825
Kitchen Sink	1	Each	1,299.74	1,300
Remove Fixtures	4	Each	180.10	720
Remove Piping	160	Lnft	9.00	1,441
Domestic Cold Water Piping	40	Lnft	32.45	1,298
Domestic Hot Water Piping	40	Lnft	28.10	1,124
Piping Insulation, HW	40	Lnft	11.04	442
Waste & Vent Piping	80	Lnft	43.90	3,512
Fan Coil Unit, 1.5 Tons Vertical	1	Each	3,863.55	3,864
Fan Coil Unit, 3/4 Tons Vertical	1	Each	3,438.80	3,439
Ceiling Exhaust Fan, 50 CFM	1	Each	652.42	652
Kitchen Hood Exhaust	1	Each	784.94	785
General Exhaust Duct	1	Lsum	169.90	170
OSA Duct & Intake	1	Lsum	307.52	308
Replace Fan Coil Unit	695	SF	2.03	1,413
Replace Light Fixtures	695	SF	10.38	7,216
Replace Receptacles	695	SF	6.97	4,844
Telecom/CATV	695	SF	3.12	2,170
A/V and Fire Alarm	695	SF	3.99	2,775
Demolition	695	SF	0.36	252

Total One Bedroom — **Cost per Unit** **62,661**
Total Cost for 188 Units **11,780,269**

Two Bedroom

Unit GSF: **1055** **GSF:** **53,805**

Remove Flooring/New VCT	920	SF	3.12	2,872
Remove Replace RB	268	LF	2.98	798
Lower Cabinet w/ Solid Surface Top	15	LF	384.82	5,772
Upper Cabinet	13	LF	210.56	2,737
Shelf/Rod	29	LF	36.30	1,053
Vanity w/ Solid Surface Top	2	EA	94.39	189
Exterior Sliding Glass Door	2	EA	1,379.54	2,759
Accessible Door Hardware	6	EA	225.08	1,350
Paint Door	6	EA	94.39	566
Ceramic Tile Floor	47	SF	13.80	648
Ceramic Tile Base	39	SF	14.52	566
Ceramic Tile Wall	273	SF	15.25	4,163
GWB Patch @ Piping	1	EA	290.43	290
Paint Walls	1,876	SF	0.65	1,226
Paint Ceiling	967	SF	0.80	772
Mirror	2	EA	123.43	247
Towel Bar	4	EA	36.30	145
TP Holder	2	EA	21.78	44
Grab Bars	4	EA	65.35	261
Stove	1	EA	798.68	799
Oven	1	EA	1,161.72	1,162
Hood	1	EA	283.17	283

DRAFT

Two Bedroom (continued)

Refrigerator	1	EA	1,379.54	1,380
Water Closet	2	Each	864.80	1,730
Lavatory, CS	2	Each	949.75	1,899
Bath Tub	1	Each	1,824.74	1,825
Shower Valve & Drain	1	Each	1,299.74	1,300
Kitchen Sink	1	Each	1,299.74	1,300
Remove Fixtures	7	Each	180.10	1,261
Remove Piping	180	Lnft	9.00	1,621
Domestic Cold Water Piping	50	Lnft	32.45	1,623
Domestic Hot Water Piping	50	Lnft	28.10	1,405
Piping Insulation, HW	50	Lnft	11.04	552
Waste & Vent Piping	80	Lnft	43.90	3,512
Fan Coil Unit, 1.5 Tons Vertical	1	Each	3,863.55	3,864
Fan Coil Unit, 3/4 Tons Vertical	2	Each	3,438.80	6,878
Ceiling Exhaust Fan, 50 CFM	2	Each	652.42	1,305
Kitchen Hood Exhaust	1	Each	784.94	785
General Exhaust Duct	1	Lsum	339.80	340
OSA Duct & Intake	3	Each	307.52	923
Replace Fan Coil Unit	1,055	SF	2.03	2,145
Replace Light Fixtures	1,055	SF	9.08	9,575
Replace Receptacles	1,055	SF	7.04	7,430
Telecom/CATV	1,055	SF	3.12	3,294
A/V and Fire Alarm	1,055	SF	2.69	2,834
Demolition	1,055	SF	0.36	383
Total Two Bedroom		**Cost per Unit**		**87,865**
		Total Cost for 51 Units		**4,481,096**

Site Work			**GSF:**	**376,500**
Repair Chain Link Fence	218	LF	7.26	1,583
Remove/Repave Parking Area	8,522	SY	30.50	259,879
Striping	4,151	LF	0.65	2,713
HC Stall	14	EA	312.21	4,371
Arrow	12	EA	152.48	1,830
Regrade Low Area	270	SY	7.26	1,960
Remove/Replace Curb	55	LF	29.04	1,597
New Railing @ Steps & Ramp	100	LF	94.39	9,439
Remove/Repair Sidewalk	250	SF	11.62	2,904
Remove Decorative Finish @ Canopy	1	EA	2,178.22	2,178
Sandblast/Patch Canopy	12,336	SF	0.94	11,644
Patch Spalled Concrete @ Canopy	1	EA	2,904.29	2,904
Total Site Work				**303,002**

DRAFT

Plumbing Systems			GSF:	376,500
Plumbing Allowance, General	376,500	Sqft	0.85	319,839
Remove Piping	32,400	Lnft	9.85	319,278
Domestic Water Booster System	1	Each	71,562.28	71,562
Waste Sump Pump	1	Each	45,356.76	45,357
Rainwater Pumps	1	Lsum	19,871.62	19,872
Domestic Water Heating System	1	Each	177,104.75	177,105
DHW Circ. Pump	2	Each	4,223.74	8,447
Domestic Cold Water Piping	5,400	Lnft	36.80	198,723
Domestic Hot Water Piping	10,800	Lnft	32.45	350,472
Piping Insulation, HW	10,800	Lnft	12.74	137,620
Waste & Vent Piping	10,800	Lnft	47.40	511,946
Condensate Piping	1,050	Lnft	25.45	26,724
Piping Insulation, Cond.	1,050	Lnft	9.34	9,812
Natural Gas Piping	500	Lnft	50.70	25,349
Test & Flush	1	Lsum	49,271.28	49,271
Total Plumbing Systems				**2,271,375**

Fire Protection			GSF:	376,500
Wet Sprinkler System	376,500	Sqft	4.14	1,558,188
Fire Pump	1	Each	108,910.87	108,911
Total Fire Protection				**1,667,099**

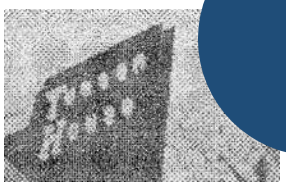
HVAC Systems			GSF:	376,500
Chiller, 250 Tons	2	Each	134,629.52	269,259
Cooling Tower, 305 Tons	2	Each	73,363.23	146,726
Boilers	2	Each	81,858.28	163,717
Heat Exchanger, 990 GPM	2	Each	131,027.62	262,055
Expansion Tank, HW	1	Each	4,498.98	4,499
Expansion Tank, CHW	1	Each	4,838.78	4,839
Air Separator, HW	1	Each	4,838.78	4,839
Air Separator, CHW	1	Each	5,178.58	5,179
Heating Water Pump	2	Each	9,806.68	19,613
Chilled Water Pump	2	Each	14,903.71	29,807
Condenser Water Pump	2	Each	18,301.73	36,603
VFD's	6	Each	6,666.91	40,001
Exhaust Fan, Roof	8	Each	3,693.65	29,549
Duct Modifications	5,000	Lbs	7.77	38,864
Chilled Water Piping	2,500	Lnft	172.11	430,274
Chiller Water Insulation	2,500	Lnft	28.88	72,208
Heating Water Piping	2,500	Lnft	101.01	252,515
Heating Water Insulation	2,500	Lnft	23.79	59,465
Condenser Water Piping	800	Lnft	452.45	361,957
Core Drilling	864	Each	172.45	148,996
Commissioning	1	Lsum	73,329.25	73,329
Test & Balance Systems	1	Lsum	59,465.33	59,465
Water Treatment	1	Lsum	20,592.00	20,592
Demolition, Piping	13,200	Lnft	18.86	248,939
Demolition, Equipment	1	Lsum	40,266.53	40,267
Controls	1,000	Pts	1,274.26	1,274,257
Total HVAC Systems				**4,097,816**

DRAFT

Electrical Systems			GSF:	376,500
Refeed Main HVAC Equip	376,500	SF	0.22	82,010
Replace Exist SES	376,500	SF	0.65	246,030
Replace Exist Panels	376,500	SF	0.94	355,376
Replace Exist Special Sys Frt End	376,500	SF	0.51	191,356
Total Electrical Systems				**874,772**

Roofing	Unit GSF:	19,421	GSF:	376,500
TPO Roofing	19,421	SF	29.04	564,042
Flashing	1,374	LF	21.78	29,929
Total Roofing				**593,971**

DRAFT



[Basis of Design]

The primary objective of the renovation is to create a safe and efficient facility for the long term use of the Housing and Community Development Staff, Residents, and Visitors. The building provides various office spaces, community rooms, storage areas, mechanical spaces and dwelling units as shown in the plans.

Public Housing facilities face different challenges than most typical building types, because of intense use and potential for high abuse. In one year a public housing facility will receive 2 times as much wear as a comparable private commercial facility. In addition, due to constraints on staffs time to clean and maintain the facility, finishes and materials should be selected for their longevity, abuse resistance, and ease of maintenance. These decisions alone can save thousands of dollars a year in staff resource if implemented correctly.

As was noted, Public Housing are complex project that require special consideration in order to properly support the staff. Other criteria to consider as the project develops are as follows:

This Building Basis of Design is written to provide an overview of the proposed building systems and construction techniques outlining the exterior envelope, interior partition assemblies, ceiling systems, finishes materials, casework systems, built-in equipment and miscellaneous specialty items.

Exterior Systems

Given the age of the facility, the overall envelope is in fair to good condition. Due to the age of the glazing units we are recommending that all of the windows be replaced with new storefront systems with insulated glazing. The stucco infill added at the dwelling units in the 1997 renovation is in good condition and should be maintained. It is the users intent to be able to use the 17th floor, this space still has the original non tempered single glazed aluminum windows, all of these units will need to be replaced as well.

Interior Systems

Due to the nature of the facility, different areas will require very different types of interior finishes to meet the program and perform as expected. Typically, the interior walls for the office areas should be constructed of one layer of gypsum wallboard on both sides of a metal stud. Interior walls in rooms associated with water or moisture should be constructed of moisture resistant gypsum wallboard “blue-board”, covered with fiber reinforced plastic panels or ceramic tiles with grout. Typically, for all areas used by the public, a semi-gloss, light colored, scrubbable, low VOC (volatile organic compound) latex paint will be used to finish walls. In the mechanical and high abuse areas, walls should consist of masonry to a minimum height of 8’ with metal stud construction above (masonry to roof deck in detention areas). A high durable, water based, low VOC epoxy paint will be used. Corner guards will be installed on all exterior corners in main traffic ways and as deemed appropriate throughout the facility. All major interior circulation paths would have abuse resistant wall treatments such plastic laminate panels, these will serve to minimize the wear and tear that a typical public housing facility will experience over its service life.

New Non-rated Interior Partitions:

- TYPICAL WALLS OFFICE AREAS: Gypsum board on metal stud (22 ga). Gypsum board shall extend above the ceiling system. Provide metal strapping or wood blocking at wall mounted items; provide above ceiling wall-kickers as necessary.

DRAFT

- TYPICAL MECHANICAL AND STORAGE AREA: 8" CMU to a minimum height of 8', Gypsum board on metal stud (22 ga) above. Gypsum board shall extend above the ceiling system. Provide metal strapping or wood blocking at wall mounted items; provide above ceiling wall-kickers as necessary.
- PERIMETER & PLUMBING WALLS: Gypsum board on metal stud (22 ga) Gypsum board shall be full height to underside of deck. Provide metal strapping or wood blocking at wall mounted items; provide above ceiling wall-kickers as necessary.
- PLUMBING / WET WALLS: Moisture resistant gypsum board on metal stud (22 ga). Provide cementitious backer board at tile locations.
- ACOUSTICAL INSULATION: Fiberglass or mineral wool unfaced batt insulation to be installed at all equipment rooms, mechanical shafts and perimeter walls that separate corridors, office areas and interview areas. Insulation criteria to be as required for acoustical/fire rated listing; provide acoustical sealant at all joints.

Rated Interior Partitions:

- TYPICAL RATED WALLS: Gypsum board (type 'X' with fire rated core) on both sides of metal stud (22 ga) for 1 hr; 2 layers each side for 2 hr. Provide fire track runner at head with multiple layers of type 'X' closure.
- RATED CMU WALLS: Concrete Masonry Unit to be UL listed for the 1 or 2 hr fire rating required.
- SHAFTWALLS 1 or 2 hr shaft wall shall be UL listed gypsum board cavity shaft wall assembly with C-H studs.

Wall Protection for High-Abuse Areas:

Main circulation corridors:

- Durable wainscot facing material with trim cap to protect the walls, or
- High-impact or abuse-resistant gypsum wall panels with a reinforced troweled epoxy finish, or
- Stainless steel wall guards with full-height corner guards at all exterior corners.

Ceiling Systems:

The ceiling system should consist of acoustical lay-in panels supported by a metal suspension grid.

- TYPICAL OFFICE AND OFFICE SUPPORT AREAS: Suspended intermediate duty white aluminum metal ceiling grid with Acoustic Ceiling Panels
- TYPICAL WET & SECURED AREAS: Gypsum board panels suspended from deck above or installed over supplemental metal framing that is deemed appropriate for the application. All gypsum board joints to butt & be sealed.

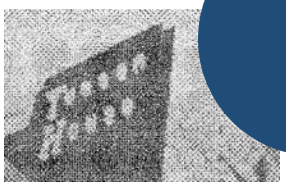
Interior Openings

Doors:

Typical the existing hollow metal or solid wood doors with hollow metal frames should be remain throughout the facility, with heavy duty doors in the high abuse areas. Automatic doors will be installed at the public entrance to the building and into the public restrooms. High traffic doors will have stainless steel armor plates and door jamb guards; others will have mop or kick plates as appropriate to the function. Accessible doorways and door clearances shall be provided throughout the facility.

Where new doors are to be provided, the following should be used

DRAFT



- Office doors are solid core wood in a welded steel frame with either half or full vision panels of tempered glass.
- Storage, restroom and other interior service doors are flush panel solid core wood.
- Security & High-abuse doors are steel in a welded steel frame.
- Wet areas to have galvanized steel doors in a welded galvanized steel frame or stainless steel doors in a welded stainless steel frame.
- Fire rated doors and frames will be labeled for the fire rating required.
- Steel Overhead Coiling doors are painted steel over coiling panels; all doors shall be powered and insulated.

Windows:

Tempered or safety glass will be installed in frames to match the same profile as the doors. . Interior windows would be hollow metal, exterior windows should be a thermally broken storefront system with 1" insulated glazing.
All public service windows will be fitted with level 3 bullet resistant glazing.

Interior Finishes

The interior materials should be durable and of a quality equal to those of the exterior. Durability and functionality is essential.

Floor:

Floor finishes will vary based on specialized functions; for example, the office areas should be a commercial grade carpet tile while the utilitarian areas (garage, mechanical) will have sealed concrete.

- CERAMIC TILE to be provided in restroom rooms to have tile on floor and full height on all walls.
- CARPET TILE: to be provided in all office areas
- HEAVY DUTY CARPET: in public waiting area and lounge
- LVT: in all corridors and elevator lobby
- VCT in all dwelling units and community spaces not in the basement
- Sealed concrete to be provided in all mechanical, storage, shop, warehouse, and other spaces as appropriate on the basement level only

Painting:

All exposed construction (including gypsum board) without a finish face within view shall be painted.

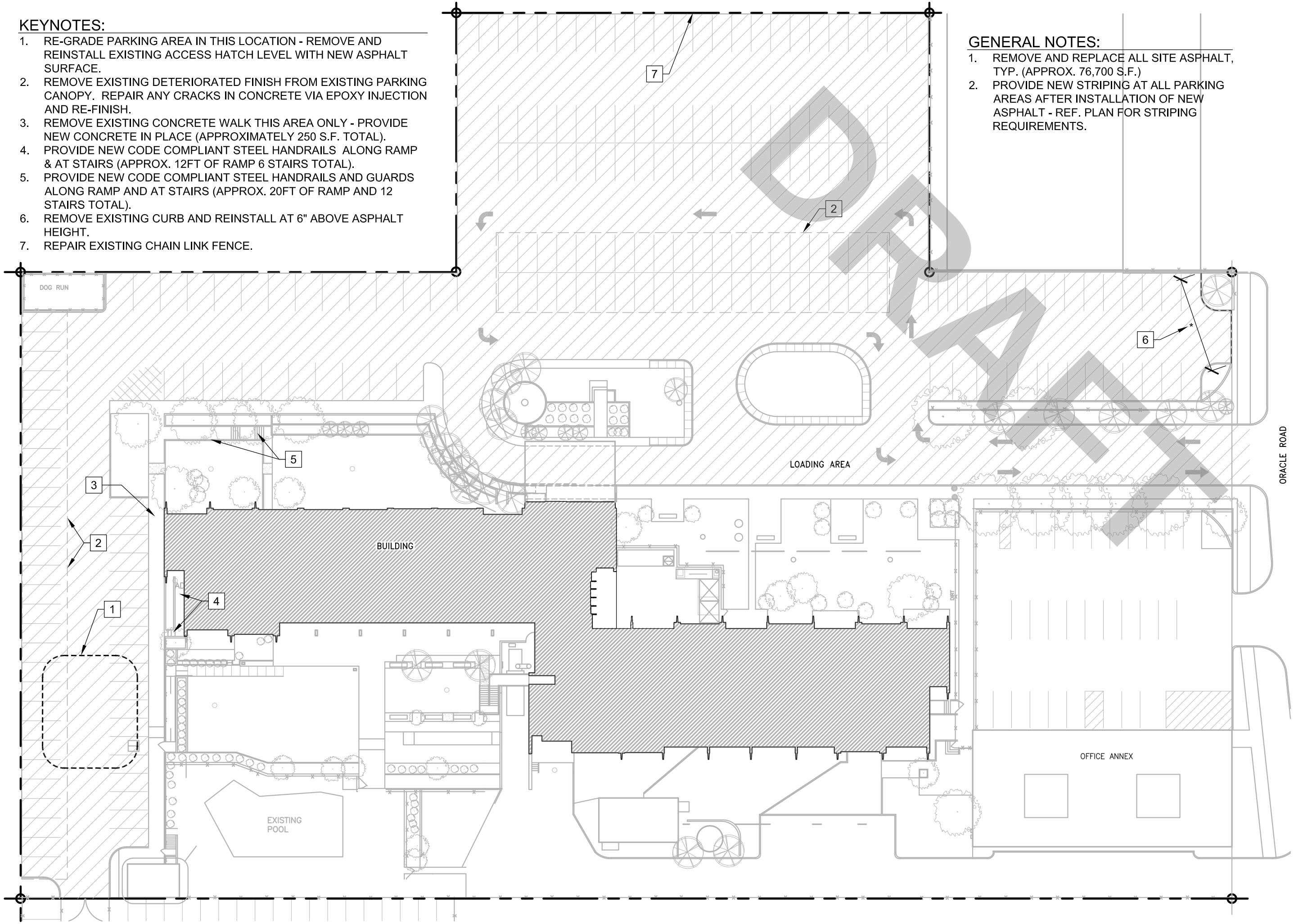
DRAFT

KEYNOTES:

1. RE-GRADE PARKING AREA IN THIS LOCATION - REMOVE AND REINSTALL EXISTING ACCESS HATCH LEVEL WITH NEW ASPHALT SURFACE.
2. REMOVE EXISTING DETERIORATED FINISH FROM EXISTING PARKING CANOPY. REPAIR ANY CRACKS IN CONCRETE VIA EPOXY INJECTION AND RE-FINISH.
3. REMOVE EXISTING CONCRETE WALK THIS AREA ONLY - PROVIDE NEW CONCRETE IN PLACE (APPROXIMATELY 250 S.F. TOTAL).
4. PROVIDE NEW CODE COMPLIANT STEEL HANDRAILS ALONG RAMP & AT STAIRS (APPROX. 12FT OF RAMP 6 STAIRS TOTAL).
5. PROVIDE NEW CODE COMPLIANT STEEL HANDRAILS AND GUARDS ALONG RAMP AND AT STAIRS (APPROX. 20FT OF RAMP AND 12 STAIRS TOTAL).
6. REMOVE EXISTING CURB AND REINSTALL AT 6" ABOVE ASPHALT HEIGHT.
7. REPAIR EXISTING CHAIN LINK FENCE.

GENERAL NOTES:

1. REMOVE AND REPLACE ALL SITE ASPHALT, TYP. (APPROX. 76,700 S.F.)
2. PROVIDE NEW STRIPING AT ALL PARKING AREAS AFTER INSTALLATION OF NEW ASPHALT - REF. PLAN FOR STRIPING REQUIREMENTS.



88

SITE PLAN
SCALE: 1" = 40'-0"

CITY OF TUCSON

WSM ARCHITECTS

4330 NORTH CAMPBELL AVE
SUITE NO 268
TUCSON, ARIZONA 85718

520.408.1044 TEL
520.408.1170 FAX
WSMARCH.COM WEB

COPYRIGHT BY WSM ARCHITECTS, INC. - 2016

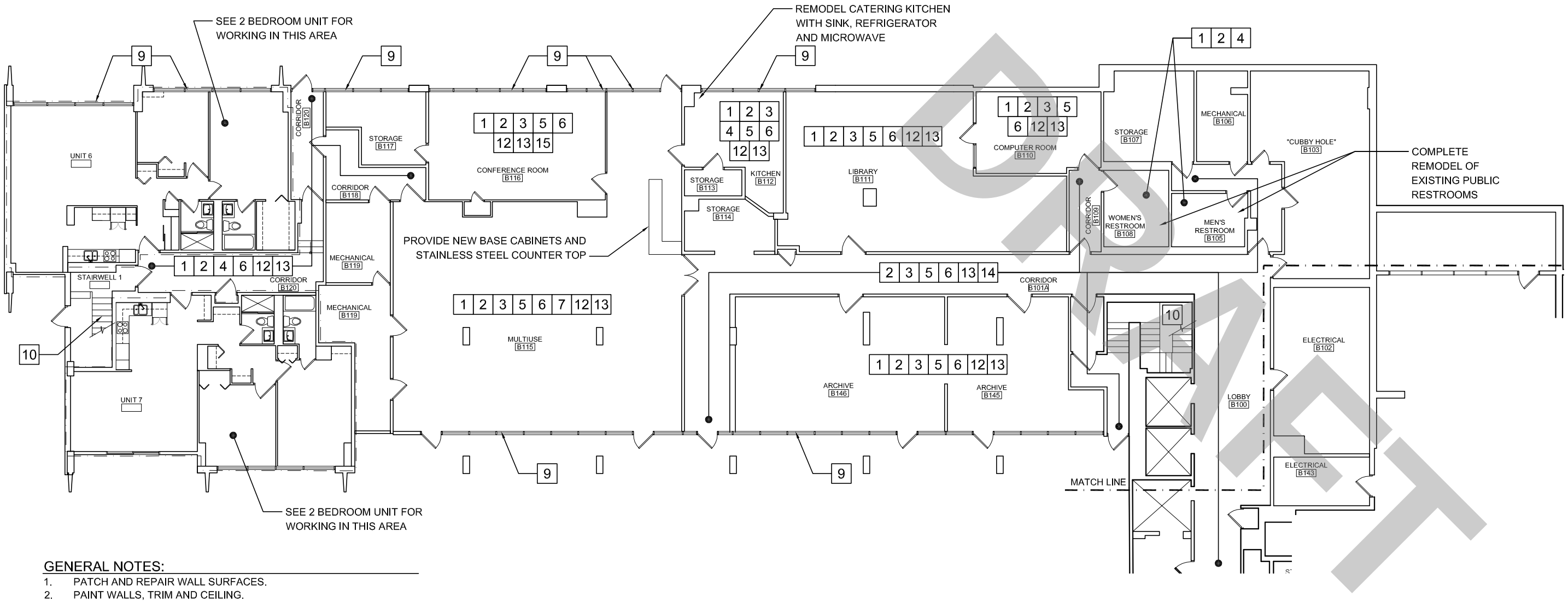
Physical Needs Assessment

Housing and Community Development

Tucson House APARTMENTS

1501 N. Oracle Road Tucson, Arizona

Project No.: 16-002
Plot Date: 1/22/2016 4:24:52 PM



GENERAL NOTES:

1. PATCH AND REPAIR WALL SURFACES.
2. PAINT WALLS, TRIM AND CEILING.
3. REPAIR WOOD BASE AND PAINT AT DWELLING UNITS.
4. PROVIDE ACCESSIBLE HARDWARE AT ALL DOORS.

KEYNOTES:

1. EXISTING VCT OR CARPET FLOORING TO BE REPLACED WITH LVT.
2. EXISTING LIGHT FIXTURES TO BE REPLACED WITH LED FIXTURES - SEE ELECTRICAL DRAWINGS.
3. PROVIDE NEW A/V FIRE ALARM DEVICES - SEE ELECTRICAL DRAWINGS.
4. ALL PLUMBING FIXTURES TO BE REPLACED IN KIND - SEE PLUMBING DRAWINGS.
5. REPLACE AND RELOCATE EXISTING RECEPTACLES. INSTALL 18" A.F.F. - SEE ELECTRICAL.
6. EXISTING MECHANICAL EQUIPMENT TO BE REPLACED - SEE MECHANICAL.
7. PROVIDE A/V SYSTEM WITH PROJECTOR SCREEN AND PROJECTOR.
8. NEW FIRE EXTINGUISHER AND RECESSED CABINET TO BE MOUNTED AT ACCESSIBLE HEIGHT.
9. EXISTING WINDOWS TO BE REPLACED WITH NEW STOREFRONT AND 1" INSULATED GLAZING.
10. NEW GUARD AND HANDRAILS TO BE PROVIDED. GUARD TO BE 2x2 TUBE STEEL WITH RESIN PANELS. HANDRAIL TO BE BOTH SIDES OF STAIRS. EPOXY PAINT AT STAIR TREADS AND LANDING.
11. REMOVE EXISTING ROOFING AND PROVIDE 3-PLY SBS MODIFIED ROOFING SYSTEM WITH WHITE CAP SHEET.
12. NEW ACT CEILING AND GRID.
13. REPLACE RUBBER BASE
14. GRIND AND SEAL EXISTING CONCRETE FLOOR.
15. PROVIDE NEW A/V SYSTEM WITH 50" PANEL TV AND CONNECTIVITY TO CONFERENCE TABLE.
16. REMOVE EXISTING ROOFING AND PROVIDE 3-PLY SBS MODIFIED ROOFING SYSTEM WITH WHITE CAP SHEET.

FLOOR AREA:	ENTIRE BASEMENT	
FLOOR AREA:	±23,215	S.F.
CORRIDOR AREA:	±2,836	S.F.
COMMON AREA:	±17,056	S.F.
STUDIO AREA:	N/A	S.F.
ONE BEDROOM AREA:	N/A	S.F.
TWO BEDROOM AREA:	±1,959	S.F.

CITY OF TUCSON
WSM ARCHITECTS
4330 NORTH CAMPBELL AVE
SUITE NO 268
TUCSON, ARIZONA 85718
520.408.1044 TEL
520.408.1170 FAX
WSMARCH.COM WEB
COPYRIGHT © WSM ARCHITECTS, INC - 2016

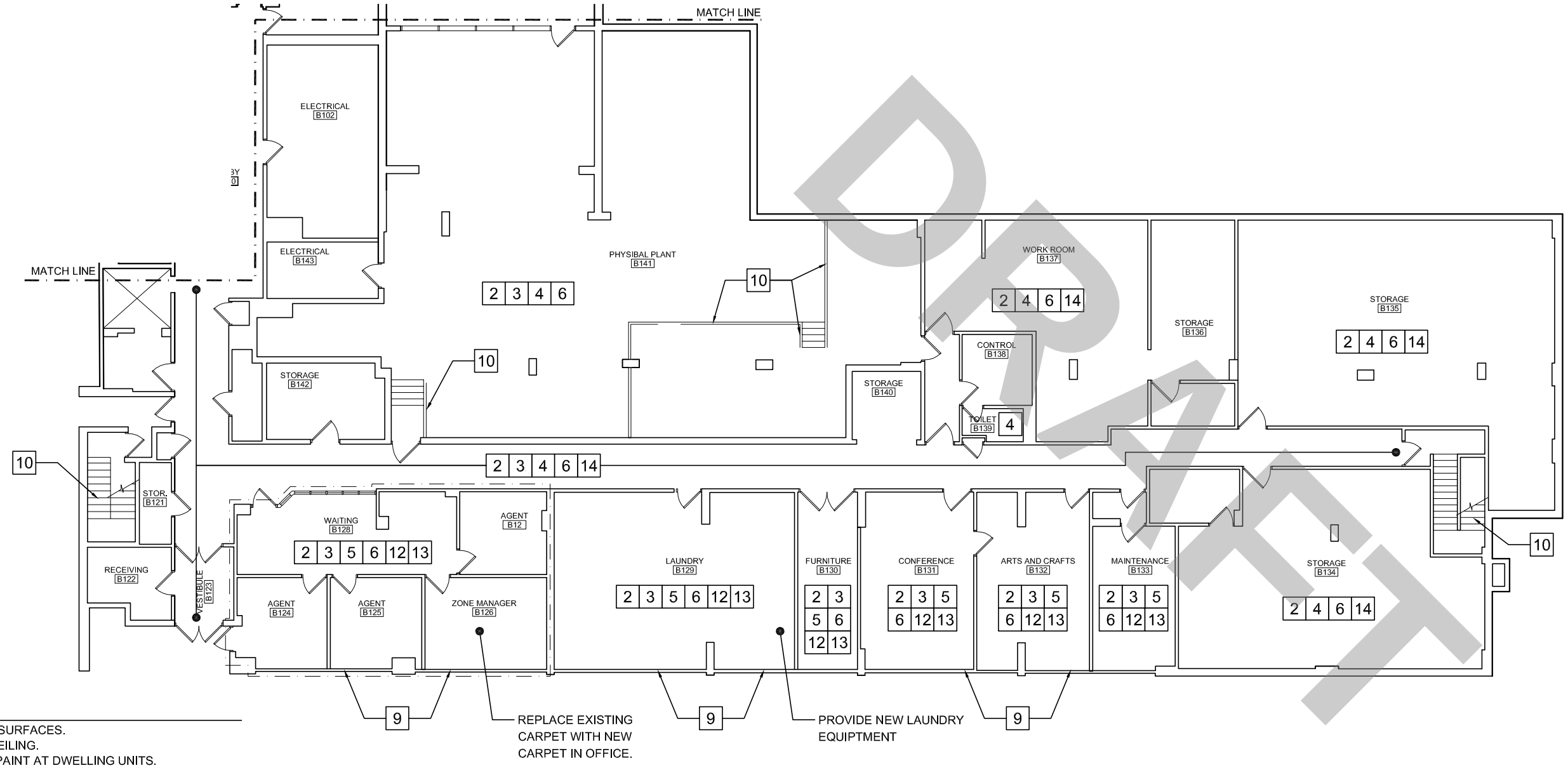
FLOOR PLAN [BASEMENT]
SCALE: 1/16" = 1'-0"

Physical Needs Assessment
Housing and Community Development

Tucson House APARTMENTS
1501 N. Oracle Road Tucson, Arizona

N

Project No.: 16-002
Plot Date: 1/25/2016 10:05:24 AM



DRAFT

GENERAL NOTES:

1. PATCH AND REPAIR WALL SURFACES.
2. PAINT WALLS, TRIM AND CEILING.
3. REPAIR WOOD BASE AND PAINT AT DWELLING UNITS.
4. PROVIDE ACCESSIBLE HARDWARE AT ALL DOORS.

KEYNOTES:

1. EXISTING VCT OR CARPET FLOORING TO BE REPLACED WITH LVT.
2. EXISTING LIGHT FIXTURES TO BE REPLACED WITH LED FIXTURES - SEE ELECTRICAL DRAWINGS.
3. PROVIDE NEW A/V FIRE ALARM DEVICES - SEE ELECTRICAL DRAWINGS.
4. ALL PLUMBING FIXTURES TO BE REPLACED IN KIND - SEE PLUMBING DRAWINGS.
5. REPLACE AND RELOCATE EXISTING RECEPTACLES. INSTALL 18" A.F.F. - SEE ELECTRICAL.
6. EXISTING MECHANICAL EQUIPMENT TO BE REPLACED - SEE MECHANICAL.
7. PROVIDE A/V SYSTEM WITH PROJECTOR SCREEN AND PROJECTOR.
8. NEW FIRE EXTINGUISHER AND RECESSED CABINET TO BE MOUNTED AT ACCESSIBLE HEIGHT.
9. EXISTING WINDOWS TO BE REPLACED WITH NEW STOREFRONT AND 1" INSULATED GLAZING.
10. NEW GUARD AND HANDRAILS TO BE PROVIDED. GUARD TO BE 2x2 TUBE STEEL WITH RESIN PANELS. HANDRAIL TO BE BOTH SIDES OF STAIRS. EPOXY PAINT AT STAIR TREADS AND LANDING.
11. REMOVE EXISTING ROOFING AND PROVIDE 3-PLY SBS MODIFIED ROOFING SYSTEM WITH WHITE CAP SHEET.
12. NEW ACT CEILING AND GRID.
13. REPLACE RUBBER BASE
14. GRIND AND SEAL EXISTING CONCRETE FLOOR.
15. PROVIDE NEW A/V SYSTEM WITH 50" PANEL TV AND CONNECTIVITY TO CONFERENCE TABLE.
16. REMOVE EXISTING ROOFING AND PROVIDE 3-PLY SBS MODIFIED ROOFING SYSTEM WITH WHITE CAP SHEET.

FLOOR AREA: ENTIRE BASEMENT

FLOOR AREA:	±23,215	S.F.
CORRIDOR AREA:	±2,836	S.F.
COMMON AREA:	±17,056	S.F.
STUDIO AREA:	N/A	S.F.
ONE BEDROOM AREA:	N/A	S.F.
TWO BEDROOM AREA:	±1,959	S.F.

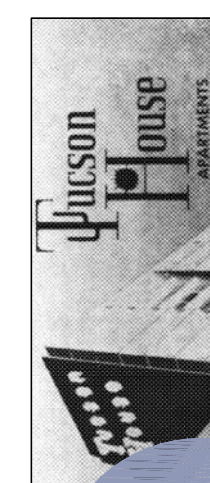
CITY OF TUCSON
WSM ARCHITECTS
4330 NORTH CAMPBELL AVE
SUITE NO 268
TUCSON, ARIZONA 85718
520.408.1044 TEL
520.408.1170 FAX
WSMARCH.COM WEB

COPYRIGHT © WSM ARCHITECTS, INC - 2016

FLOOR PLAN [BASEMENT]
SCALE: 1/16" = 1'-0"

Physical Needs Assessment

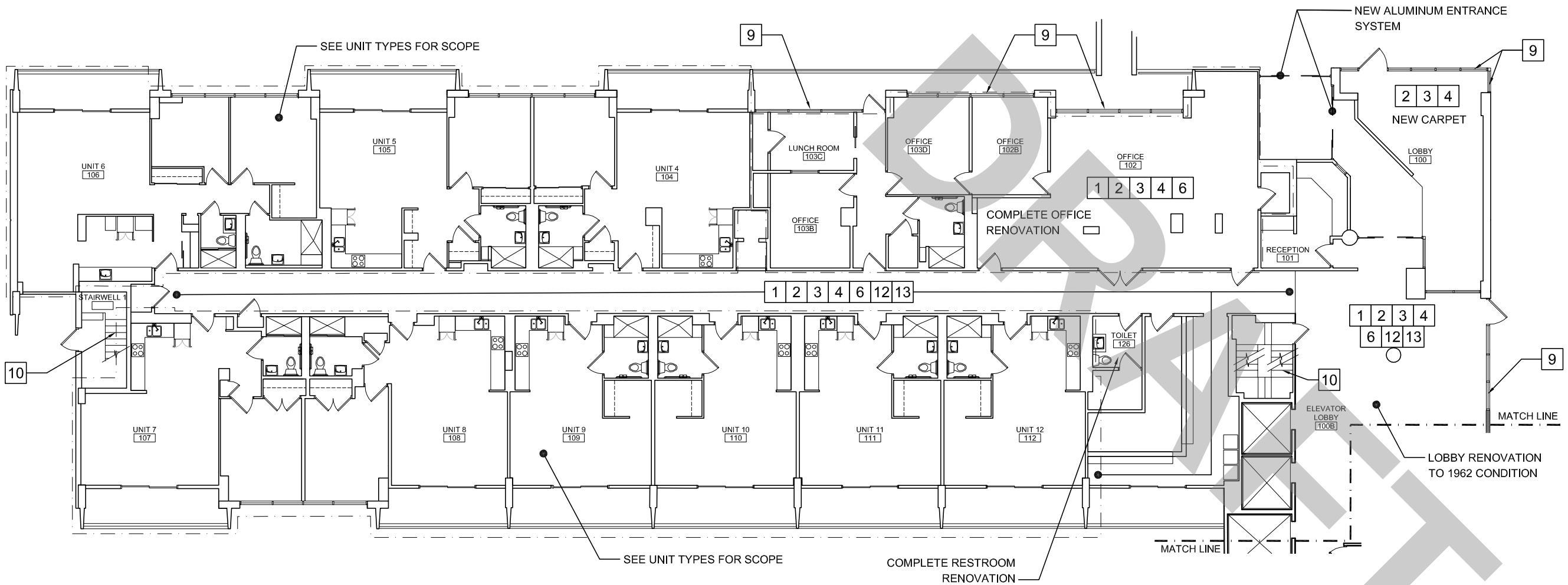
Housing and Community Development



1501 N. Oracle Road Tucson, Arizona

N

Project No.: 16-002
Plot Date: 1/25/2016 10:05:48 AM



DRAFT

GENERAL NOTES:

1. PATCH AND REPAIR WALL SURFACES.
2. PAINT WALLS, TRIM AND CEILING.
3. REPAIR WOOD BASE AND PAINT AT DWELLING UNITS.
4. PROVIDE ACCESSIBLE HARDWARE AT ALL DOORS.

KEYNOTES:

1. EXISTING VCT OR CARPET FLOORING TO BE REPLACED WITH LVT.
2. EXISTING LIGHT FIXTURES TO BE REPLACED WITH LED FIXTURES - SEE ELECTRICAL DRAWINGS.
3. PROVIDE NEW A/V FIRE ALARM DEVICES - SEE ELECTRICAL DRAWINGS.
4. ALL PLUMBING FIXTURES TO BE REPLACED IN KIND - SEE PLUMBING DRAWINGS.
5. REPLACE AND RELOCATE EXISTING RECEPTACLES. INSTALL 18" A.F.F. - SEE ELECTRICAL.
6. EXISTING MECHANICAL EQUIPMENT TO BE REPLACED - SEE MECHANICAL.
7. PROVIDE A/V SYSTEM WITH PROJECTOR SCREEN AND PROJECTOR.
8. NEW FIRE EXTINGUISHER AND RECESSED CABINET TO BE MOUNTED AT ACCESSIBLE HEIGHT.
9. EXISTING WINDOWS TO BE REPLACED WITH NEW STOREFRONT AND 1" INSULATED GLAZING.
10. NEW GUARD AND HANDRAILS TO BE PROVIDED. GUARD TO BE 2x2 TUBE STEEL WITH RESIN PANELS. HANDRAIL TO BE BOTH SIDES OF STAIRS. EPOXY PAINT AT STAIR TREADS AND LANDING.
11. REMOVE EXISTING ROOFING AND PROVIDE 3-PLY SBS MODIFIED ROOFING SYSTEM WITH WHITE CAP SHEET.
12. NEW ACT CEILING AND GRID.
13. REPLACE RUBBER BASE
14. GRIND AND SEAL EXISTING CONCRETE FLOOR.
15. PROVIDE NEW A/V SYSTEM WITH 50" PANEL TV AND CONNECTIVITY TO CONFERENCE TABLE.
16. REMOVE EXISTING ROOFING AND PROVIDE 3-PLY SBS MODIFIED ROOFING SYSTEM WITH WHITE CAP SHEET.

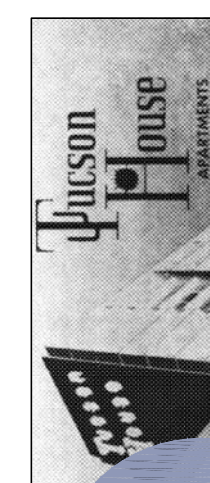
FLOOR AREA:	ENTIRE FIRST FLOOR	
FLOOR AREA:	±20,816	S.F.
CORRIDOR AREA:	±2626	S.F.
STUDIO AREA:	±5,318	S.F.
ONE BEDROOM AREA:	±8,413	S.F.
TWO BEDROOM AREA:	±3,159	S.F.

CITY OF TUCSON
WSM ARCHITECTS
4330 NORTH CAMPBELL AVE
SUITE NO 268
TUCSON, ARIZONA 85718
520.408.1044 TEL
520.408.1170 FAX
WSMARCH.COM WEB

COPYRIGHT © WSM ARCHITECTS, INC - 2016

FLOOR PLAN [FIRST]
SCALE: 1/16" = 1'-0"

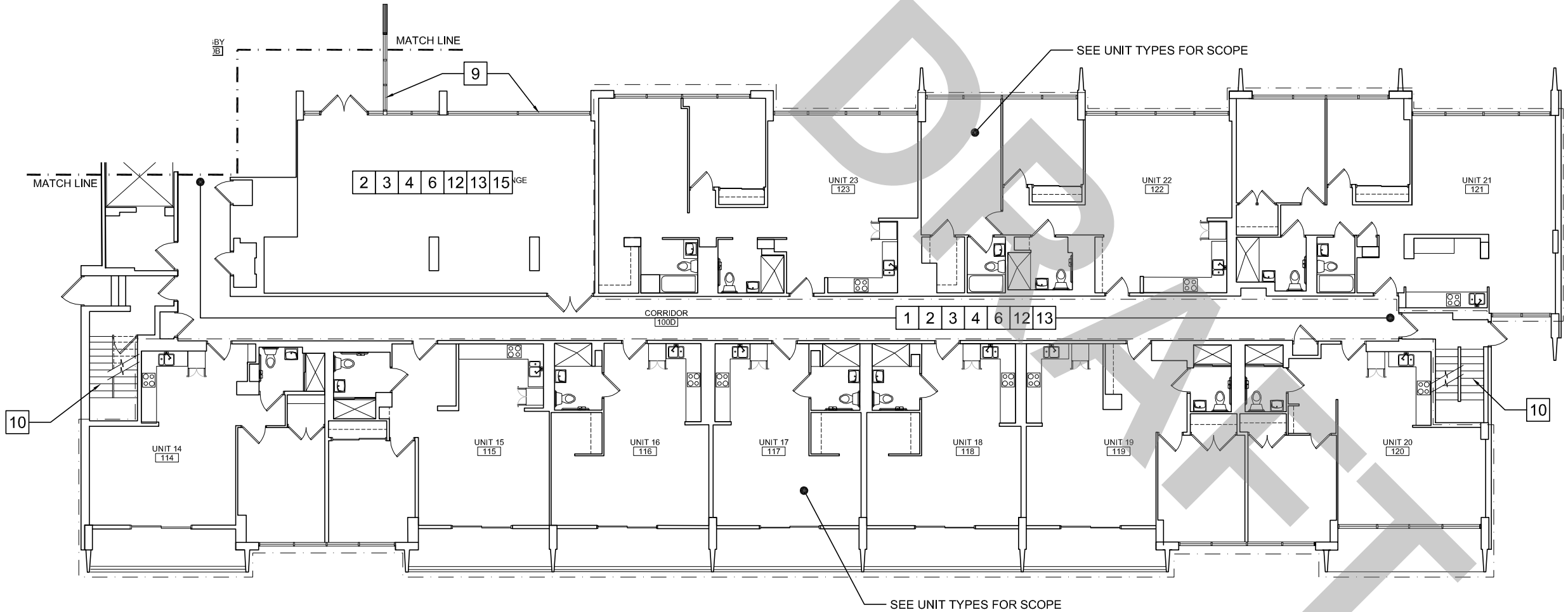
Physical Needs Assessment
Housing and Community Development



1501 N. Oracle Road Tucson, Arizona

N

Project No.: 16-002
Plot Date: 1/25/2016 10:04:03 AM



DRAFT

GENERAL NOTES:

1. PATCH AND REPAIR WALL SURFACES.
2. PAINT WALLS, TRIM AND CEILING.
3. REPAIR WOOD BASE AND PAINT AT DWELLING UNITS.
4. PROVIDE ACCESSIBLE HARDWARE AT ALL DOORS.

KEYNOTES:

1. EXISTING VCT OR CARPET FLOORING TO BE REPLACED WITH LVT.
2. EXISTING LIGHT FIXTURES TO BE REPLACED WITH LED FIXTURES - SEE ELECTRICAL DRAWINGS.
3. PROVIDE NEW A/V FIRE ALARM DEVICES - SEE ELECTRICAL DRAWINGS.
4. ALL PLUMBING FIXTURES TO BE REPLACED IN KIND - SEE PLUMBING DRAWINGS.
5. REPLACE AND RELOCATE EXISTING RECEPTACLES. INSTALL 18" A.F.F. - SEE ELECTRICAL.
6. EXISTING MECHANICAL EQUIPMENT TO BE REPLACED - SEE MECHANICAL.
7. PROVIDE A/V SYSTEM WITH PROJECTOR SCREEN AND PROJECTOR.
8. NEW FIRE EXTINGUISHER AND RECESSED CABINET TO BE MOUNTED AT ACCESSIBLE HEIGHT.
9. EXISTING WINDOWS TO BE REPLACED WITH NEW STOREFRONT AND 1" INSULATED GLAZING.
10. NEW GUARD AND HANDRAILS TO BE PROVIDED. GUARD TO BE 2x2 TUBE STEEL WITH RESIN PANELS. HANDRAIL TO BE BOTH SIDES OF STAIRS. EPOXY PAINT AT STAIR TREADS AND LANDING.
11. REMOVE EXISTING ROOFING AND PROVIDE 3-PLY SBS MODIFIED ROOFING SYSTEM WITH WHITE CAP SHEET.
12. NEW ACT CEILING AND GRID.
13. REPLACE RUBBER BASE
14. GRIND AND SEAL EXISTING CONCRETE FLOOR.
15. PROVIDE NEW A/V SYSTEM WITH 50" PANEL TV AND CONNECTIVITY TO CONFERENCE TABLE.
16. REMOVE EXISTING ROOFING AND PROVIDE 3-PLY SBS MODIFIED ROOFING SYSTEM WITH WHITE CAP SHEET.

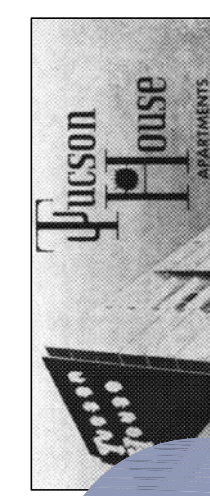
FLOOR AREA:	ENTIRE FIRST FLOOR	
FLOOR AREA:	±20,816	S.F.
CORRIDOR AREA:	±2626	S.F.
STUDIO AREA:	±5,318	S.F.
ONE BEDROOM AREA:	±8,413	S.F.
TWO BEDROOM AREA:	±3,159	S.F.

CITY OF TUCSON
WSM ARCHITECTS
4330 NORTH CAMPBELL AVE
SUITE NO 268
TUCSON, ARIZONA 85718
520.408.1044 TEL
520.408.1170 FAX
WSMARCH.COM WEB

COPYRIGHT BY WSM ARCHITECTS, INC - 2016

FLOOR PLAN [FIRST]
SCALE: 1/16" = 1'-0"

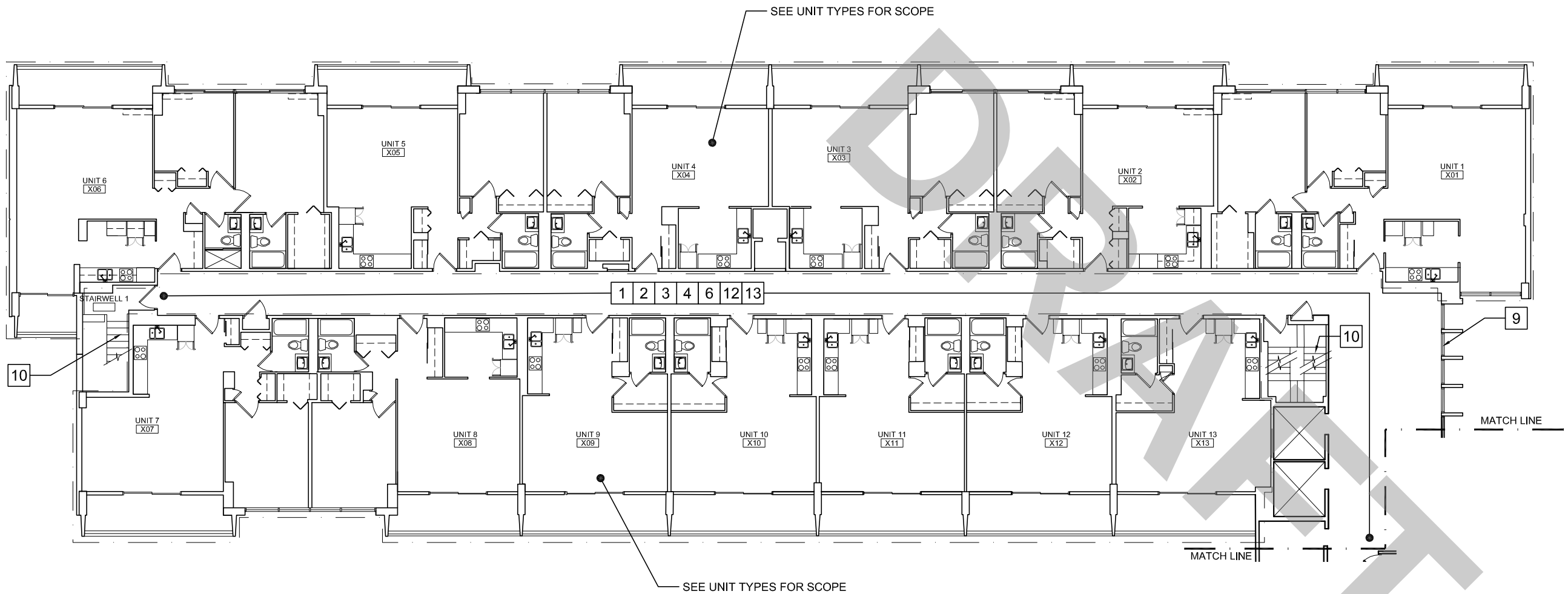
Physical Needs Assessment
Housing and Community Development



1501 N. Oracle Road Tucson, Arizona

N

Project No.: 16-002
Plot Date: 1/25/2016 10:04:30 AM



DRAFT

GENERAL NOTES:

1. PATCH AND REPAIR WALL SURFACES.
2. PAINT WALLS, TRIM AND CEILING.
3. REPAIR WOOD BASE AND PAINT AT DWELLING UNITS.
4. PROVIDE ACCESSIBLE HARDWARE AT ALL DOORS.

KEYNOTES:

1. EXISTING VCT OR CARPET FLOORING TO BE REPLACED WITH LVT.
2. EXISTING LIGHT FIXTURES TO BE REPLACED WITH LED FIXTURES - SEE ELECTRICAL DRAWINGS.
3. PROVIDE NEW A/V FIRE ALARM DEVICES - SEE ELECTRICAL DRAWINGS.
4. ALL PLUMBING FIXTURES TO BE REPLACED IN KIND - SEE PLUMBING DRAWINGS.
5. REPLACE AND RELOCATE EXISTING RECEPTACLES. INSTALL 18" A.F.F. - SEE ELECTRICAL.
6. EXISTING MECHANICAL EQUIPMENT TO BE REPLACED - SEE MECHANICAL.
7. PROVIDE A/V SYSTEM WITH PROJECTOR SCREEN AND PROJECTOR.
8. NEW FIRE EXTINGUISHER AND RECESSED CABINET TO BE MOUNTED AT ACCESSIBLE HEIGHT.
9. EXISTING WINDOWS TO BE REPLACED WITH NEW STOREFRONT AND 1" INSULATED GLAZING.
10. NEW GUARD AND HANDRAILS TO BE PROVIDED. GUARD TO BE 2x2 TUBE STEEL WITH RESIN PANELS. HANDRAIL TO BE BOTH SIDES OF STAIRS. EPOXY PAINT AT STAIR TREADS AND LANDING.
11. REMOVE EXISTING ROOFING AND PROVIDE 3-PLY SBS MODIFIED ROOFING SYSTEM WITH WHITE CAP SHEET.
12. NEW ACT CEILING AND GRID.
13. REPLACE RUBBER BASE
14. GRIND AND SEAL EXISTING CONCRETE FLOOR.
15. PROVIDE NEW A/V SYSTEM WITH 50" PANEL TV AND CONNECTIVITY TO CONFERENCE TABLE.
16. REMOVE EXISTING ROOFING AND PROVIDE 3-PLY SBS MODIFIED ROOFING SYSTEM WITH WHITE CAP SHEET.

FLOOR AREA:	ENTIRE FLOOR	
FLOOR AREA:	±20,816	S.F.
CORRIDOR AREA:	±2626	S.F.
STUDIO AREA:	±5,318	S.F.
ONE BEDROOM AREA:	±8,413	S.F.
TWO BEDROOM AREA:	±3,159	S.F.

CITY OF TUCSON

WSM ARCHITECTS

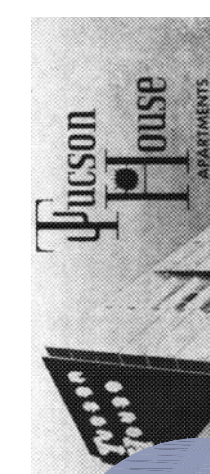
4330 NORTH CAMPBELL AVE
SUITE NO 268
TUCSON, ARIZONA 85718

520.408.1044 TEL
520.408.1170 FAX
WSMARCH.COM WEB

COPYRIGHT © WSM ARCHITECTS, INC - 2016

FLOOR PLAN [2ND - 16TH]
SCALE: 1/16" = 1'-0"

Physical Needs Assessment
Housing and Community Development

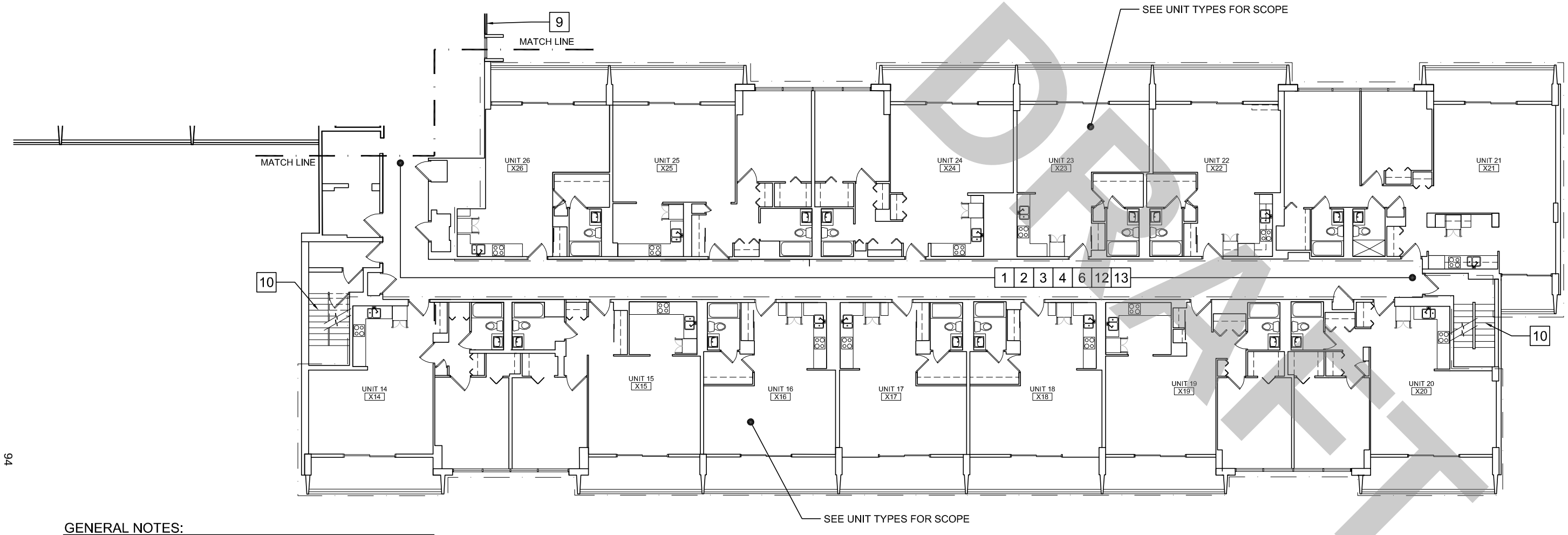


1501 N. Oracle Road Tucson, Arizona

A0.1

N

Project No.: 16-002
Plot Date: 1/25/2016 10:02:44 AM



DRAFT

GENERAL NOTES:

1. PATCH AND REPAIR WALL SURFACES.
2. PAINT WALLS, TRIM AND CEILING.
3. REPAIR WOOD BASE AND PAINT AT DWELLING UNITS.
4. PROVIDE ACCESSIBLE HARDWARE AT ALL DOORS.

KEYNOTES:

1. EXISTING VCT OR CARPET FLOORING TO BE REPLACED WITH LVT.
2. EXISTING LIGHT FIXTURES TO BE REPLACED WITH LED FIXTURES - SEE ELECTRICAL DRAWINGS.
3. PROVIDE NEW A/V FIRE ALARM DEVICES - SEE ELECTRICAL DRAWINGS.
4. ALL PLUMBING FIXTURES TO BE REPLACED IN KIND - SEE PLUMBING DRAWINGS.
5. REPLACE AND RELOCATE EXISTING RECEPTACLES. INSTALL 18" A.F.F. - SEE ELECTRICAL.
6. EXISTING MECHANICAL EQUIPMENT TO BE REPLACED - SEE MECHANICAL.
7. PROVIDE A/V SYSTEM WITH PROJECTOR SCREEN AND PROJECTOR.
8. NEW FIRE EXTINGUISHER AND RECESSED CABINET TO BE MOUNTED AT ACCESSIBLE HEIGHT.
9. EXISTING WINDOWS TO BE REPLACED WITH NEW STOREFRONT AND 1" INSULATED GLAZING.
10. NEW GUARD AND HANDRAILS TO BE PROVIDED. GUARD TO BE 2x2 TUBE STEEL WITH RESIN PANELS. HANDRAIL TO BE BOTH SIDES OF STAIRS. EPOXY PAINT AT STAIR TREADS AND LANDING.
11. REMOVE EXISTING ROOFING AND PROVIDE 3-PLY SBS MODIFIED ROOFING SYSTEM WITH WHITE CAP SHEET.
12. NEW ACT CEILING AND GRID.
13. REPLACE RUBBER BASE
14. GRIND AND SEAL EXISTING CONCRETE FLOOR.
15. PROVIDE NEW A/V SYSTEM WITH 50" PANEL TV AND CONNECTIVITY TO CONFERENCE TABLE.
16. REMOVE EXISTING ROOFING AND PROVIDE 3-PLY SBS MODIFIED ROOFING SYSTEM WITH WHITE CAP SHEET.

FLOOR AREA:	ENTIRE FLOOR	
FLOOR AREA:	±20,816	S.F.
CORRIDOR AREA:	±2626	S.F.
STUDIO AREA:	±5,318	S.F.
ONE BEDROOM AREA:	±8,413	S.F.
TWO BEDROOM AREA:	±3,159	S.F.

CITY OF TUCSON

WSM ARCHITECTS

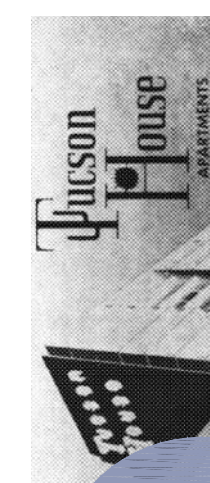
4330 NORTH CAMPBELL AVE
SUITE NO 268
TUCSON, ARIZONA 85718

520.408.1044 TEL
520.408.1170 FAX
WSMARCH.COM WEB

COPYRIGHT BY WSM ARCHITECTS, INC - 2016

FLOOR PLAN [2ND - 16TH]
SCALE: 1/16" = 1'-0"

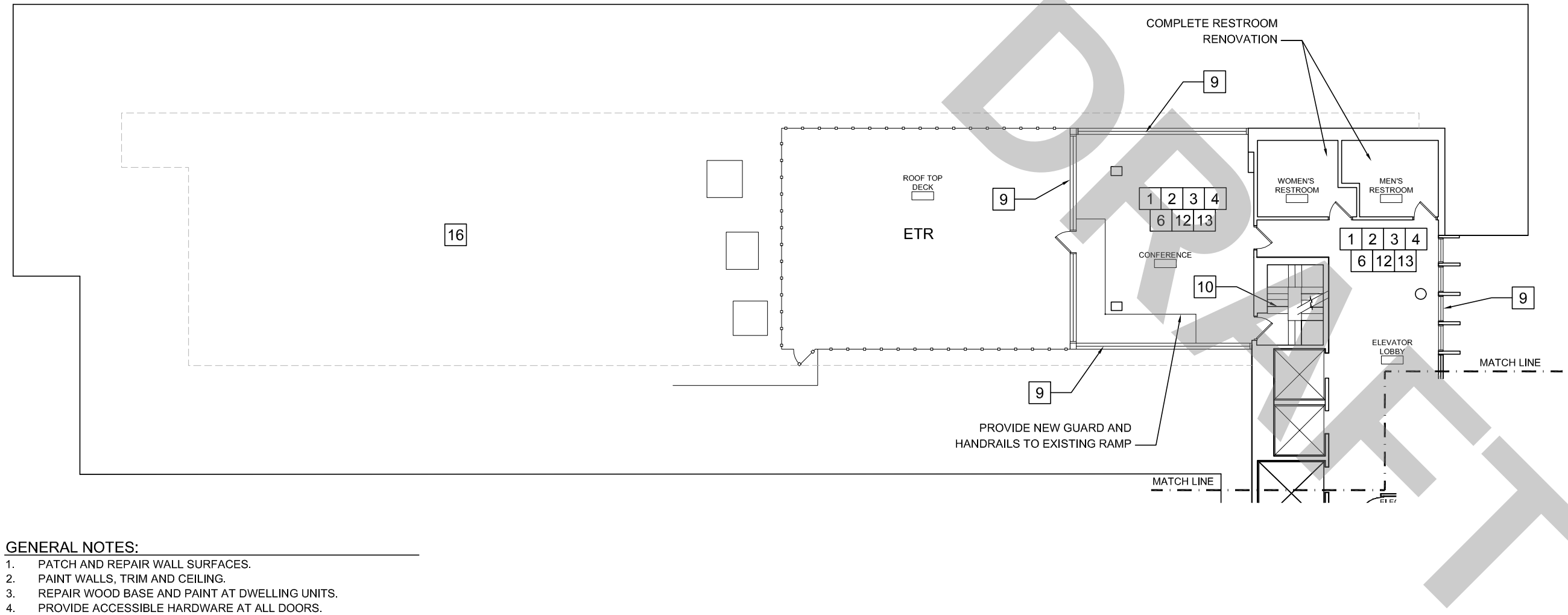
Physical Needs Assessment
Housing and Community Development



1501 N. Oracle Road Tucson, Arizona

N

Project No.: 16-002
Plot Date: 1/25/2016 10:03:00 AM



DRAFT

GENERAL NOTES:

1. PATCH AND REPAIR WALL SURFACES.
2. PAINT WALLS, TRIM AND CEILING.
3. REPAIR WOOD BASE AND PAINT AT DWELLING UNITS.
4. PROVIDE ACCESSIBLE HARDWARE AT ALL DOORS.

KEYNOTES:

1. EXISTING VCT OR CARPET FLOORING TO BE REPLACED WITH LVT.
2. EXISTING LIGHT FIXTURES TO BE REPLACED WITH LED FIXTURES - SEE ELECTRICAL DRAWINGS.
3. PROVIDE NEW A/V FIRE ALARM DEVICES - SEE ELECTRICAL DRAWINGS.
4. ALL PLUMBING FIXTURES TO BE REPLACED IN KIND - SEE PLUMBING DRAWINGS.
5. REPLACE AND RELOCATE EXISTING RECEPTACLES. INSTALL 18" A.F.F. - SEE ELECTRICAL.
6. EXISTING MECHANICAL EQUIPMENT TO BE REPLACED - SEE MECHANICAL.
7. PROVIDE A/V SYSTEM WITH PROJECTOR SCREEN AND PROJECTOR.
8. NEW FIRE EXTINGUISHER AND RECESSED CABINET TO BE MOUNTED AT ACCESSIBLE HEIGHT.
9. EXISTING WINDOWS TO BE REPLACED WITH NEW STOREFRONT AND 1" INSULATED GLAZING.
10. NEW GUARD AND HANDRAILS TO BE PROVIDED. GUARD TO BE 2x2 TUBE STEEL WITH RESIN PANELS. HANDRAIL TO BE BOTH SIDES OF STAIRS. EPOXY PAINT AT STAIR TREADS AND LANDING.
11. REMOVE EXISTING ROOFING AND PROVIDE 3-PLY SBS MODIFIED ROOFING SYSTEM WITH WHITE CAP SHEET.
12. NEW ACT CEILING AND GRID.
13. REPLACE RUBBER BASE
14. GRIND AND SEAL EXISTING CONCRETE FLOOR.
15. PROVIDE NEW A/V SYSTEM WITH 50" PANEL TV AND CONNECTIVITY TO CONFERENCE TABLE.
16. REMOVE EXISTING ROOFING AND PROVIDE 3-PLY SBS MODIFIED ROOFING SYSTEM WITH WHITE CAP SHEET.

FLOOR AREA: ENTIRE SEVENTEENTH FLOOR

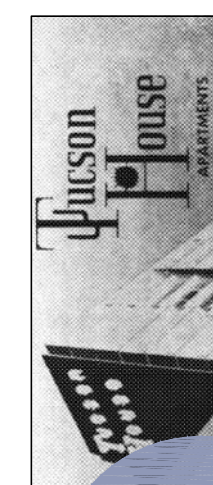
FLOOR AREA:	±5,521	S.F.
CORRIDOR AREA:	±785	S.F.
COMMON AREA:	±4,138	S.F.
STUDIO AREA:	N/A	S.F.
ONE BEDROOM AREA:	N/A	S.F.
TWO BEDROOM AREA:	N/A	S.F.

CITY OF TUCSON
WSM ARCHITECTS
4330 NORTH CAMPBELL AVE
SUITE NO 268
TUCSON, ARIZONA 85718
520.408.1044 TEL
520.408.1170 FAX
WSMARCH.COM WEB

COPYRIGHT © WSM ARCHITECTS, INC - 2016

FLOOR PLAN [SEVENTEENTH]
SCALE: 1/8" = 1'-0"

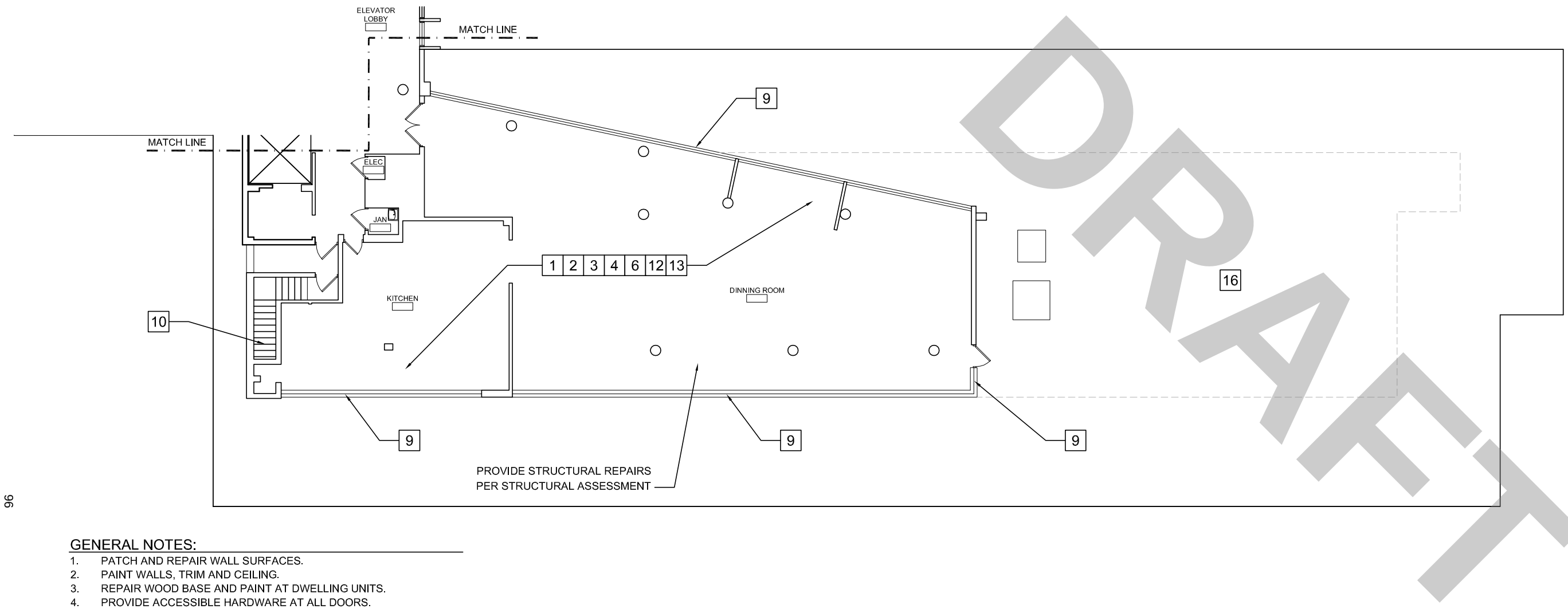
Physical Needs Assessment
Housing and Community Development



1501 N. Oracle Road Tucson, Arizona

N

Project No.: 16-002
Plot Date: 1/25/2016 10:01:25 AM



DRAFT

GENERAL NOTES:

1. PATCH AND REPAIR WALL SURFACES.
2. PAINT WALLS, TRIM AND CEILING.
3. REPAIR WOOD BASE AND PAINT AT DWELLING UNITS.
4. PROVIDE ACCESSIBLE HARDWARE AT ALL DOORS.

KEYNOTES:

1. EXISTING VCT OR CARPET FLOORING TO BE REPLACED WITH LVT.
2. EXISTING LIGHT FIXTURES TO BE REPLACED WITH LED FIXTURES - SEE ELECTRICAL DRAWINGS.
3. PROVIDE NEW A/V FIRE ALARM DEVICES - SEE ELECTRICAL DRAWINGS.
4. ALL PLUMBING FIXTURES TO BE REPLACED IN KIND - SEE PLUMBING DRAWINGS.
5. REPLACE AND RELOCATE EXISTING RECEPTACLES. INSTALL 18" A.F.F. - SEE ELECTRICAL.
6. EXISTING MECHANICAL EQUIPMENT TO BE REPLACED - SEE MECHANICAL.
7. PROVIDE A/V SYSTEM WITH PROJECTOR SCREEN AND PROJECTOR.
8. NEW FIRE EXTINGUISHER AND RECESSED CABINET TO BE MOUNTED AT ACCESSIBLE HEIGHT.
9. EXISTING WINDOWS TO BE REPLACED WITH NEW STOREFRONT AND 1" INSULATED GLAZING.
10. NEW GUARD AND HANDRAILS TO BE PROVIDED. GUARD TO BE 2x2 TUBE STEEL WITH RESIN PANELS. HANDRAIL TO BE BOTH SIDES OF STAIRS. EPOXY PAINT AT STAIR TREADS AND LANDING.
11. REMOVE EXISTING ROOFING AND PROVIDE 3-PLY SBS MODIFIED ROOFING SYSTEM WITH WHITE CAP SHEET.
12. NEW ACT CEILING AND GRID.
13. REPLACE RUBBER BASE
14. GRIND AND SEAL EXISTING CONCRETE FLOOR.
15. PROVIDE NEW A/V SYSTEM WITH 50" PANEL TV AND CONNECTIVITY TO CONFERENCE TABLE.
16. REMOVE EXISTING ROOFING AND PROVIDE 3-PLY SBS MODIFIED ROOFING SYSTEM WITH WHITE CAP SHEET.

FLOOR AREA: ENTIRE SEVENTEENTH FLOOR

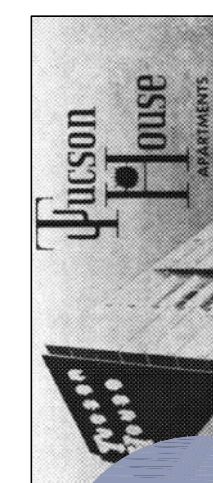
FLOOR AREA:	±5,521	S.F.
CORRIDOR AREA:	±785	S.F.
COMMON AREA:	±4,138	S.F.
STUDIO AREA:	N/A	S.F.
ONE BEDROOM AREA:	N/A	S.F.
TWO BEDROOM AREA:	N/A	S.F.

CITY OF TUCSON
WSM ARCHITECTS
4330 NORTH CAMPBELL AVE
SUITE NO 268
TUCSON, ARIZONA 85718
520.408.1044 TEL
520.408.1170 FAX
WSMARCH.COM WEB

COPYRIGHT © WSM ARCHITECTS, INC - 2016

FLOOR PLAN [SEVENTEENTH]
SCALE: 1/16" = 1'-0"

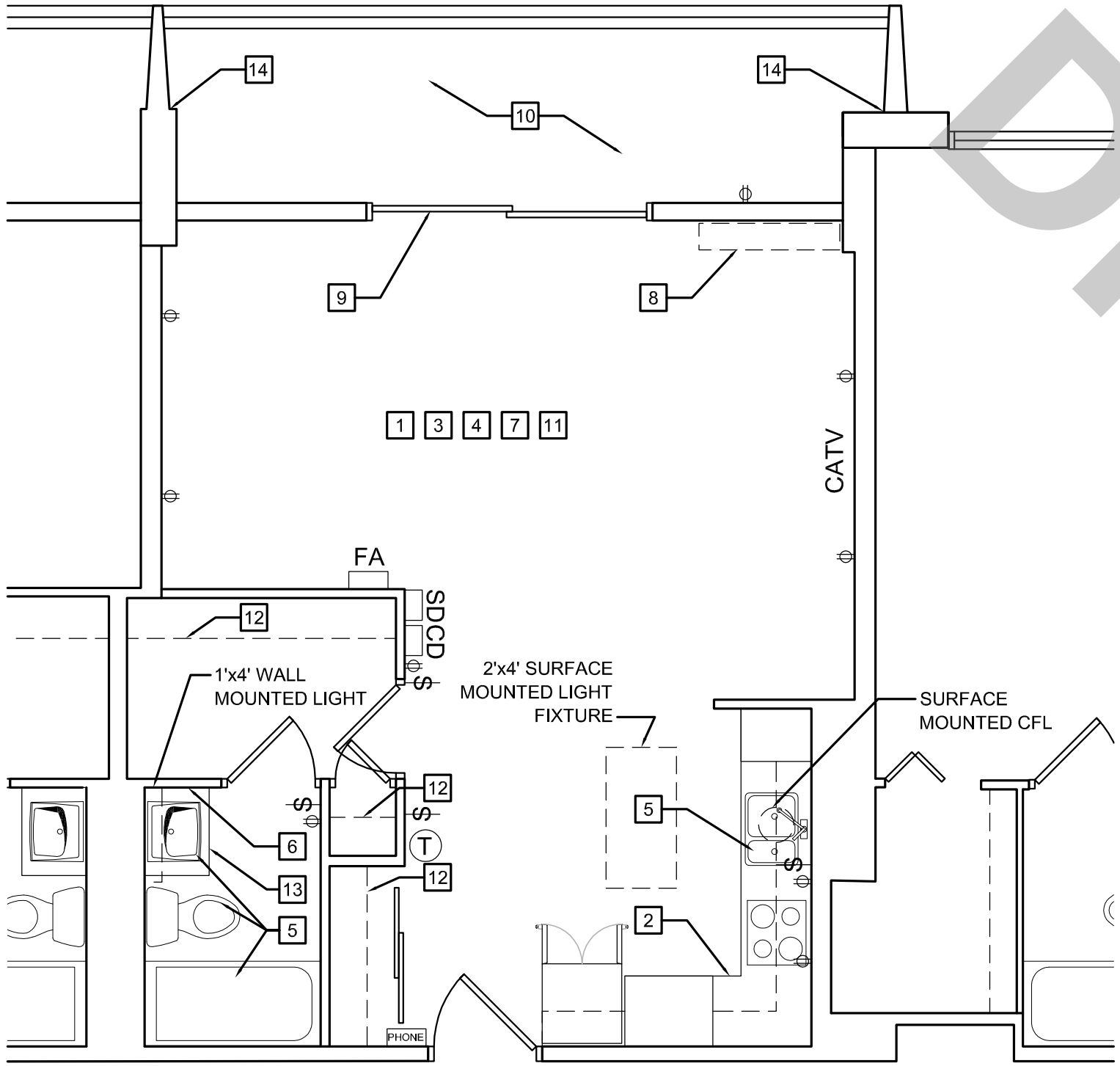
Physical Needs Assessment
Housing and Community Development



1501 N. Oracle Road Tucson, Arizona

N

Project No.: 16-002
Plot Date: 1/25/2016 10:02:01 AM



GENERAL NOTES:

1. PATCH AND REPAIR WALL SURFACES.
2. PAINT WALLS, TRIM AND CEILING.
3. REPAIR WOOD BASE AND PAINT.
4. PROVIDE NEW STOVE, OVEN AND REFRIGERATOR.
5. IN ASSESSABLE UNITS PROVIDE A/V FIRE ALARM DEVICES.

KEYNOTES:

1. EXISTING VCT FLOORING TO BE REPLACED WITH VCT.
2. EXISTING MILLWORK TO BE REPLACED WITH PREMIUM GRADE P-LAM CABINETS AND SOLID SURFACE COUNTER TOPS.
3. EXISTING LIGHT FIXTURES TO BE REPLACED WITH LED FIXTURES.
4. EXISTING SMOKE AND CARBON MONOXIDE SENSORS TO BE REPLACED. CARBON MONOXIDE SENSOR TO BE TIED INTO FIRE ALARM SYSTEM.
5. ALL PLUMBING FIXTURES TO BE REPLACED IN KIND.
6. MOVE GFCI ADJACENT TO LAVATORY AND REPLACE WITH NEW GFCI RECEPTACLE.
7. REPLACE AND RELOCATE EXISTING RECEPTACLES. INSTALL 18" A.F.F. - SEE ELECTRICAL.
8. EXISTING FAN COIL UNIT TO BE REPLACED - SEE MECHANICAL.
9. EXISTING SLIDING GLASS DOOR TO BE REPLACED WITH NEW SLIDING GLASS DOOR WITH 1" INSULATED GLAZING.
10. CRACKS IN CONCRETE TO BE INJECTED WITH EPOXY RESIN.
11. PROVIDE ACCESSIBLE HARDWARE AT ALL DOORS.
12. PROVIDE NEW SHELF AND ROD.
13. REPLACE VANITY WITH PREMIUM GRADE P-LAM CABINET AND SOLID SURFACE COUNTERTOP.
14. CRACKS IN WING WALL TO BE FILLED WITH FLEXIBLE SEALANT.

STUDIO APARTMENT (169 IN BUILDING)		
AREA:	±460	S.F.
CEILING HEIGHT:	8'-0"	AFF
VCT AREA:	±413	S.F.
RESTROOM FLOOR AREA:	±36	S.F.
WALL LENGTH:	±160	L.F.
LOWER CABINETS:	±7	L.F.
UPPER CABINETS:	±10	L.F.
PANTRY	±1.5	L.F.
OVEN:	30"	
VANITY:	2.5	L.F.

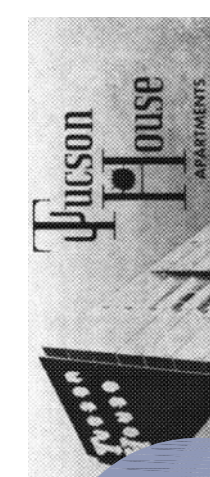
DRAFT

CITY OF TUCSON
WSM ARCHITECTS
4330 NORTH CAMPBELL AVE
SUITE NO 268
TUCSON, ARIZONA 85718
520.408.1044 TEL
520.408.1170 FAX
WSMARCH.COM WEB

COPYRIGHT © WSM ARCHITECTS, INC - 2016

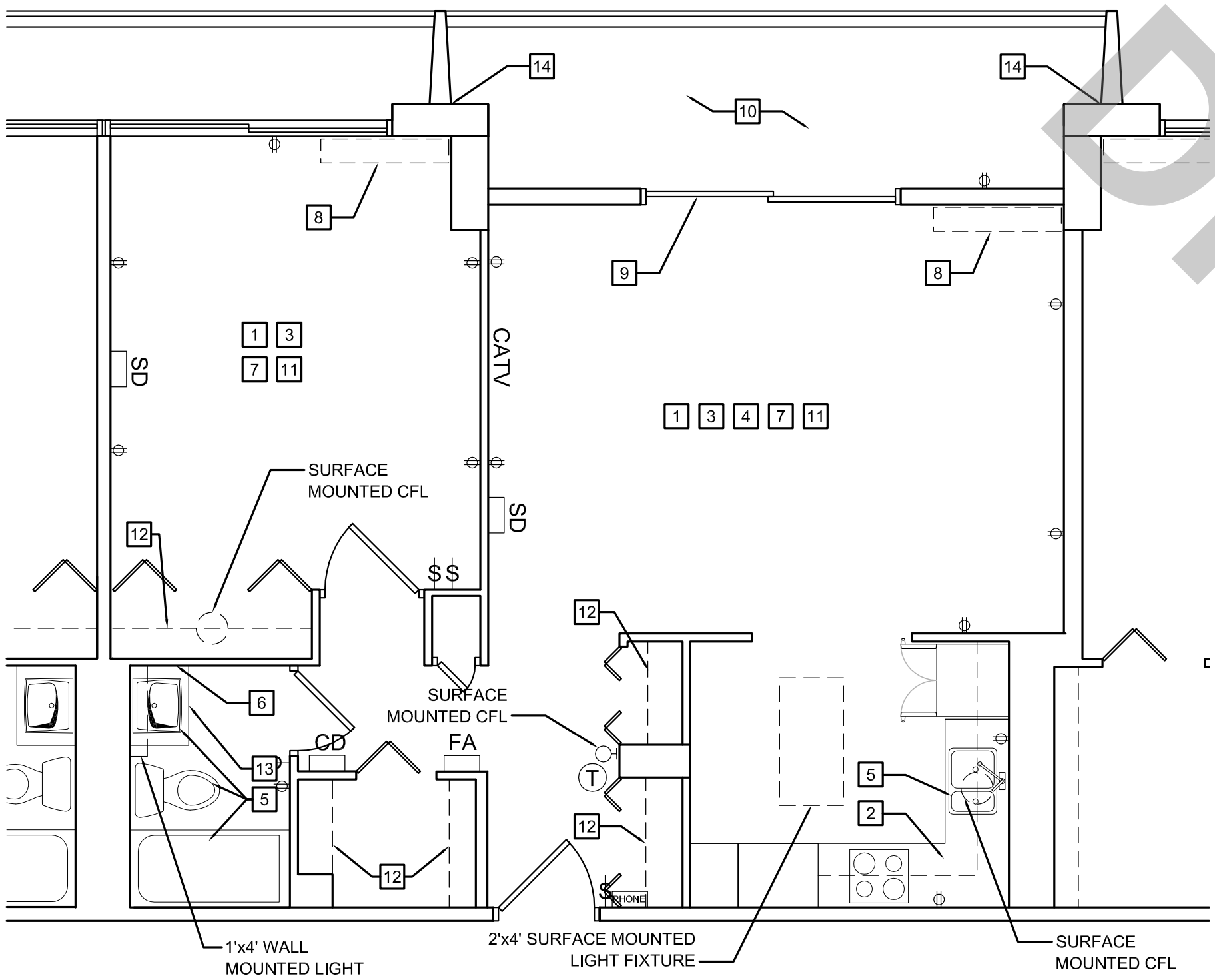
FLOOR PLAN [STUDIO]
SCALE: 3/16" = 1'-0"

Physical Needs Assessment
Housing and Community Development



1501 N. Oracle Road Tucson, Arizona

Project No.: 16-002
Plot Date: 1/25/2016 10:42:27 AM



GENERAL NOTES:

1. PATCH AND REPAIR WALL SURFACES.
2. PAINT WALLS, TRIM AND CEILING.
3. REPAIR WOOD BASE AND PAINT.
4. PROVIDE NEW STOVE, OVEN AND REFRIGERATOR.
5. IN ASSESSABLE UNITS PROVIDE A/V FIRE ALARM DEVICES.

KEYNOTES:

1. EXISTING VCT FLOORING TO BE REPLACED WITH VCT.
2. EXISTING MILLWORK TO BE REPLACED WITH PREMIUM GRADE P-LAM CABINETS AND SOLID SURFACE COUNTER TOPS.
3. EXISTING LIGHT FIXTURES TO BE REPLACED WITH LED FIXTURES.
4. EXISTING SMOKE AND CARBON MONOXIDE SENSORS TO BE REPLACED. CARBON MONOXIDE SENSOR TO BE TIED INTO FIRE ALARM SYSTEM.
5. ALL PLUMBING FIXTURES TO BE REPLACED IN KIND.
6. MOVE GFCI ADJACENT TO LAVATORY AND REPLACE WITH NEW GFCI RECEPTACLE.
7. REPLACE AND RELOCATE EXISTING RECEPTACLES. INSTALL 18" A.F.F. - SEE ELECTRICAL.
8. EXISTING FAN COIL UNIT TO BE REPLACED - SEE MECHANICAL.
9. EXISTING SLIDING GLASS DOOR TO BE REPLACED WITH NEW SLIDING GLASS DOOR WITH 1" INSULATED GLAZING.
10. CRACKS IN CONCRETE TO BE INJECTED WITH EPOXY RESIN.
11. PROVIDE ACCESSIBLE HARDWARE AT ALL DOORS.
12. PROVIDE NEW SHELF AND ROD.
13. REPLACE VANITY WITH PREMIUM GRADE P-LAM CABINET AND SOLID SURFACE COUNTERTOP.
14. CRACKS IN WING WALL TO BE FILLED WITH FLEXIBLE SEALANT.

ONE BEDROOM APARTMENT (183 IN BUILDING)		
FLOOR AREA:	±658	S.F.
CEILING HEIGHT:	8'-0"	AFF
VCT AREA:	±605	S.F.
RESTROOM FLOOR AREA:	±37	S.F.
WALL LENGTH:	±230	L.F.
LOWER CABINETS:	±8	L.F.
UPPER CABINETS:	±11	L.F.
PANTRY	±1.5	L.F.
OVEN:	30"	
VANITY:	2.5	L.F.

DRAFT

CITY OF TUCSON
WSM ARCHITECTS
4330 NORTH CAMPBELL AVE
SUITE NO 268
TUCSON, ARIZONA 85718
520.408.1044 TEL
520.408.1170 FAX
WSMARCH.COM WEB

COPYRIGHT © WSM ARCHITECTS, INC - 2016

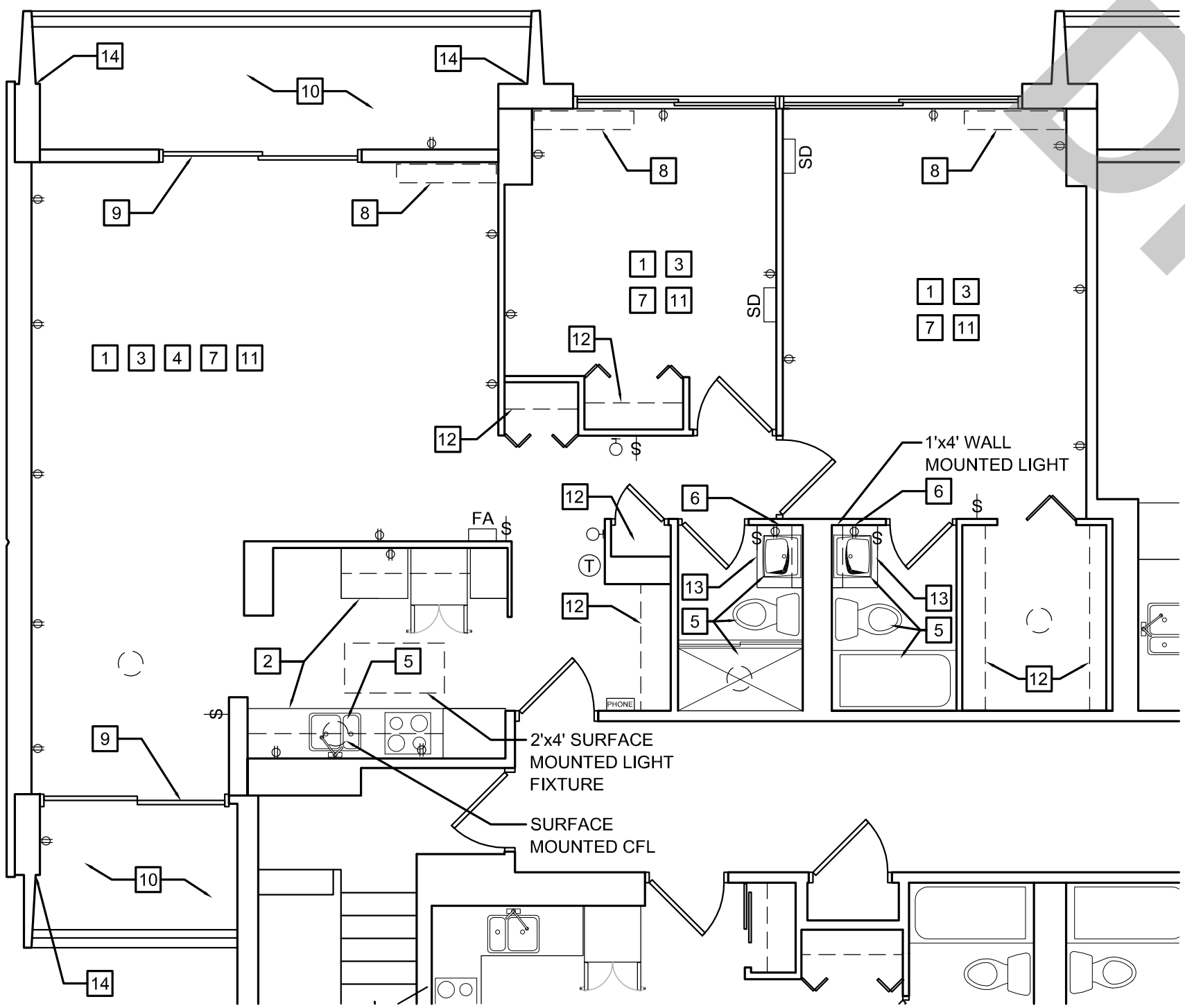
FLOOR PLAN [ONE BEDROOM]
SCALE: 1/4" = 1'-0"

Physical Needs Assessment
Housing and Community Development

Tucson House APARTMENTS
1501 N. Oracle Road Tucson, Arizona

N

Project No.: 16-002
Plot Date: 1/25/2016 10:41:28 AM



GENERAL NOTES:

1. PATCH AND REPAIR WALL SURFACES.
2. PAINT WALLS, TRIM AND CEILING.
3. REPAIR WOOD BASE AND PAINT.
4. PROVIDE NEW STOVE, OVEN AND REFRIGERATOR.
5. IN ASSESSABLE UNITS PROVIDE A/V FIRE ALARM DEVICES.

KEYNOTES:

1. EXISTING VCT FLOORING TO BE REPLACED WITH VCT.
2. EXISTING MILLWORK TO BE REPLACED WITH PREMIUM GRADE P-LAM CABINETS AND SOLID SURFACE COUNTER TOPS.
3. EXISTING LIGHT FIXTURES TO BE REPLACED WITH LED FIXTURES.
4. EXISTING SMOKE AND CARBON MONOXIDE SENSORS TO BE REPLACED. CARBON MONOXIDE SENSOR TO BE TIED INTO FIRE ALARM SYSTEM.
5. ALL PLUMBING FIXTURES TO BE REPLACED IN KIND.
6. MOVE GFCI ADJACENT TO LAVATORY AND REPLACE WITH NEW GFCI RECEPTACLE.
7. REPLACE AND RELOCATE EXISTING RECEPTACLES. INSTALL 18" A.F.F. - SEE ELECTRICAL.
8. EXISTING FAN COIL UNIT TO BE REPLACED - SEE MECHANICAL.
9. EXISTING SLIDING GLASS DOOR TO BE REPLACED WITH NEW SLIDING GLASS DOOR WITH 1" INSULATED GLAZING.
10. CRACKS IN CONCRETE TO BE INJECTED WITH EPOXY RESIN.
11. PROVIDE ACCESSIBLE HARDWARE AT ALL DOORS.
12. PROVIDE NEW SHELF AND ROD.
13. REPLACE VANITY WITH PREMIUM GRADE P-LAM CABINET AND SOLID SURFACE COUNTERTOP.
14. CRACKS IN WING WALL TO BE FILLED WITH FLEXIBLE SEALANT.

TWO BEDROOM APARTMENT (55 IN BUILDING)		
AREA:	±1,027	S.F.
CEILING HEIGHT:	8'-0"	AFF
VCT AREA:	±922	S.F.
RESTROOM FLOOR AREA:	±74	S.F.
WALL LENGTH:	±365	L.F.
LOWER CABINETS:	±11	L.F.
UPPER CABINETS:	±13	L.F.
PANTRY	±1.5	L.F.
OVEN:	30"	
VANITY:	2.5	L.F.

DRAFT

CITY OF TUCSON
WSM ARCHITECTS
4330 NORTH CAMPBELL AVE
SUITE NO 268
TUCSON, ARIZONA 85718
520.408.1044 TEL
520.408.1170 FAX
WSMARCH.COM WEB

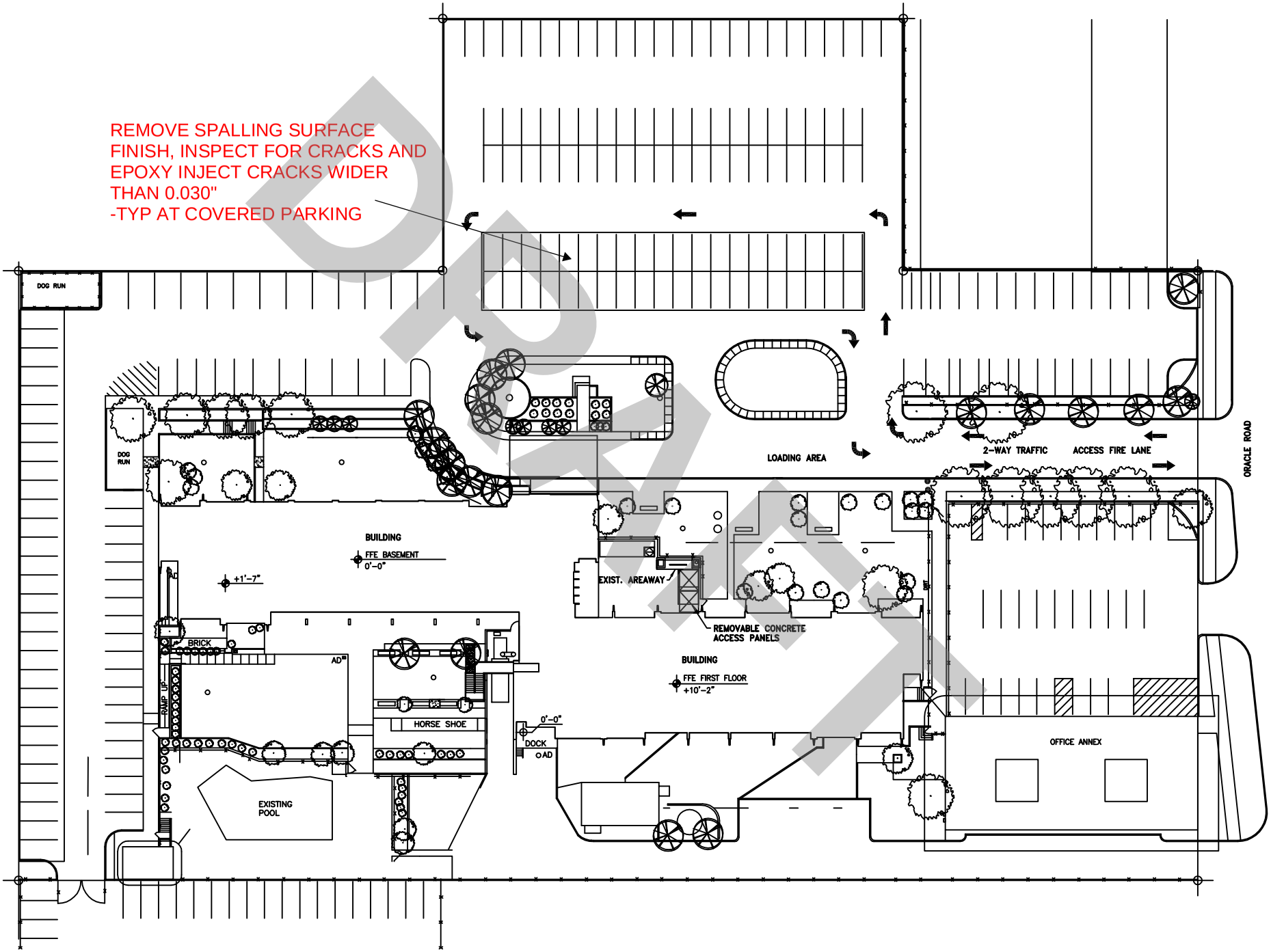
COPYRIGHT BY WSM ARCHITECTS, INC - 2016

FLOOR PLAN [TWO BEDROOM]
SCALE: 3/16" = 1'-0"

Physical Needs Assessment
Housing and Community Development

Tucson House APARTMENTS
1501 N. Oracle Road Tucson, Arizona

Project No.: 16-002
Plot Date: 1/25/2016 10:42:03 AM

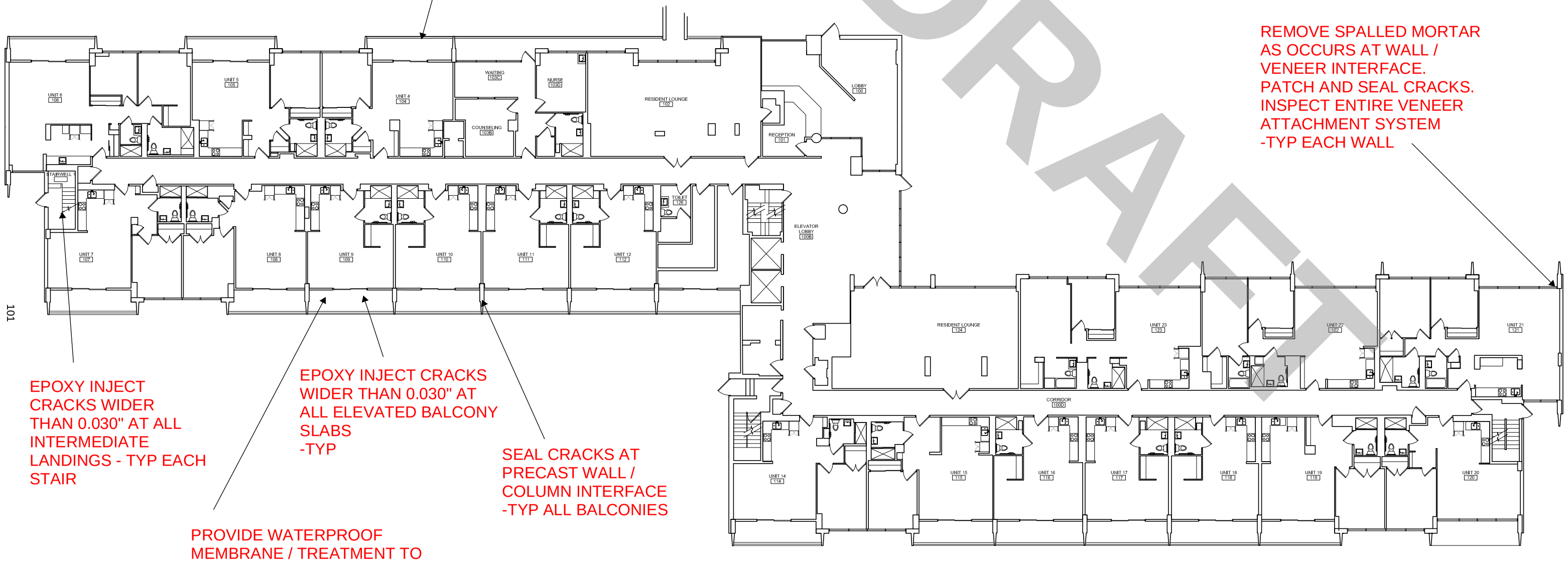


SITE PLAN

DRAFT

REMOVE EXISTING METAL FASCIA - TYP AT ALL ELEVATED BALCONIES

REMOVE SPALLED MORTAR AS OCCURS AT WALL / VENEER INTERFACE. PATCH AND SEAL CRACKS. INSPECT ENTIRE VENEER ATTACHMENT SYSTEM -TYP EACH WALL



EPOXY INJECT CRACKS WIDER THAN 0.030" AT ALL INTERMEDIATE LANDINGS - TYP EACH STAIR

EPOXY INJECT CRACKS WIDER THAN 0.030" AT ALL ELEVATED BALCONY SLABS -TYP

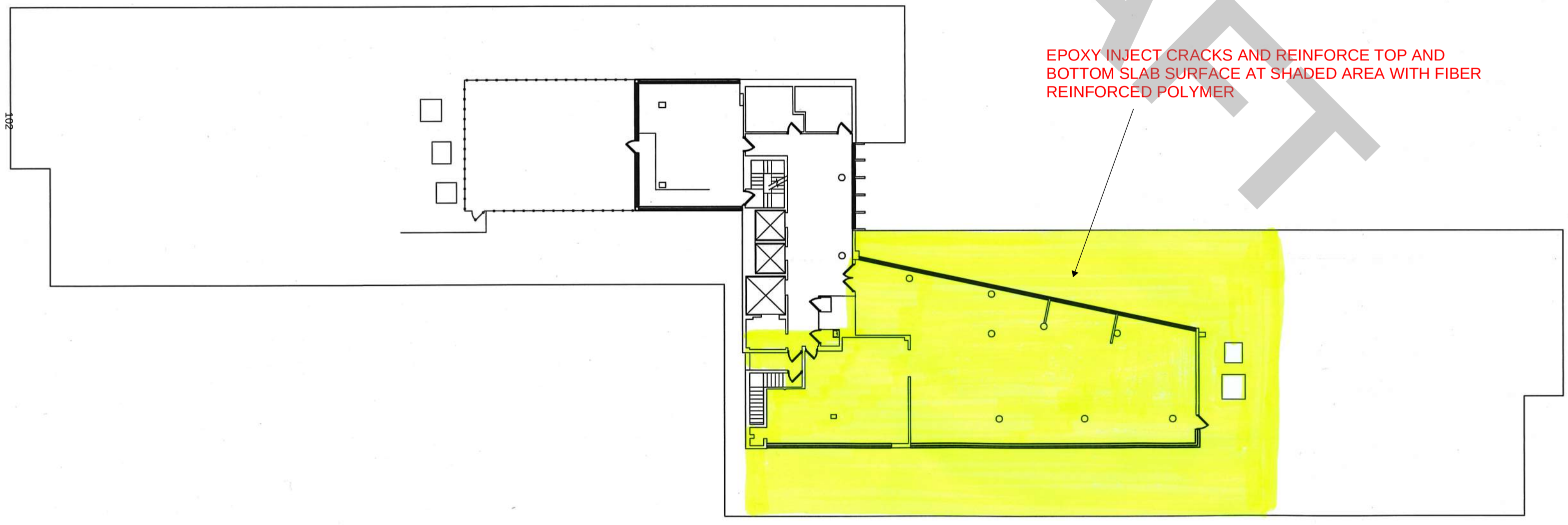
SEAL CRACKS AT PRECAST WALL / COLUMN INTERFACE -TYP ALL BALCONIES

PROVIDE WATERPROOF MEMBRANE / TREATMENT TO SURFACE OF ALL ELEVATED BALCONIES - TYP

RECOMMENDED STRUCTURAL REPAIRS INDICATED ON THIS SHEET APPLY AT LEVELS 1 - 15

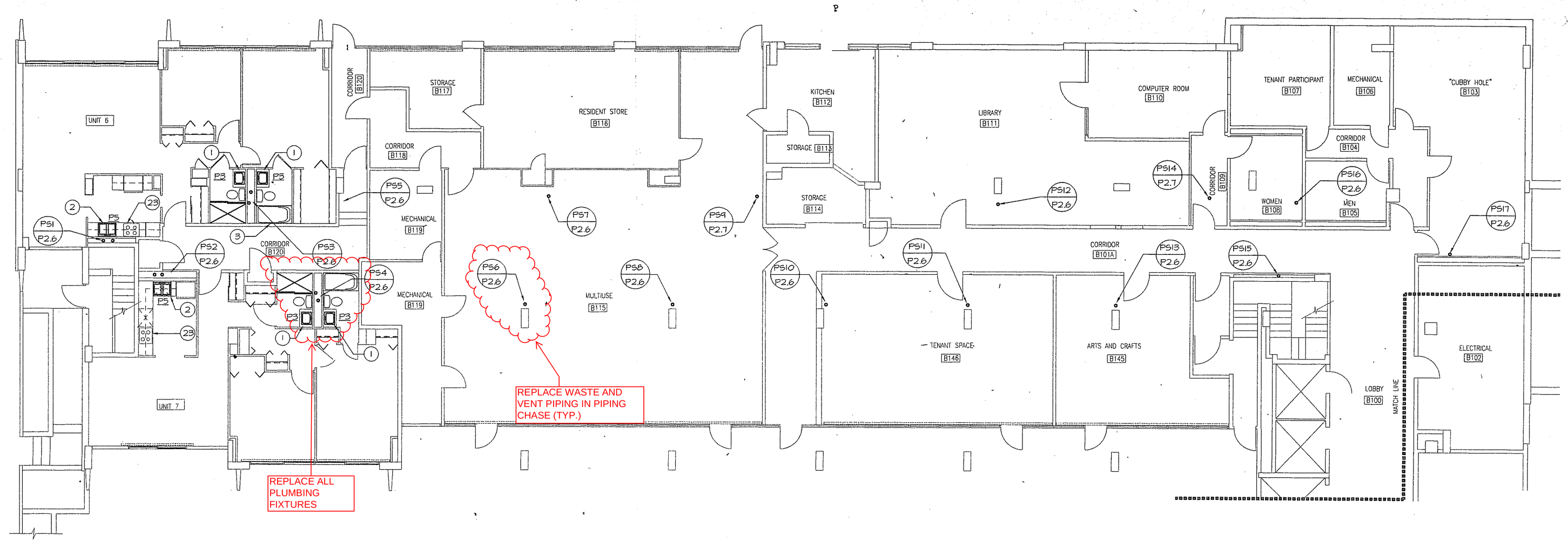
DRAFT

FLOOR PLAN - FIRST FLOOR



ROOF / FLOOR PLAN - LOW ROOF / 16TH FLOOR

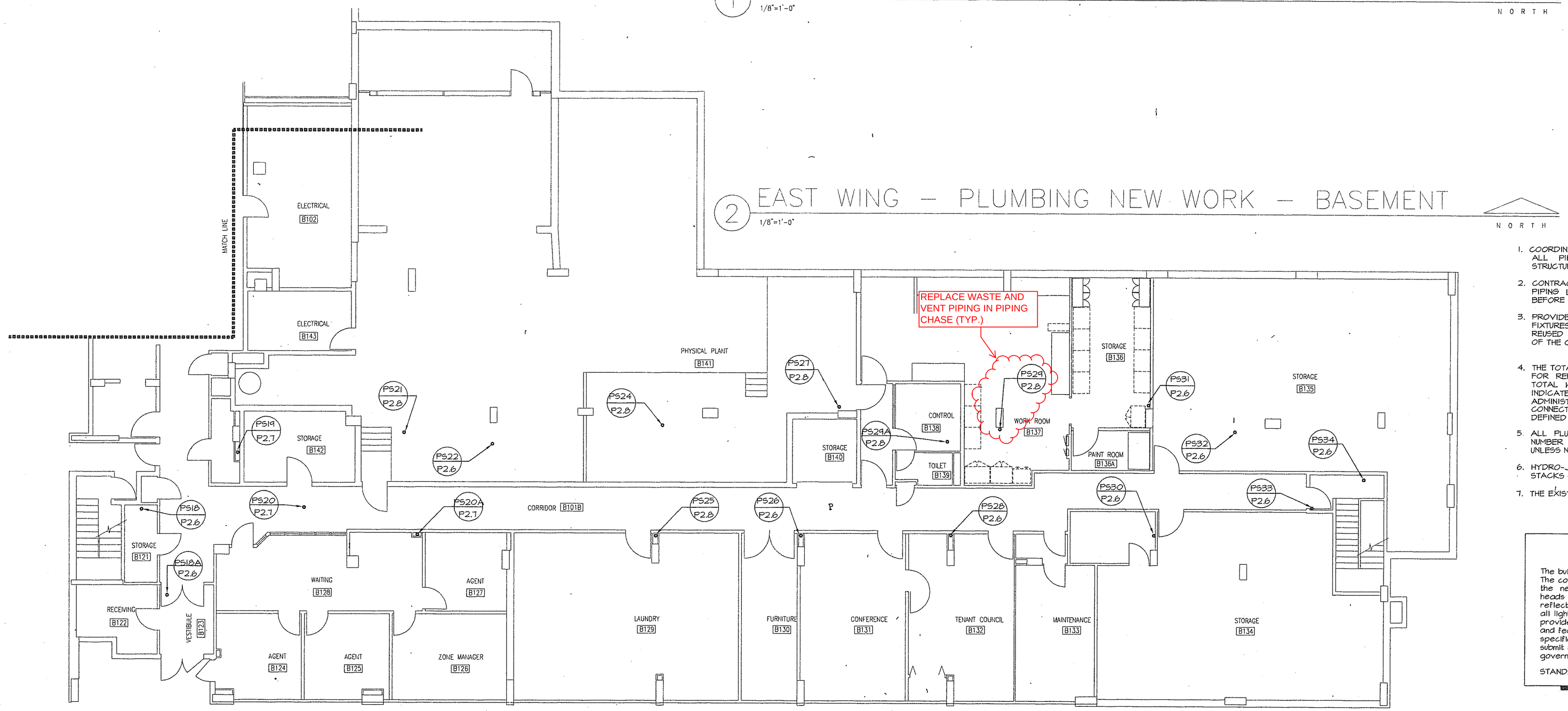
DRAFT



1 WEST WING – PLUMBING NEW WORK – BASEMENT

1/8"=1'-0"

NORTH



2 EAST WING – PLUMBING NEW WORK – BASEMENT

1/8"=1'-0"

NORTH

PLUMBING KEYNOTES

*1. PROVIDE NEW LAVATORY (P3) & P-TRAP. CONNECT TO EXISTING WASTE & WATER PIPING. MODIFY PIPING AS REQUIRED.

*2. PROVIDE NEW SINGLE COMPARTMENT KITCHEN SINK UNDER BASE BID & A NEW TWO COMPARTMENT KITCHEN SINK UNDER ALTERNATE #4 . PROVIDE TAILPIECE & P-TRAP. CONNECT TO EXISTING WASTE & WATER PIPING. MODIFY PIPING AS REQUIRED.

*3. REGLAZE EXISTING BATHTUB. BATHTUB SURFACE SHALL BE CLEANED AND CHEMICALLY ETCHED. ANY CHIPS, SCRATCHES OR STRUCTURAL DISCREPANCIES SHALL BE LEVELED AND SANDED SMOOTH. PROVIDE A MINIMUM OF 3 LAYERS OF SYNTHETIC PORCELAIN APPLIED TO SURFACE SIMILAR TO PERMA-GLAZE OR ITS EQUIVALENT.

4. KITCHEN SINK. PROVIDE TAILPIECE & P-TRAP - CONNECT TO WASTE & EXIST. CW/HW WATER PIPING IN CHASE.

5. LAVATORY - CONNECT TO WASTE & EXISTING CW/HW PIPING IN CHASE.

6. WATER CLOSET - CONNECT TO WASTE & EXISTING CW WATER PIPING IN CHASE.

7. BATH TUB - CONNECT TO WASTE & EXISTING HW/CW WATER PIPING IN CHASE.

8. SHOWER - CONNECT TO WASTE & EXISTING HW/CW WATER PIPING IN CHASE.

9. 1/2"HW & 1/2"CW DOWN TO SHOWER.

10. 1/2"HW & 3/4"CW DOWN TO LAVATORY/WATER CLOSET.

11. 3/4"HW & 3/4"CW - CONNECT TO EXISTING HW/CW WATER PIPING IN CHASE.

12. 1/2"HW & 1/2"CW - CONNECT TO EXISTING HW/CW WATER PIPING IN CHASE.

13. PROVIDE 2" WASTE LINE W/P-TRAP.

14. OFFSET WASTE & VENT PIPING IN CEILING SPACE.

15. WASTE RISER FROM 5TH THRU 16TH FLOORS.

16. VENT RISER FROM 5TH THRU 16TH FLOORS.

17. WASTE RISER FROM 1ST THRU 4TH FLOORS.

18. VENT RISER FROM 1ST THRU 4TH FLOORS.

19. REMOVE EXISTING WATER CLOSET & ASSOCIATED PIPING AS REQ'D & RE-INSTALL AFTER PLUMBING WALL HAS BEEN INSTALLED.

20. REMOVE EXISTING LAVATORY & ASSOCIATED PIPING AS REQ'D & RE-INSTALL AFTER PLUMBING WALL HAS BEEN INSTALLED.

21. REMOVE EXISTING WASTE & WATER PIPING AS REQ'D ASSOCIATED W/KITCHEN SINK AS REQ'D & RE-INSTALL AFTER PLUMBING WALL HAS BEEN INSTALLED.

22. REMOVE EXISTING GAS RANGE & ASSOCIATED PIPING & RE-INSTALL AFTER PLUMBING WALL HAS BEEN INSTALLED. INSTALL NEW GAS RANGE IF ALTERNATE #4 IS ACCEPTED. MODIFY PIPING AS REQ'D. COORDINATE W/ ARCH. SHEETS A9.1 A9.5 & A9.8 FOR EXACT QUANTITIES

*23. INSTALL NEW RANGE GAS IF ALTERNATE #4 IS ACCEPTED. MODIFY PIPING AS REQ'D.

24. REMOVE EXISTING SHOWER TRIM & ASSOCIATED PIPING AS REQ'D & RE-INSTALL AFTER PLUMBING WALL HAS BEEN INSTALLED.

25. REMOVE EXISTING BATHTUB TRIM & ASSOCIATED PIPING AS REQ'D & RE-INSTALL AFTER PLUMBING WALL HAS BEEN INSTALLED.

26. GAS RANGE CONNECT 1/2 GAS LINE IN AND EXTEND PIPE TO RANGE-PROVIDE SOV AT CHASE WALL.

27. 2" VENT LINE-CONNECT TO VENT RISER.

* INDICATES THAT NOTE APPLIES TO THIS SHEET

PLUMBING GENERAL NOTES

1. COORDINATE ALL WORK WITH ALL OTHER TRADES. EXACT ROUTING OF ALL PIPING SHALL BE CAREFULLY COORDINATED WITH ALL STRUCTURAL CONDITIONS.

2. CONTRACTOR SHALL VERIFY ALL EXISTING CONDITIONS INCLUDING PIPING LOCATIONS, SIZES, INVERTS AND DIRECTION OF FLOW BEFORE THE START OF WORK.

3. PROVIDE REQUIRED DEMOLITION OF EXISTING PLUMBING EQUIPMENT, FIXTURES, MATERIALS AND OTHER ITEMS WHICH ARE NOT TO BE REUSED IN NEW DESIGN. ALL ITEMS SHALL BECOME THE PROPERTY OF THE CONTRACTOR AND SHALL BE REMOVED FROM THE SITE.

4. THE TOTAL NUMBER OF FIXTURE UNITS SHOWN FOR THIS PROJECT IS FOR REFERENCE ONLY. CONTRACTOR SHALL VERIFY FIXTURE UNIT TOTAL WITH ADMINISTRATIVE AUTHORITY. FIXTURE UNIT COUNTS INDICATED FOR EACH TYPE OF FIXTURE SHALL BE VERIFIED BY THE ADMINISTRATIVE AUTHORITY. OWNER SHALL PAY FOR ALL SEWER CONNECTIONS FEES. SOIL PIPE SIZING IS BASED ON FIXTURE UNITS DEFINED IN THE UNIFORM PLUMBING CODE.

5. ALL PLUMBING FIXTURES AND EQUIPMENT IDENTIFIED BY A "P" NUMBER SHALL BE FURNISHED AND INSTALLED BY THIS CONTRACTOR, UNLESS NOTED OTHERWISE. SEE PLUMBING SCHEDULES.

6. HYDRO-JET/PRESSURE SPRAY. CLEAN THE EXISTING KITCHEN WASTE & VENT STACKS ON THE 5th FLOOR THRU 16th FLOOR.

7. THE EXISTING GAS LOAD TO REMAIN AS CURRENTLY EXISTS.

WET PIPE SPRINKLER SYSTEM

The building contains an existing wet pipe sprinkler system. The contractor shall modify this system to conform with the new architectural floor plan. Location of sprinkler heads shall be coordinated with architectural reflective ceiling plan (specifically the location of all light fixtures and ceiling air devices). The system provided shall comply with all requirements of NFPA, local and federal codes which govern such work and the specification notes on these drawings. Contractor shall submit and shop drawings for approval by the governing agency.

STANDARD FOR CONSTRUCTION: NFPA 13

S'MU Mechanical Engineering, LLC
5447 East Fifth Street # 216
Tucson, Arizona 85711
520/327-7611
JOB # 26996

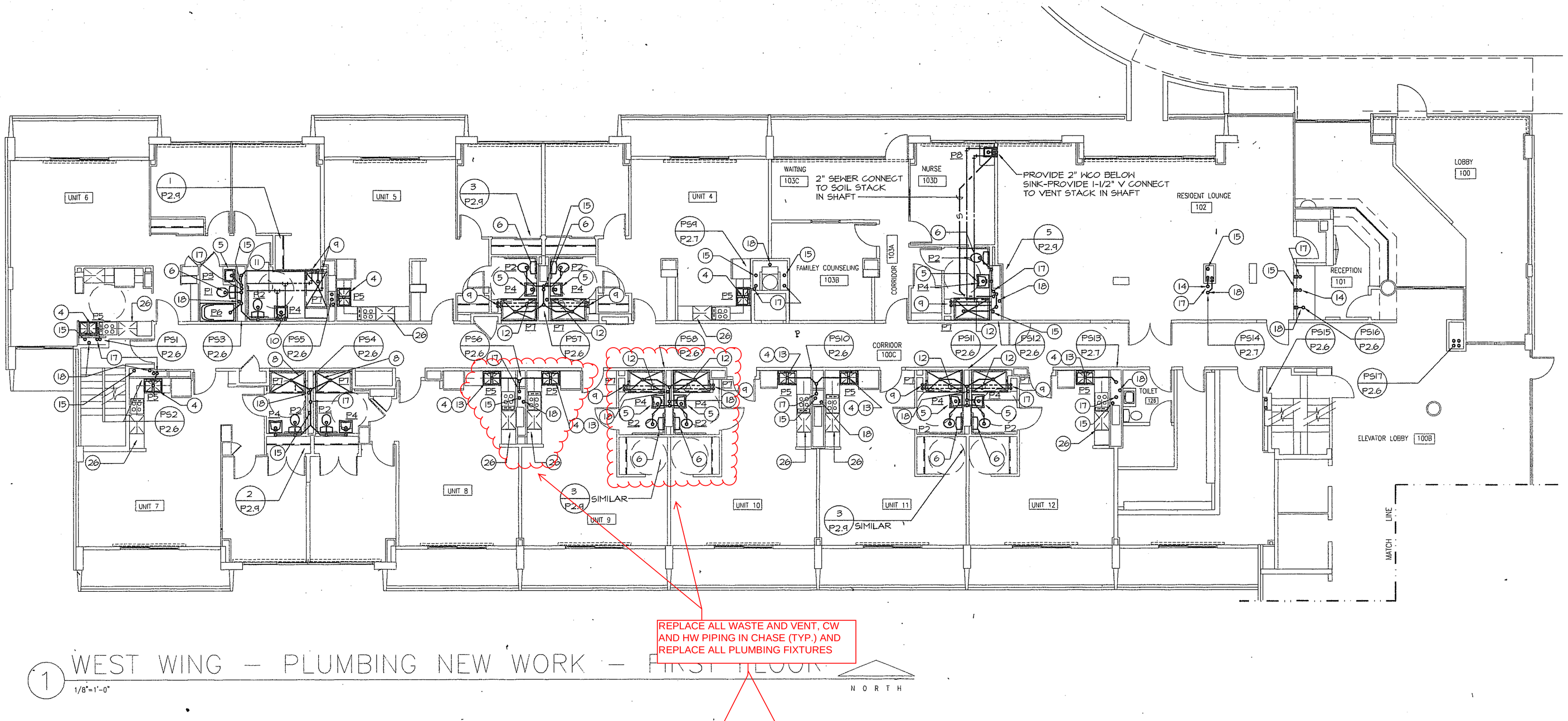
Poster Frost Associates, Inc.
Architecture Planning Urban Design
317 North Court Avenue Tucson, Arizona 85701 (520) 882-6310

PLUMBING PLAN BASEMENT

TUCSON HOUSE TAX CREDIT REHABILITATION

project no. 450
date AUGUST 1997
revised

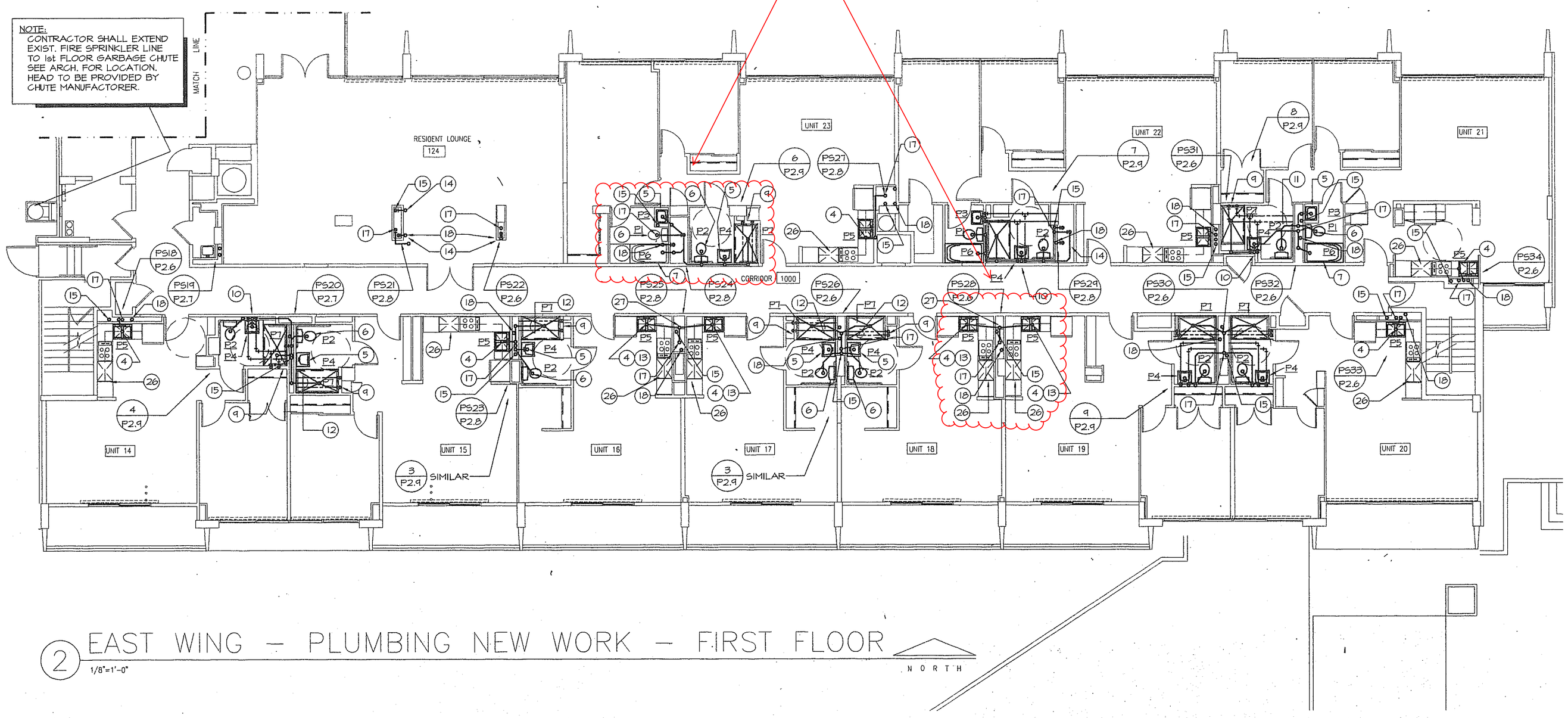
P2.1



1 WEST WING – PLUMBING NEW WORK – FIRST FLOOR

1/8"=1'-0"

NORTH



2 EAST WING – PLUMBING NEW WORK – FIRST FLOOR

1/8"=1'-0"

NORTH

PLUMBING KEYNOTES

1. PROVIDE NEW LAVATORY (P3) & P-TRAP. CONNECT TO EXISTING WASTE & WATER PIPING. MODIFY PIPING AS REQUIRED.
2. PROVIDE NEW SINGLE COMPARTMENT KITCHEN SINK UNDER BASE BID & A NEW TWO COMPARTMENT KITCHEN SINK UNDER ALTERNATE #4. PROVIDE TAILPIECE & P-TRAP. CONNECT TO EXISTING WASTE & WATER PIPING. MODIFY PIPING AS REQUIRED.
3. RESLAZE EXISTING BATHTUB. BATHTUB SURFACE SHALL BE CLEANED AND CHEMICALLY ETCHED. ANY CHIPS, SCRATCHES OR STRUCTURAL DISCREPANCIES SHALL BE LEVELED AND SANDED SMOOTH. PROVIDE A MINIMUM OF 3 LAYERS OF SYNTHETIC PORCELAIN APPLIED TO SURFACE SIMILAR TO PERMA-GLAZE OR ITS EQUIVALENT.

*4. KITCHEN SINK. PROVIDE TAILPIECE & P-TRAP - CONNECT TO WASTE & EXIST. CW/HW WATER PIPING IN CHASE.

*5. LAVATORY - CONNECT TO WASTE & EXISTING CW/HW PIPING IN CHASE.

*6. WATER CLOSET - CONNECT TO WASTE & EXISTING CW WATER PIPING IN CHASE.

*7. BATH TUB - CONNECT TO WASTE & EXISTING HW/CW WATER PIPING IN CHASE

*8. SHOWER - CONNECT TO WASTE & EXISTING HW/CW WATER PIPING IN CHASE.

*9. 1/2"HW & 1/2"CW DOWN TO SHOWER.

*10. 1/2"HW & 3/4"CW DOWN TO LAVATORY/WATER CLOSET.

11. 3/4"HW & 3/4"CW - CONNECT TO EXISTING HW/CW WATER PIPING IN CHASE.

*12. 1/2"HW & 1/2"CW - CONNECT TO EXISTING HW/CW WATER PIPING IN CHASE.

*13. PROVIDE 2" WASTE LINE W/P-TRAP.

*14. OFFSET WASTE & VENT PIPING IN CEILING SPACE.

*15. WASTE RISER FROM 5TH THRU 16TH FLOORS.

16. VENT RISER FROM 5TH THRU 16TH FLOORS.

*17. WASTE RISER FROM 1ST THRU 4TH FLOORS.

*18. VENT RISER FROM 1ST THRU 4TH FLOORS.

19. REMOVE EXISTING WATER CLOSET & ASSOCIATED PIPING AS REQ'D & RE-INSTALL AFTER PLUMBING WALL HAS BEEN INSTALLED.

20. REMOVE EXISTING LAVATORY & ASSOCIATED PIPING AS REQ'D & RE-INSTALL AFTER PLUMBING WALL HAS BEEN INSTALLED.

21. REMOVE EXISTING WASTE & WATER PIPING AS REQ'D ASSOCIATED W/KITCHEN SINK AS REQ'D & RE-INSTALL AFTER PLUMBING WALL HAS BEEN INSTALLED.

22. REMOVE EXISTING GAS RANGE & ASSOCIATED PIPING & RE-INSTALL AFTER PLUMBING WALL HAS BEEN INSTALLED. INSTALL NEW GAS RANGE IF ALTERNATE #4 IS ACCEPTED. MODIFY PIPING AS REQ'D. COORDINATE W/ ARCH. SHEETS A9.1 A9.5 & A9.8 FOR EXACT QUANTITIES

23. PROVIDE EXISTING GAS RANGE & INSTALL NEW RANGE IF ACTERNATE #4 IS ACCEPTED. MODIFY PIPING AS REQ'D.

24. REMOVE EXISTING SHOWER TRIM & ASSOCIATED PIPING AS REQ'D & RE-INSTALL AFTER PLUMBING WALL HAS BEEN INSTALLED.

25. REMOVE EXISTING BATHTUB TRIM & ASSOCIATED PIPING AS REQ'D & RE-INSTALL AFTER PLUMBING WALL HAS BEEN INSTALLED.

*26. GAS RANGE CONNECT 1/2 GAS LINE TO EXISTING PIPING IN CHASE. EXTEND PIPE TO RANGE-PROVIDE SOV AT CHASE WALL.

27. 2" VENT LINE-CONNECT TO VENT RISER.

* INDICATES THAT NOTE APPLIES TO THIS SHEET

DRAFT

Poster Frost Associates, Inc.
Architecture Planning Urban Design
317 North Court Avenue Tucson, Arizona 85701 (520) 882-6310

PLUMBING PLAN
FIRST FLOOR

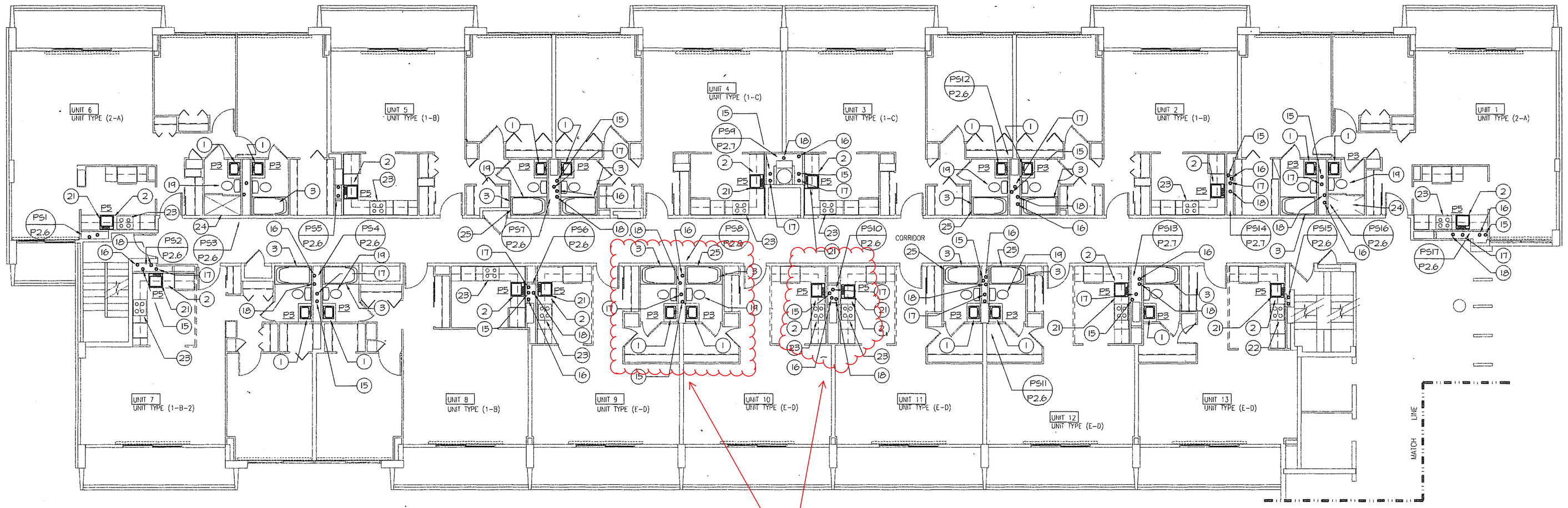
TUCSON HOUSE
TAX CREDIT
REHABILITATION

project no. 450
date AUGUST 1997
revised

SMU Mechanical Engineering, LLC
5447 East Fifth Street # 216
Tucson, Arizona 85711
520/327-7611

JOB # 26996

P2.2

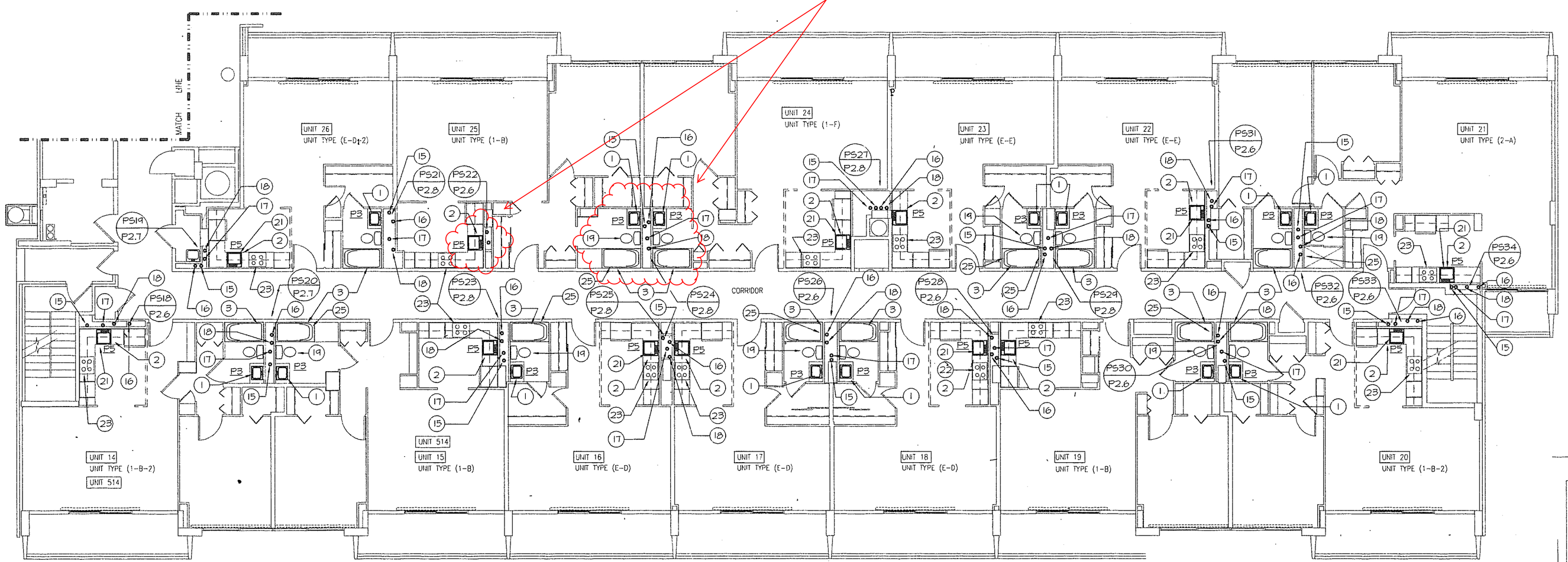


1 WEST WING – PLUMBING NEW WORK – FLOORS 2 THRU 4

1/8"=1'-0"

NORTH

REPLACE WASTE AND VENT AND CW/HW PIPING IN CHASE. REPLACE PLUMBING FIXTURES.

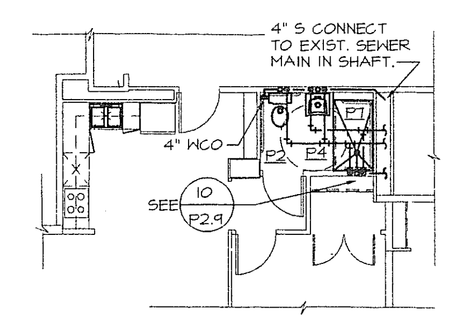


2 EAST WING – PLUMBING NEW WORK – FLOORS 2 THRU 4

1/8"=1'-0"

AND UNITS 514 AND 515

NORTH



3 HANDICAPPED UNIT @214 ONLY

1/8"=1'-0"

PLUMBING KEYNOTES

*1. PROVIDE NEW LAVATORY (P3) & P-TRAP. CONNECT TO EXISTING WASTE & WATER PIPING. MODIFY PIPING AS REQUIRED.

*2. PROVIDE NEW SINGLE COMPARTMENT KITCHEN SINK UNDER BASE BID & A NEW TWO COMPARTMENT KITCHEN SINK UNDER ALTERNATE #4. PROVIDE TAILPIECE & P-TRAP. CONNECT TO EXISTING WASTE & WATER PIPING. MODIFY PIPING AS REQUIRED.

*3. REGLAZE EXISTING BATHTUB. BATHTUB SURFACE SHALL BE CLEANED AND CHEMICALLY ETCHED. ANY CHIPS, SCRATCHES OR STRUCTURAL DISCREPANCIES SHALL BE LEVELED AND SANDED SMOOTH. PROVIDE A MINIMUM OF 3 LAYERS OF SYNTHETIC PORCELAIN APPLIED TO SURFACE SIMILAR TO PERMA-GLAZE OR ITS EQUIVALENT.

4. KITCHEN SINK PROVIDE TAILPIECE & P-TRAP - CONNECT TO WASTE & EXIST. CW/HW WATER PIPING IN CHASE.

5. LAVATORY - CONNECT TO WASTE & EXISTING CW/HW PIPING IN CHASE.

6. WATER CLOSET - CONNECT TO WASTE & EXISTING CW WATER PIPING IN CHASE.

7. BATH TUB - CONNECT TO WASTE & EXISTING HW/CW WATER PIPING IN CHASE.

8. SHOWER - CONNECT TO WASTE & EXISTING HW/CW WATER PIPING IN CHASE.

9. 1/2"HW & 1/2"CW DOWN TO SHOWER.

10. 1/2"HW & 3/4"CW DOWN TO LAVATORY/WATER CLOSET.

11. 3/4"HW & 3/4"CW - CONNECT TO EXISTING HW/CW WATER PIPING IN CHASE.

12. 1/2"HW & 1/2"CW - CONNECT TO EXISTING HW/CW WATER PIPING IN CHASE.

13. PROVIDE 2" WASTE LINE W/P-TRAP.

14. OFFSET WASTE & VENT PIPING IN CEILING SPACE.

15. WASTE RISER FROM 5TH THRU 16TH FLOORS.

*16. VENT RISER FROM 5TH THRU 16TH FLOORS.

*17. WASTE RISER FROM 1ST THRU 4TH FLOORS.

*18. VENT RISER FROM 1ST THRU 4TH FLOORS.

*19. REMOVE EXISTING WATER CLOSET & ASSOCIATED PIPING AS REQ'D & RE-INSTALL AFTER PLUMBING WALL HAS BEEN INSTALLED.

*20. REMOVE EXISTING LAVATORY & ASSOCIATED PIPING AS REQ'D & RE-INSTALL AFTER PLUMBING WALL HAS BEEN INSTALLED.

*21. REMOVE EXISTING WASTE & WATER PIPING AS REQ'D ASSOCIATED W/KITCHEN SINK AS REQ'D & RE-INSTALL AFTER PLUMBING WALL HAS BEEN INSTALLED.

*22. REMOVE EXISTING GAS RANGE & ASSOCIATED PIPING & RE-INSTALL AFTER PLUMBING WALL HAS BEEN INSTALLED. INSTALL NEW GAS RANGE IF ALTERNATE #4 IS ACCEPTED. MODIFY PIPING AS REQ'D. COORDINATE W/ ARCH. SHEETS A9.1, A9.5 & A9.8 FOR EXACT QUANTITIES

*23. PROVIDE EXISTING GAS RANGE & INSTALL NEW RANGE IF ALTERNATE #4 IS ACCEPTED. MODIFY PIPING AS REQ'D.

24. REMOVE EXISTING SHOWER TRIM & ASSOCIATED PIPING AS REQ'D & RE-INSTALL AFTER PLUMBING WALL HAS BEEN INSTALLED.

*25. REMOVE EXISTNG BATHTUB TRIM & ASSOCIATED PIPING AS REQ'D & RE-INSTALL AFTER PLUMBING WALL HAS BEEN INSTALLED.

26. GAS RANGE CONNECT 1/2 GAS LINE IN AND EXTEND PIPE TO RANGE-PROVIDE SOV AT CHASE WALL.

27. 2" VENT LINE-CONNECT TO VENT RISER.

* INDICATES THAT NOTE APPLIES TO THIS SHEET

DRAFT

Poster Frost Associates, Inc.
Architecture Planning Urban Design
317 North Court Avenue Tucson, Arizona 85701 (520) 882-6310

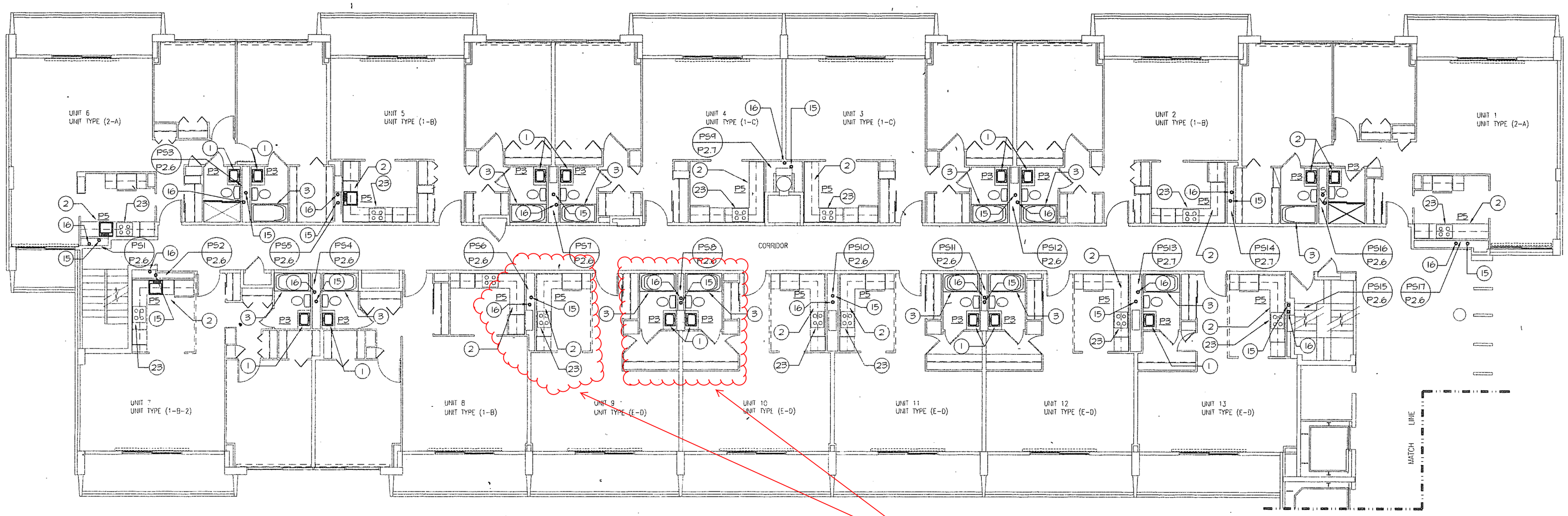
PLUMBING PLAN
FLOORS 2 – 4

TUCSON HOUSE
TAX CREDIT
REHABILITATION

project no.	450
date	AUGUST 1997
revised	

SMU Mechanical Engineering, LLC
5447 East Fifth Street # 216
Tucson, Arizona 85711
520/327-7611
JOB # 26996

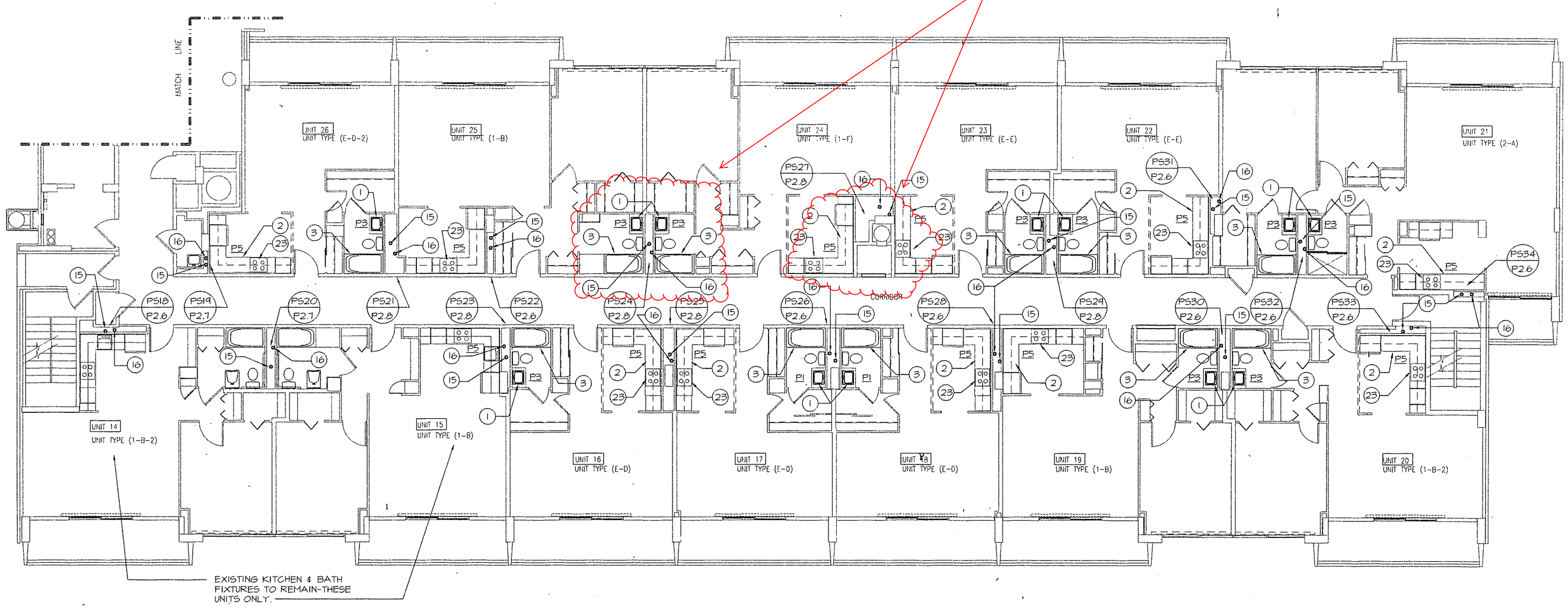
P2.3



1 WEST WING – PLUMBING NEW WORK – FLOORS 5 THRU 15

1/8"=1'-0"

REPLACE WASTE AND VENT AND CW/HW PIPING IN CHASE. REPLACE ALL PLLUMBING FIXTURES (TYP.)



2 EAST WING – PLUMBING NEW WORK – FLOORS 5 THRU 15

1/8"=1'-0"

NORTH

PLUMBING KEYNOTES

*1. PROVIDE NEW LAVATORY (P3) & P-TRAP. CONNECT TO EXISTING WASTE & WATER PIPING. MODIFY PIPING AS REQUIRED.

*2. PROVIDE NEW SINGLE COMPARTMENT KITCHEN SINK UNDER BASE BID & A NEW TWO COMPARTMENT KITCHEN SINK UNDER ALTERNATE #4 . PROVIDE TAILPIECE & P-TRAP. CONNECT TO EXISTING WASTE & WATER PIPING. MODIFY PIPING AS REQUIRED.

*3. REGLAZE EXISTING BATHTUB. BATHTUB SURFACE SHALL BE CLEANED AND CHEMICALLY ETCHED. ANY CHIPS, SCRATCHES OR STRUCTURAL DISCREPANCIES SHALL BE LEVELED AND SANDED SMOOTH. PROVIDE A MINIMUM OF 3 LAYERS OF SYNTHETIC PORCELAIN APPLIED TO SURFACE. SIMILAR TO PERMA-GLAZE OR ITS EQUIVALENT.

4. KITCHEN SINK. PROVIDE TAILPIECE & P-TRAP - CONNECT TO WASTE & EXIST. CW/HW WATER PIPING IN CHASE.

5. LAVATORY - CONNECT TO WASTE & EXISTING CW/HW PIPING IN CHASE.

6. WATER CLOSET - CONNECT TO WASTE & EXISTING CW WATER PIPING IN CHASE.

7. BATH TUB - CONNECT TO WASTE & EXISTING HW/CW WATER PIPING IN CHASE.

8. SHOWER - CONNECT TO WASTE & EXISTING HW/CW WATER PIPING IN CHASE.

9. 1/2"HW & 1/2"CW DOWN TO SHOWER.

10. 1/2"HW & 3/4"CW DOWN TO LAVATORY/WATER CLOSET.

11. 3/4"HW & 3/4"CW - CONNECT TO EXISTING HW/CW WATER PIPING IN CHASE.

12. 1/2"HW & 1/2"CW - CONNECT TO EXISTING HW/CW WATER PIPING IN CHASE.

13. PROVIDE 2" WASTE LINE W/P-TRAP.

14. OFFSET WASTE & VENT PIPING IN CEILING SPACE.

*15. WASTE RISER FROM 5TH THRU 16TH FLOORS.

*16. VENT RISER FROM 5TH THRU 16TH FLOORS.

17. WASTE RISER FROM 1ST THRU 4TH FLOORS.

18. VENT RISER FROM 1ST THRU 4TH FLOORS.

19. REMOVE EXISTING WATER CLOSET & ASSOCIATED PIPING AS REQ'D & RE-INSTALL AFTER PLUMBING WALL HAS BEEN INSTALLED.

20. REMOVE EXISTING LAVATORY & ASSOCIATED PIPING AS REQ'D & RE-INSTALL AFTER PLUMBING WALL HAS BEEN INSTALLED.

21. REMOVE EXISTING WASTE & WATER PIPING AS REQ'D ASSOCIATED W/KITCHEN SINK AS REQ'D & RE-INSTALL AFTER PLUMBING WALL HAS BEEN INSTALLED.

22. REMOVE EXISTING GAS RANGE & ASSOCIATED PIPING & RE-INSTALL AFTER PLUMBING WALL HAS BEEN INSTALLED. INSTALL NEW GAS RANGE IF ALTERNATE #4 IS ACCEPTED. MODIFY PIPING AS REQ'D. COORDINATE W/ ARCH. SHEETS A9.1 ,A9.5 & A9.8 FOR EXACT QUANTITIES

*23. PROVIDE EXISTING GAS RANGE & INSTALL NEW RANGE IF ACTERNATE #4 IS ACCEPTED. MODIFY PIPING AS REQ'D.

* INDICATES THAT NOTE APPLIES TO THIS SHEET

SMU Mechanical Engineering, LLC
5447 East Fifth Street # 216
Tucson, Arizona 85711
520/327-7611
JOB # 26996

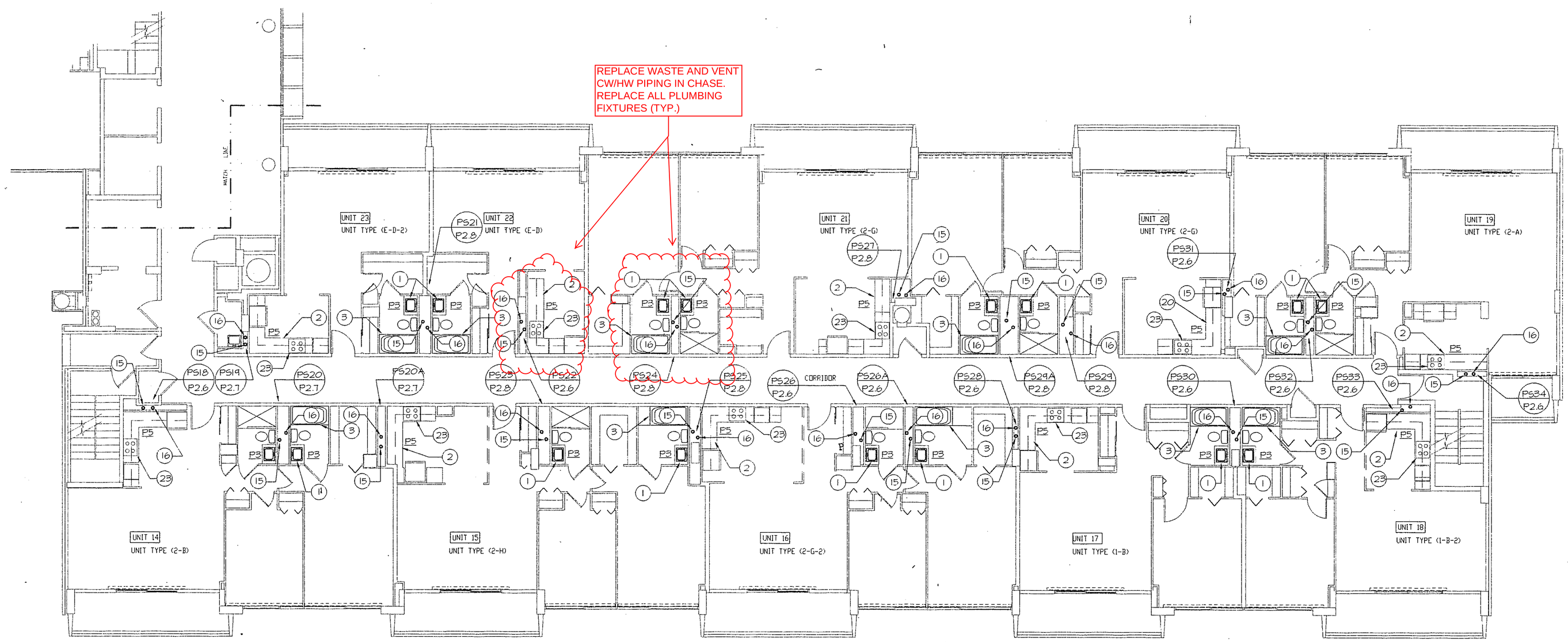
Poster Frost Associates, Inc.
Architecture Planning Urban Design
317 North Court Avenue Tucson, Arizona 85701 (520) 882-6310

PLUMBING PLAN
FLOORS 5 – 15
16th FLOOR WEST

TUCSON HOUSE
TAX CREDIT
REHABILITATION

project no. 450
date AUGUST 1997
revised

P2.4



1 EAST WING - PLUMBING NEW WORK - 16TH FLOOR

1/8"=1'-0"

FOR WEST WING SEE P2.4

NORTH

PLUMBING KEYNOTES

*1. PROVIDE NEW LAVATORY (P3) & P-TRAP. CONNECT TO EXISTING WASTE & WATER PIPING. MODIFY PIPING AS REQUIRED.

*2. PROVIDE NEW SINGLE COMPARTMENT KITCHEN SINK UNDER BASE BID & A NEW TWO COMPARTMENT KITCHEN SINK UNDER ALTERNATE #4. PROVIDE TAILPIECE & P-TRAP. CONNECT TO EXISTING WASTE & WATER PIPING. MODIFY PIPING AS REQUIRED.

*3. REGLAZE EXISTING BATHTUB. BATHTUB SURFACE SHALL BE CLEANED AND CHEMICALLY ETCHED. ANY CHIPS, SCRATCHES OR STRUCTURAL DISCREPANCIES SHALL BE LEVELED AND SANDED SMOOTH. PROVIDE A MINIMUM OF 3 LAYERS OF SYNTHETIC PORCELAIN APPLIED TO SURFACE SIMILAR TO PERMA-GLAZE OR ITS EQUIVALENT.

4. KITCHEN SINK. PROVIDE TAILPIECE & P-TRAP - CONNECT TO WASTE & EXIST. CW/HW WATER PIPING IN CHASE.

5. LAVATORY - CONNECT TO WASTE & EXISTING CW/HW PIPING IN CHASE.

6. WATER CLOSET - CONNECT TO WASTE & EXISTING CW WATER PIPING IN CHASE.

7. BATH TUB - CONNECT TO WASTE & EXISTING HW/CW WATER PIPING IN CHASE.

8. SHOWER - CONNECT TO WASTE & EXISTING HW/CW WATER PIPING IN CHASE.

9. 1/2"HW & 1/2"CW DOWN TO SHOWER.

10. 1/2"HW & 3/4"CW DOWN TO LAVATORY/WATER CLOSET.

11. 3/4"HW & 3/4"CW - CONNECT TO EXISTING HW/CW WATER PIPING IN CHASE.

12. 1/2"HW & 1/2"CW - CONNECT TO EXISTING HW/CW WATER PIPING IN CHASE.

13. PROVIDE 2" WASTE LINE W/P-TRAP.

14. OFFSET WASTE & VENT PIPING IN CEILING SPACE.

*15. WASTE RISER FROM 5TH THRU 16TH FLOORS.

*16. VENT RISER FROM 5TH THRU 16TH FLOORS.

17. WASTE RISER FROM 1ST THRU 4TH FLOORS.

18. VENT RISER FROM 1ST THRU 4TH FLOORS.

19. REMOVE EXISTING WATER CLOSET & ASSOCIATED PIPING AS REQ'D & RE-INSTALL AFTER PLUMBING WALL HAS BEEN INSTALLED.

20. REMOVE EXISTING LAVATORY & ASSOCIATED PIPING AS REQ'D & RE-INSTALL AFTER PLUMBING WALL HAS BEEN INSTALLED.

21. REMOVE EXISTING WASTE & WATER PIPING AS REQ'D ASSOCIATED W/KITCHEN SINK AS REQ'D & RE-INSTALL AFTER PLUMBING WALL HAS BEEN INSTALLED.

22. REMOVE EXISTING GAS RANGE & ASSOCIATED PIPING & RE-INSTALL AFTER PLUMBING WALL HAS BEEN INSTALLED. INSTALL NEW GAS RANGE IF ALTERNATE #4 IS ACCEPTED. MODIFY PIPING AS REQ'D. COORDINATE W/ ARCH. SHEETS A9.1 A9.5 & A9.8 FOR EXACT QUANTITIES

*23. PROVIDE EXISTING GAS RANGE & INSTALL NEW RANGE IF ALTERNATE #4 IS ACCEPTED. MODIFY PIPING AS REQ'D.

24. REMOVE EXISTING SHOWER TRIM & ASSOCIATED PIPING AS REQ'D & RE-INSTALL AFTER PLUMBING WALL HAS BEEN INSTALLED.

25. REMOVE EXISTNG BATHTUB TRIM & ASSOCIATED PIPING AS REQ'D & RE-INSTALL AFTER PLUMBING WALL HAS BEEN INSTALLED.

26. GAS RANGE CONNECT 1/2 GAS LINE IN AND EXTEND PIPE TO RANGE-PROVIDE SOV AT CHASE WALL.

27. 2" VENT LINE-CONNECT TO VENT RISER.

* INDICATES THAT NOTE APPLIES TO THIS SHEET

DRAFT

Poster Frost Associates, Inc.
Architecture Planning Urban Design
317 North Court Avenue Tucson, Arizona 85701 (520) 882-6310

PLUMBING PLAN
FLOOR 16th

TUCSON HOUSE
TAX CREDIT
REHABILITATION

project no. 450
date AUGUST 1997
revised

P2.5

75 of 110

SMU Mechanical Engineering, LLC
5447 East Fifth Street # 216
Tucson, Arizona 85711
520/327-7611

JOB # 26996

STACK NO.

PS-31, 33, 34
PS-1, 2, 5, 15 & 22
17, 18 (NO FIXTURES ON 1st FLR.)

PS-3
PS-16 (NO FIXTURES ON 1st FLR.)
PS-32 (SIMILAR EXCEPT 1st FLR.)

NOTE: REPLACE ALL WASTE AND VENT PIPING

PS-6, 10
PS-26, 28

PS-7, 12
PS-12 (SIMILAR EXCEPT 1ST FLOOR)

PS-8, 11

LEGEND

- KS - EXISTING KITCHEN SINK
- SH - EXISTING SHOWER
- LAV - EXISTING LAVATORY
- WC - EXISTING WATER CLOSET
- TUB - EXISTING BATH TUB
- SS - SERVICE SINK
- AD - ACCESS DOOR
- NEW FIXTURES REFER TO P# AND FIXTURE SCHEDULES

NOTE:

ALL SOIL & VENT PIPING LOCATED BETWEEN THE BASEMENT AND THE 5TH FLOOR SHALL BE REMOVED UNLESS NOTED OTHERWISE.

SMU Mechanical Engineering, LLC
5447 East Fifth Street # 216
Tucson, Arizona 85711
520/327-7611

JOB # 26996

DRAFT

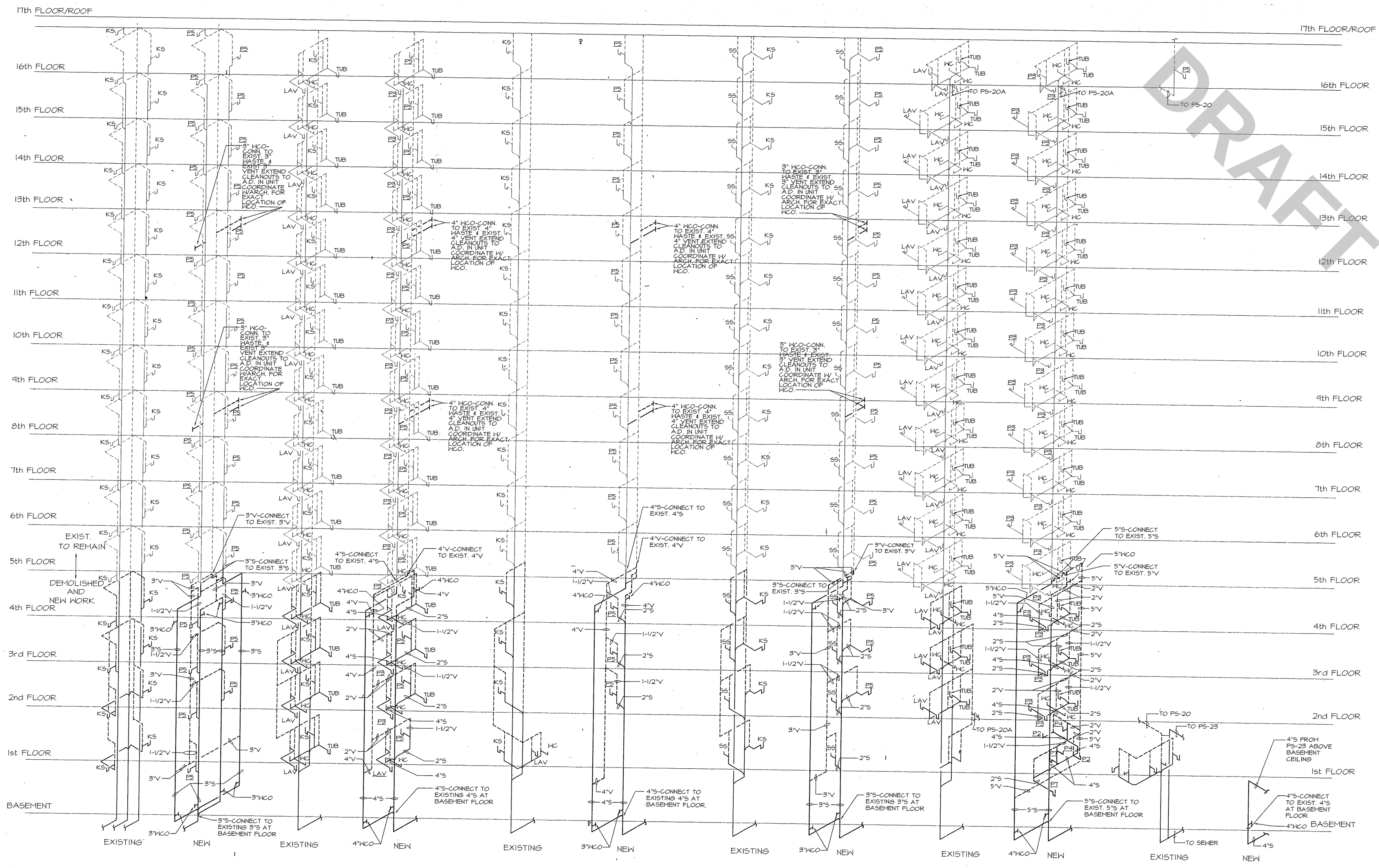
Poster Frost Associates, Inc.
Architecture Planning Urban Design
317 North Court Avenue Tucson, Arizona 85701 (520) 882-8310

PLUMBING RISERS

TUCSON HOUSE
TAX CREDIT
REHABILITATION

project no.	450
date	AUGUST 1997
revised	

P2.6



NOTE: REPLACE ALL WASTE AND VENT PIPING

LEGEND

- KS - EXISTING KITCHEN SINK
- SH - EXISTING SHOWER
- LAV - EXISTING LAVATORY
- WC - EXISTING WATER CLOSET
- TUB - EXISTING BATH TUB
- SS - SERVICE SINK
- NEW FIXTURES REFER TO P# AND FIXTURE SCHEDULES

SMU Mechanical Engineering, LLC
5447 East Fifth Street # 216
Tucson, Arizona 85711
520/327-7611
JOB # 26996

DRAFT

REGISTERED ARCHITECT CERTIFICATE NO. 23237 STEVEN M. CARLOS EROSE STATE OF ARIZONA

REGISTERED PROFESSIONAL ENGINEER CERTIFICATE NO. 23237 STEVEN M. UNDURRA STATE OF ARIZONA

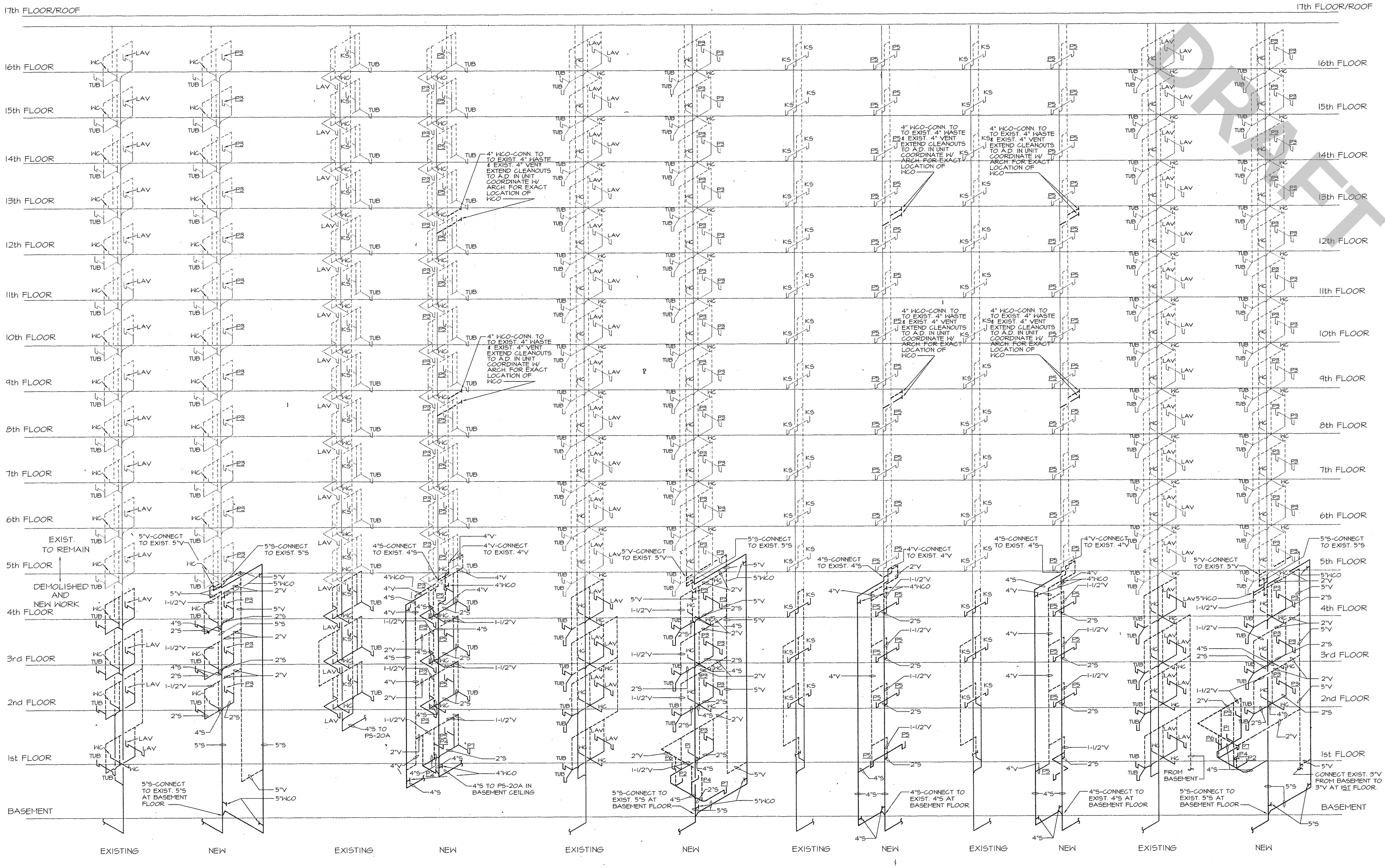
Poster Frost Associates, Inc.
Architecture Planning Urban Design
317 North Court Avenue Tucson, Arizona 85701 (520) 882-6310

PLUMBING RISERS

TUCSON HOUSE TAX CREDIT REHABILITATION

project no. 450
date AUGUST 1997
revised

P2.7



NOTE: REPLACE ALL WASTE AND VENT PIPING

LEGEND

- KS - EXISTING KITCHEN SINK
- SH - EXISTING SHOWER
- LAV - EXISTING LAVATORY
- WC - EXISTING WATER CLOSET
- TUB - EXISTING BATH TUB
- SS - SERVICE SINK
- AD - ACCESS DOOR
- NEW FIXTURES REFER TO P# AND FIXTURE SCHEDULES

DRAFT

Poster Frost Associates, Inc.
Architecture Planning Urban Design
317 North Court Avenue Tucson, Arizona 85701 (520) 882-8310

PLUMBING RISERS

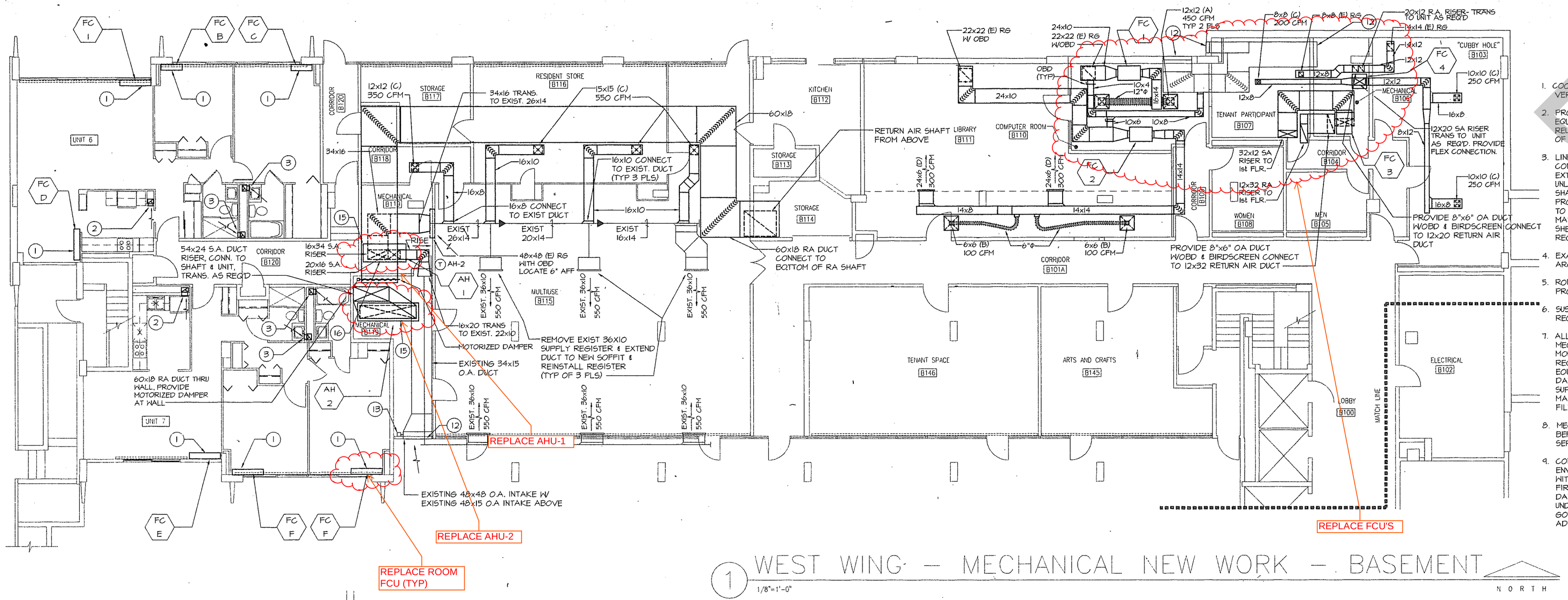
TUCSON HOUSE TAX CREDIT REHABILITATION

project no. 450
date AUGUST 1997
revised

P2.8

SMU Mechanical Engineering, LLC
5447 East Fifth Street # 216
Tucson, Arizona 85711
520/327-7611

JOB # 26996



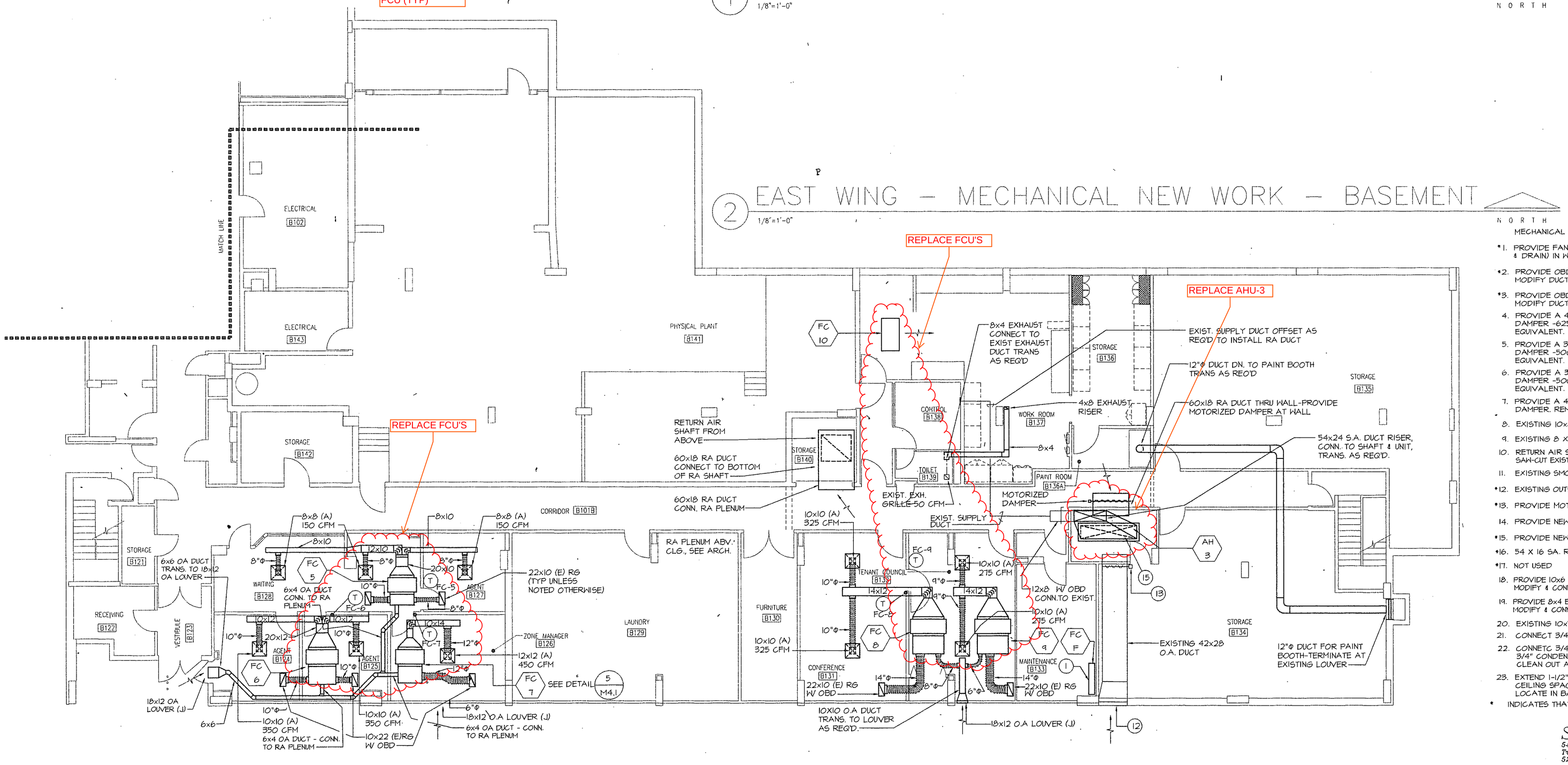
1 WEST WING – MECHANICAL NEW WORK – BASEMENT

1/8"=1'-0"

NORTH

MECHANICAL GENERAL NOTES

1. COORDINATE ALL MECHANICAL WORK WITH ALL OTHER TRADES. VERIFY ALL EXISTING CONDITIONS BEFORE THE START OF WORK.
2. PROVIDE ALL REQUIRED DEMOLITION OF EXISTING MECHANICAL EQUIPMENT, MATERIALS AND OTHER ITEMS WHICH ARE NOT TO BE REUSED IN NEW DESIGN. ALL ITEMS SHALL BECOME THE PROPERTY OF THE CONTRACTOR AND SHALL BE REMOVED FROM THE SITE.
3. LINE ALL RECTANGULAR AIR CONDITIONING DUCTWORK. ALL AIR CONDITIONING DUCTWORK NOT INTERNALLY LINED SHALL BE EXTERNALLY WRAPPED WITH INSULATION AS PER SPECIFICATIONS. UNLESS INSTRUCTED OTHERWISE ON THE DRAWINGS, ALL ELBOWS SHALL BE MITERED WITH SINGLE THICKNESS TURNING VANES. PROVIDE 45 DEGREE ENTRY FITTINGS AT BRANCH DUCT CONNECTIONS TO DUCT MAINS. FLEXIBLE DUCTS SHALL BE INSTALLED TO MAINTAIN FULL CROSS-SECTIONAL FREE AREA. PROVIDE RIGID SHEET METAL ELBOWS OR LINED PLENUM BOXES AT AIR DEVICES AS REQUIRED.
4. EXACT LOCATION OF ALL AIR DEVICES SHALL BE AS PER ARCHITECTURAL REFLECTIVE CEILING PLAN.
5. ROUTE ALL CONDENSATE DRAIN LINES AS INDICATED ON DRAWINGS. PROVIDE MINIMUM SLOPE OF 1/8" PER 1'-0".
6. SUSPEND FAN COIL UNIT FROM STRUCTURE WITH THREADED RODS AS REQUIRED.
7. ALL LOW VOLTAGE CONTROL WIRING AND ITS INSTALLATION TO BE BY MECHANICAL CONTRACTOR. INSTALL AS PER DIVISION 16. MOUNTING HEIGHT OF THERMOSTATS TO BE AS PER ADA REQUIREMENTS. PROVIDE SMOKE DETECTOR IN SUPPLY DUCT OF ALL EQUIPMENT SUPPLYING MORE THAN 2000 CFM OR WHERE SMOKE DAMPERS ARE PROVIDED. SMOKE DETECTORS SHALL DISENGAGE SUPPLY FAN WHEN ACTIVATED. SMOKE DETECTORS INSTALLED IN THE MAIN SUPPLY AIR DUCT MUST BE LOCATED DOWNSTREAM OF THE FILTERS.
8. MECHANICAL CONTRACTOR SHALL REVIEW ALL ELECTRICAL DRAWINGS BEFORE PURCHASING EQUIPMENT TO INSURE THAT PROPER ELECTRICAL SERVICE IS TO BE PROVIDED FOR ALL NEW EQUIPMENT.
9. CONTRACTOR TO VERIFY THAT ALL COMBINATION FIRE/SMOKE ENVELOPES AS INDICATED ON THE DRAWINGS HAVE BEEN PROVIDE WITH LISTED FIRE DAMPERS AS REQUIRED BY CODE. COMBINATION FIRE/SMOKE DAMPERS SHALL BE UL LISTED AND INSTALLATION OF DAMPERS SHALL MEET OR EXCEED ALL REQUIREMENTS OF UNDERWRITERS LABORATORY, NFPA, UMC AND ALL OTHER CODES GOVERNING FIRE DAMPER INSTALLATION. SEE SPECIFICATIONS FOR ADDITIONAL NOTES.



2 EAST WING – MECHANICAL NEW WORK – BASEMENT

1/8"=1'-0"

NORTH

MECHANICAL KEYNOTES - NEW WORK

*1. PROVIDE FAN COIL UNIT, CONNECT TO EXISTING PIPING (SUPPLY, RETURN, & DRAIN) IN WALL. MODIFY/EXTEND PIPING FULL SIZE & PATCH WALL AS REQ'D.

*2. PROVIDE OBD BEHIND EXIST. 10x6 EXHAUST GRILLE, 120 CFM MODIFY DUCT AS REQUIRED.

*3. PROVIDE OBD BEHIND EXIST. 8 X 4 EXHAUST GRILLE, 50 CFM MODIFY DUCT AS REQUIRED.

4. PROVIDE A 48x12 SUPPLY GRILLE (D) W/ 36x12 COMBINATION FIRE/SMOKE DAMPER -625 CFM. REMOVE AND PATCH WALL AS REQ'D.-RUSKIN FSD60FA OR EQUIVALENT.

5. PROVIDE A 36x12 SUPPLY GRILLE (D) W/ 24x12 COMBINATION FIRE/SMOKE DAMPER -500 CFM. REMOVE AND PATCH WALL AS REQ'D.-RUSKIN FSD60FA OR EQUIVALENT.

6. PROVIDE A 30x16 SUPPLY GRILLE (D) W/ 18x16 COMBINATION FIRE/SMOKE DAMPER -500 CFM. REMOVE AND PATCH WALL AS REQ'D.-RUSKIN FSD60FA OR EQUIVALENT.

7. PROVIDE A 48x12 RETURN GRILLE (H) W/ 36x12 COMBINATION FIRE/SMOKE DAMPER. REMOVE AND PATCH WALL AS REQ'D.-RUSKIN FSD 60FA OR EQUIVALENT

8. EXISTING 10x8 EXHAUST RISER

9. EXISTING 8 X 6 EXHAUST RISER

10. RETURN AIR SHAFT; SEAL ALL EXIST. WALL PENETRATIONS; SAW-CUT EXISTING FLOOR.

11. EXISTING SMOKE RELIEF ASSEMBLY TO REMAIN

*12. EXISTING OUTSIDE AIR INTAKE, TO REMAIN

*13. PROVIDE MOTORIZED DAMPER IN EXISTING OUTSIDE AIR DUCT.

14. PROVIDE NEW EXHAUST FAN. RECONNECT DUCTWORK TO EXISTING.

*15. PROVIDE NEW AIR HANDLER. RECONNECT DUCTWORK, PIPING, ETC. TO EXISTING.

*16. 54 X 16 SA. RISER-TRANS. TO UNIT AS REQ'D.

*17. NOT USED

18. PROVIDE 10x6 EXHAUST GRILLE W/OBD & FD (G), 120 CFM MODIFY & CONNECT TO EXIST. DUCT RISER AS REQ'D.

19. PROVIDE 8x4 EXHAUST GRILLE W/OBD & FD (G), 50 CFM MODIFY & CONNECT TO EXIST. DUCT RISER AS REQ'D.

20. EXISTING 10x7 EXHAUST RISER.

21. CONNECT 3/4" CHWS/CHWR TO EXIST 3/4" ABOVE CEILING.

22. CONNETC 3/4" CHWS/CHWR TO EXIST. PIPING IN SHAFT. CONNECT 3/4" CONDENSATE DRAIN TO EXIST DRAIN LINE IN SHAFT. PROVIDE CLEAN OUT AT EACH CHANGE OF DIRECTION.

23. EXTEND 1-1/2" SUPPLY, 1" RETURN, & 1" DRAIN LINES FROM 1st FLOOR CEILING SPACE DOWN TO BASEMENT. RECONECT LINES TO MAINS LOCATE IN BASEMENT. FIELD VERIFY SIZES.

* INDICATES THAT NOTE APPLIES TO THIS SHEET

SMU Mechanical Engineering, LLC
5447 East Fifth Street # 216
Tucson, Arizona 85711
520/327-7611
JOB # 26996

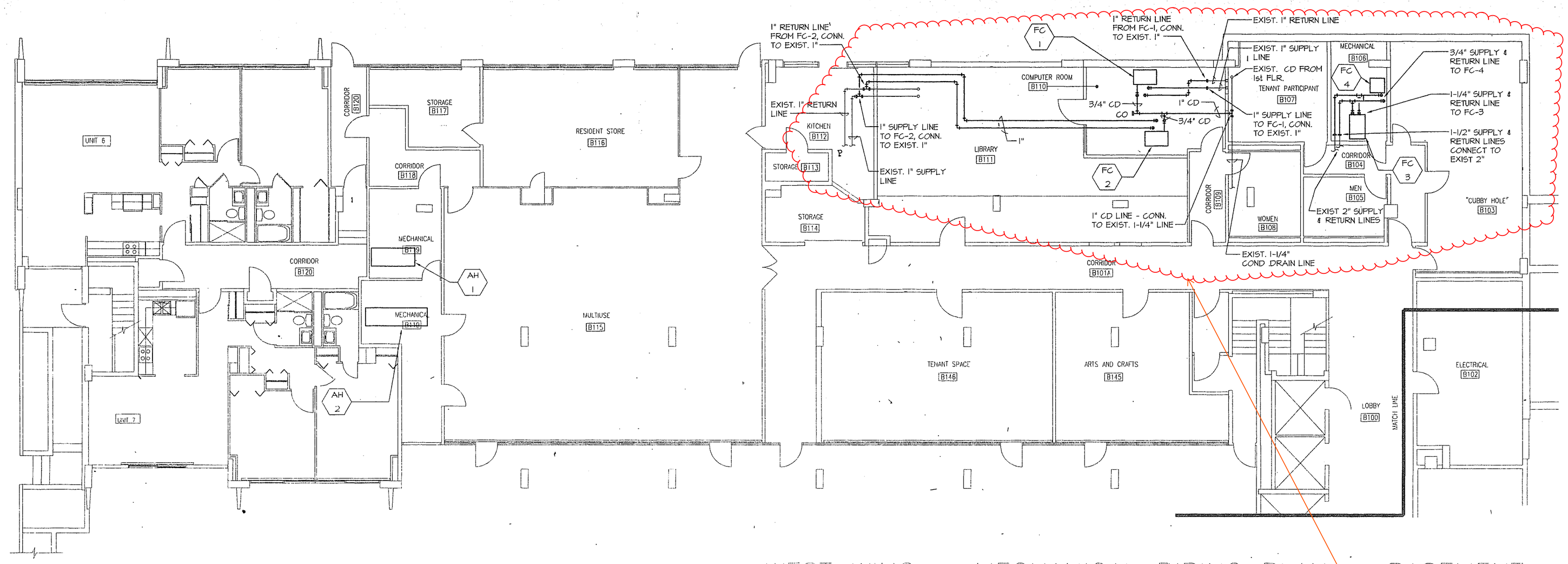
Poster Frost Associates, Inc.
Architecture Planning Urban Design
317 North Court Avenue Tucson, Arizona 85701 (520) 882-6310

MECHANICAL PLAN
BASEMENT

TUCSON HOUSE
TAX CREDIT
REHABILITATION

project no.	450
date	AUGUST 1997
revised	

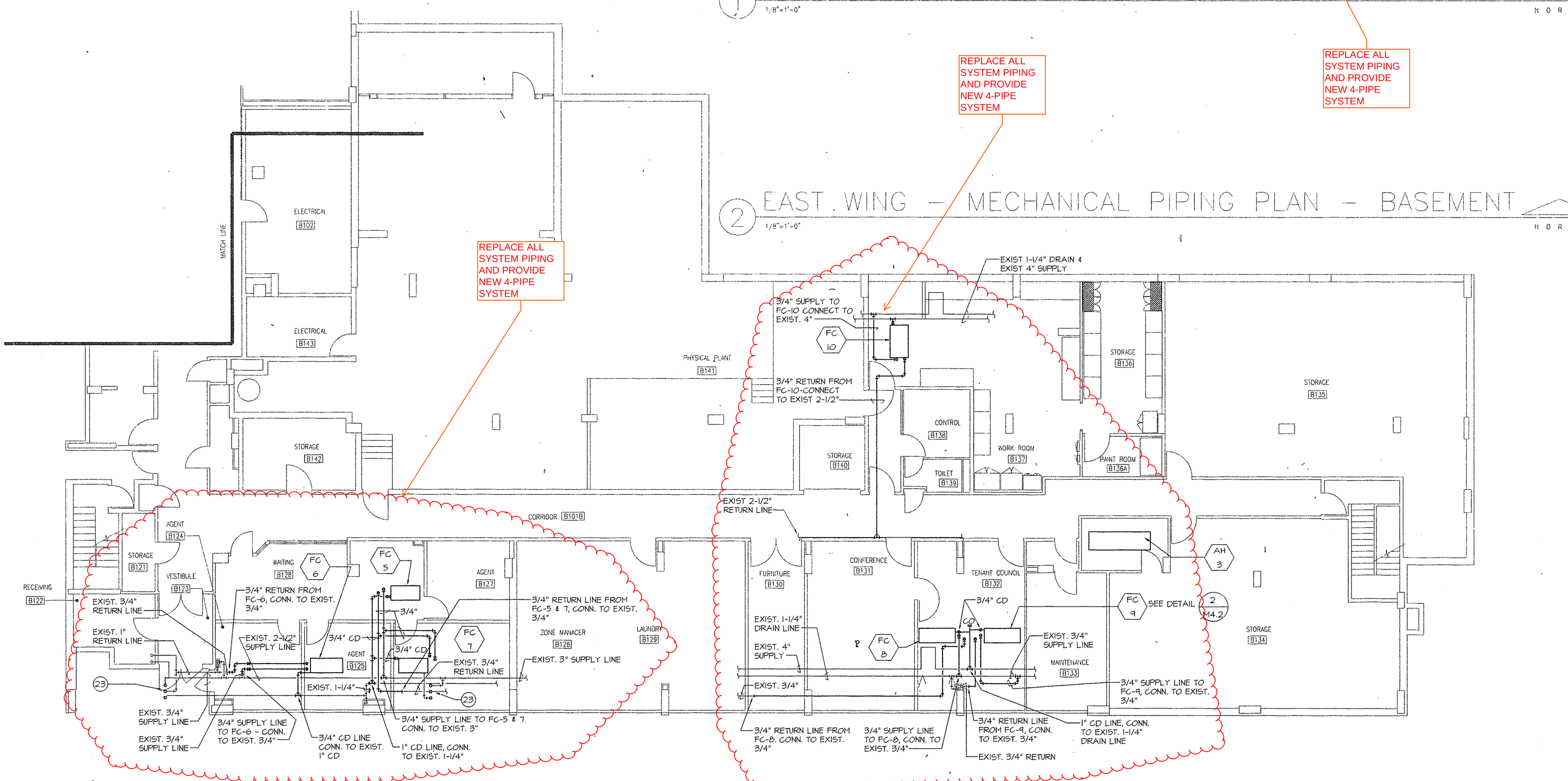
M2.1



1 WEST WING – MECHANICAL PIPING PLAN – BASEMENT

1/8"=1'-0"

NORTH



2 EAST WING – MECHANICAL PIPING PLAN – BASEMENT

1/8"=1'-0"

NORTH

MECHANICAL KEYNOTES - NEW WORK

1. PROVIDE FAN COIL UNIT, CONNECT TO EXISTING PIPING (SUPPLY, RETURN, & DRAIN) IN WALL. MODIFY/EXTEND PIPING FULL SIZE & PATCH ALL AS REQ'D.
2. PROVIDE OBD BEHIND EXIST. 10x6 EXHAUST GRILLE, 120 CFM MODIFY DUCT AS REQUIRED.
3. PROVIDE OBD BEHIND EXIST.8 X 4 EXHAUST GRILLE, 50 CFM MODIFY DUCT AS REQUIRED.
4. PROVIDE A 48x12 SUPPLY GRILLE (D) W/ 36x12 COMBINATION FIRE/SMOKE DAMPER -625 CFM. REMOVE AND PATCH WALL AS REQ'D.-RUSKIN FSD60FA OR EQUIVALENT.
5. PROVIDE A 36x12 SUPPLY GRILLE (D) W/ 24x12 COMBINATION FIRE/SMOKE DAMPER -500 CFM. REMOVE AND PATCH WALL AS REQ'D.-RUSKIN FSD60FA OR EQUIVALENT.
6. PROVIDE A 30x16 SUPPLY GRILLE (D) W/ 18x16 COMBINATION FIRE/SMOKE DAMPER -500 CFM. REMOVE AND PATCH WALL AS REQ'D.-RUSKIN FSD60FA OR EQUIVALENT.
7. PROVIDE A 48x12 RETURN GRILLE (H) W/ 36x12 COMBINATION FIRE/SMOKE DAMPER. REMOVE AND PATCH WALL AS REQ'D. - RUSKIN FSD60FA OR EQUIVALENT
8. EXISTING 10x8 EXHAUST RISER
9. EXISTING 8 X 6 EXHAUST RISER
10. RETURN AIR SHAFT; SEAL ALL EXIST. WALL PENETRATIONS; SAW-CUT EXISTING FLOOR.
11. EXISTING SMOKE RELIEF ASSEMBLY TO REMAIN
12. EXISTING OUTSIDE AIR INTAKE.
13. PROVIDE MOTORIZED DAMPER IN EXISTING OUTSIDE AIR DUCT.
14. PROVIDE NEW EXHAUST FAN. RECONNECT DUCTWORK TO EXIST.
15. PROVIDE NEW AIR HANDLER. RECONNECT DUCTWORK, PIPING, ETC. TO EXIST.
16. 54 X 16 SA. RISER-TRANS. TO UNIT AS REQ'D.
17. NOT USED
18. PROVIDE 10x6 EXHAUST GRILLE W/OBD & FD (G), 120 CFM MODIFY & CONNECT TO EXIST. DUCT RISER AS REQ'D.
19. PROVIDE 8x4 EXHAUST GRILLE W/OBD & FD (G), 50 CFM MODIFY & CONNECT TO EXIST. DUCT RISER AS REQ'D.
20. EXISTING 10x1 EXHAUST RISER.
21. CONNECT 3/4" CHWS/CHWR TO EXIST 3/4" ABOVE CEILING.
22. CONNECT 3/4" CHWS/CHWR TO EXIST. PIPING IN SHAFT. CONNECT 3/4" CONDENSATE DRAIN TO EXIST DRAIN LINE IN SHAFT. PROVIDE CLEAN OUT AT EACH CHANGE OF DIRECTION.
*23. EXTEND 1-1/2" SUPPLY, 1" RETURN, & 1" DRAIN LINES FROM 1st FLOOR CEILING SPACE DOWN TO BASEMENT RECONNECT LINES TO MAINS LOCATE IN BASEMENT. FIELD VERIFY SIZES.

* INDICATES THAT NOTE APPLIES TO THIS SHEET

DRAFT

Poster Frost Associates, Inc.
Architecture Planning Urban Design
317 North Court Avenue Tucson, Arizona 85701 (520) 882-6310

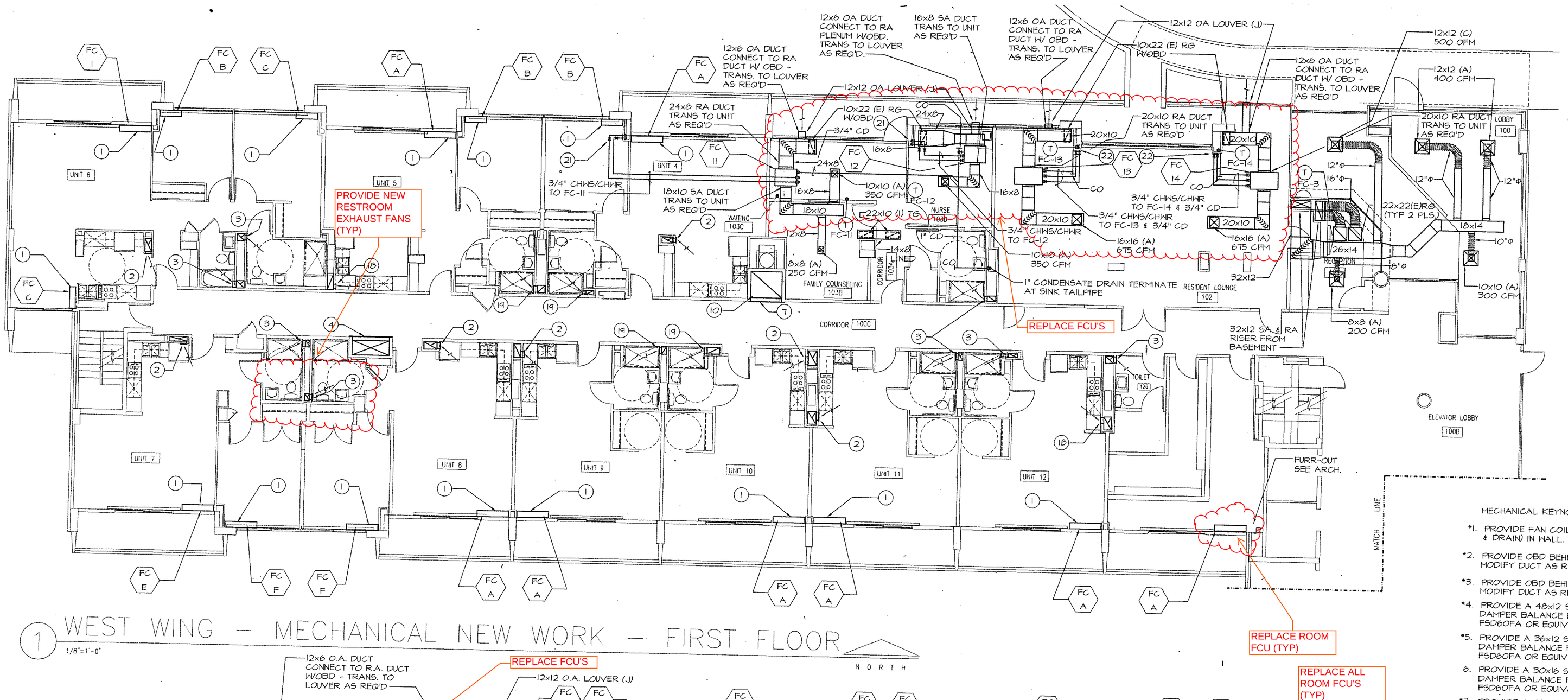
MECHANICAL PIPING PLAN BASEMENT

TUCSON HOUSE TAX CREDIT REHABILITATION

project no.	450
date	AUGUST 1997
revised	

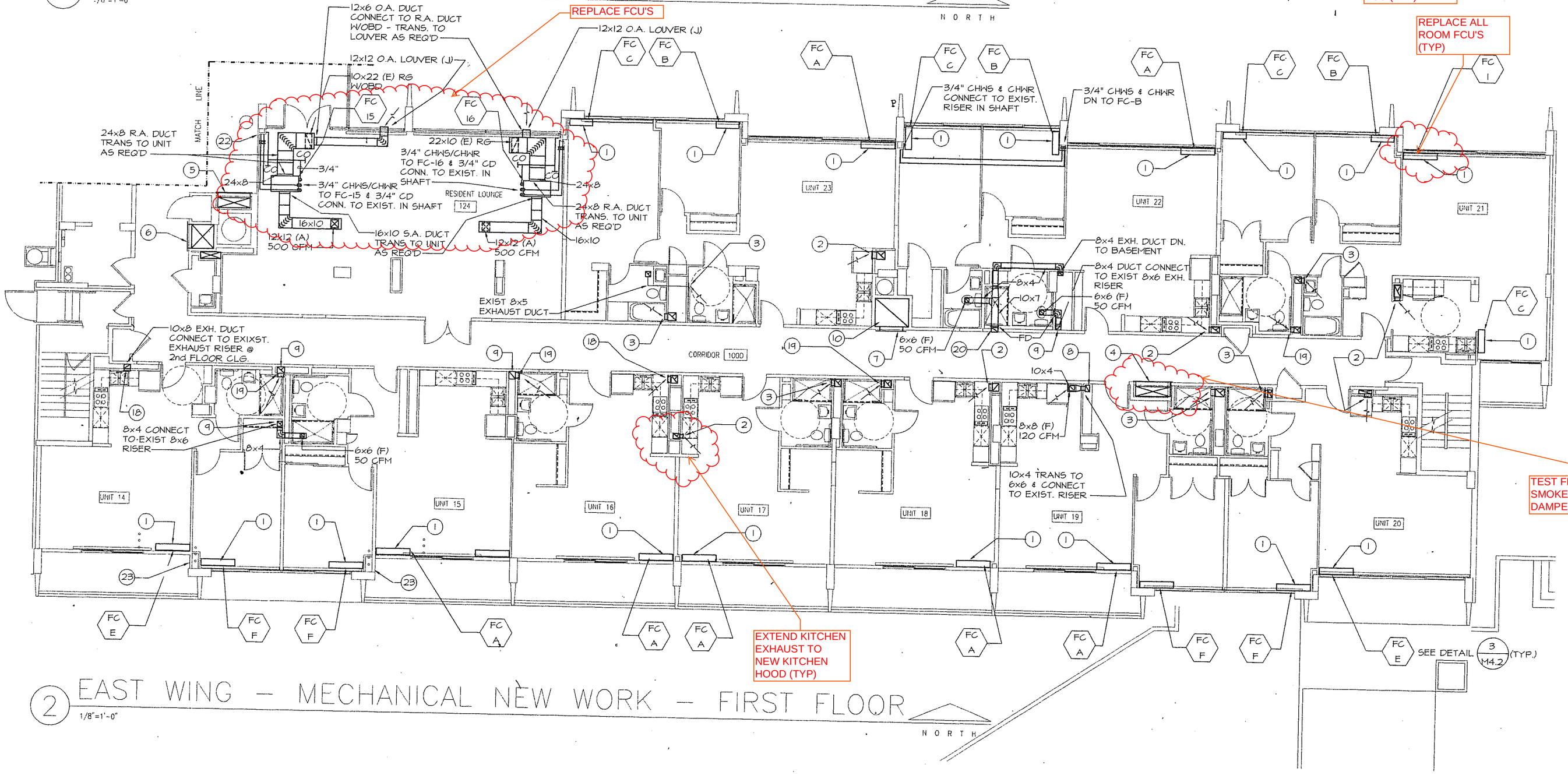
M2.1.1

SMU Mechanical Engineering, LLC
5447 East Fifth Street # 216
Tucson, Arizona 85711
520/327-7611
JOB # 26996



1 WEST WING – MECHANICAL NEW WORK – FIRST FLOOR

1/8"=1'-0"



2 EAST WING – MECHANICAL NEW WORK – FIRST FLOOR

1/8"=1'-0"

MECHANICAL KEYNOTES - NEW WORK

*1. PROVIDE FAN COIL UNIT, CONNECT TO EXISTING PIPING (SUPPLY, RETURN, & DRAIN) IN WALL. MODIFY/EXTEND PIPING FULL SIZE & PATCH ALL AS REQ'D.

*2. PROVIDE OBD BEHIND EXIST. 10x6 EXHAUST GRILLE, 120 CFM MODIFY DUCT AS REQUIRED.

*3. PROVIDE OBD BEHIND EXIST.8 X 4 EXHAUST GRILLE, 50 CFM MODIFY DUCT AS REQUIRED.

*4. PROVIDE A 48x12 SUPPLY GRILLE (D) W/ 36x12 COMBINATION FIRE/SMOKE DAMPER BALANCE FOR 625 CFM. REMOVE AND PATCH WALL AS REQ'D.-RUSKIN FSD60FA OR EQUIVALENT.

*5. PROVIDE A 36x12 SUPPLY GRILLE (D) W/ 24x12 COMBINATION FIRE/SMOKE DAMPER BALANCE FOR 500 CFM. REMOVE AND PATCH WALL AS REQ'D.-RUSKIN FSD60FA OR EQUIVALENT.

6. PROVIDE A 30x16 SUPPLY GRILLE (D) W/ 18x16 COMBINATION FIRE/SMOKE DAMPER BALANCE FOR 500 CFM. REMOVE AND PATCH WALL AS REQ'D.-RUSKIN FSD60FA OR EQUIVALENT.

*7. PROVIDE A 48x12 RETURN GRILLE (H) W/ 36x12 COMBINATION FIRE/SMOKE DAMPER. REMOVE AND PATCH WALL AS REQ'D. RUSKIN FSD60FA OR EQUIVALENT.

*8. EXISTING 10x8 EXHAUST RISER

*9. EXISTING 8 X 6 EXHAUST RISER

10. RETURN AIR SHAFT; SEAL ALL EXIST. WALL PENETRATIONS; SAW-CUT EXISTING FLOOR.

11. EXISTING SMOKE RELIEF ASSEMBLY TO REMAIN

12. EXISTING OUTSIDE AIR INTAKE.

13. PROVIDE MOTORIZED DAMPER IN EXISTING OUTSIDE AIR DUCT.

14. PROVIDE NEW EXHAUST FAN. RECONNECT DUCTWORK TO EXISTING.

15. PROVIDE NEW AIR HANDLER. RECONNECT DUCTWORK, PIPING, ETC. TO EXISTING.

16. 54 X 16 SA. RISER-TRANS. TO UNIT AS REQ'D.

17. NOT USED

*18. PROVIDE 10x6 EXHAUST GRILLE W/OBD & FD (G), 120 CFM MODIFY & CONNECT TO EXIST. DUCT RISER AS REQ'D.

*19. PROVIDE 8x4 EXHAUST GRILLE W/OBD & FD (G), 50 CFM MODIFY & CONNECT TO EXIST. DUCT RISER AS REQ'D.

*20. EXISTING 10x7 EXHAUST RISER.

*21. CONNECT 3/4" CHWS/CHWR TO EXIST 3/4" ABOVE CEILING.

*22. CONNECT 3/4" CHWS/CHWR TO EXIST. PIPING IN SHAFT. CONNECT 3/4" CONDENSATE DRAIN TO EXIST DRAIN LINE IN SHAFT. PROVIDE CLEAN OUT AT EACH CHANGE OF DIRECTION.

23. EXTEND 2-1/2" SUPPLY, 1" RETURN, & 1" DRAIN LINES FROM 1st FLOOR CEILING SPACE DOWN TO BASEMENT RECONECT LINES TO MAINS LOCATE IN BASEMENT. FIELD VERIFY SIZES.

* INDICATES THAT NOTE APPLIES TO THIS SHEET

SMU Mechanical Engineering, LLC
5447 East Fifth Street # 216
Tucson, Arizona 85711
520/327-7611

JOB # 26996

DRAFT

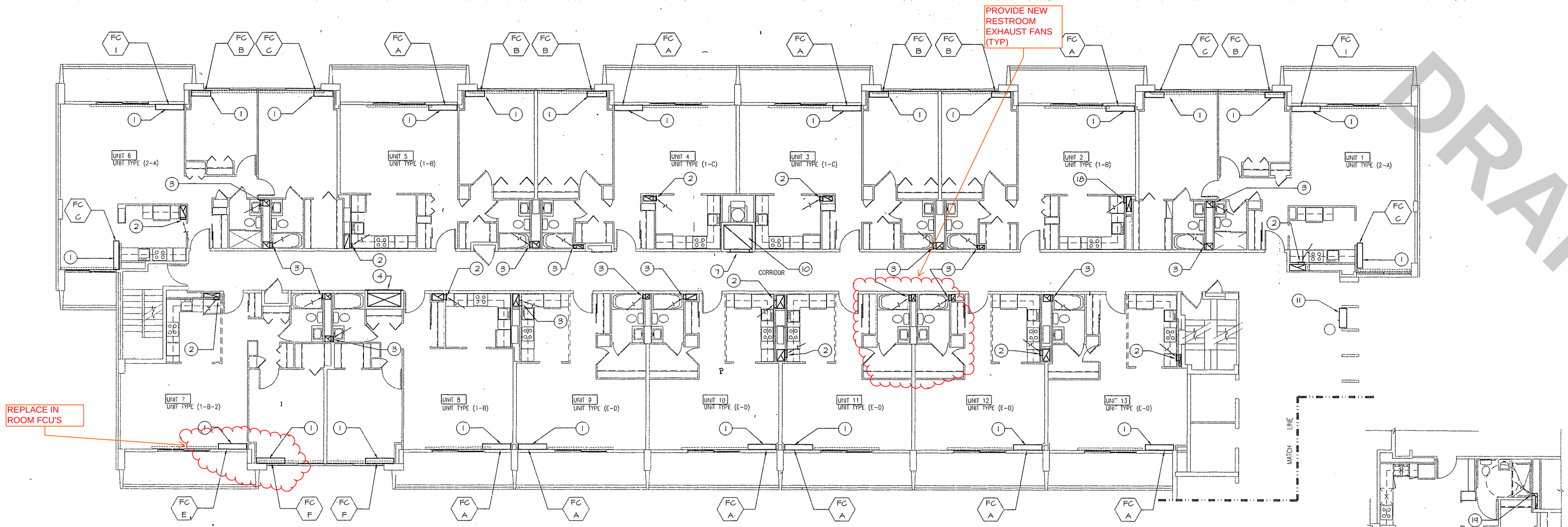
Poster Frost Associates, Inc.
Architecture Planning Urban Design
317 North Court Avenue Tucson, Arizona 85701 (520) 882-6310

MECHANICAL PLAN
FIRST FLOOR

TUCSON HOUSE
TAX CREDIT
REHABILITATION

project no. 450
date AUGUST 1997
revised

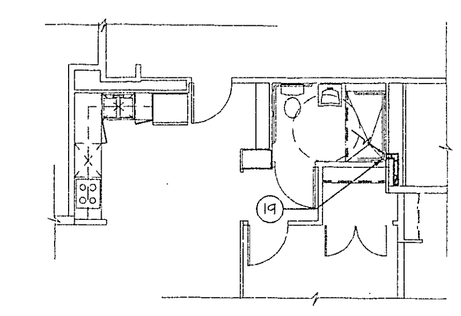
M2.2



1 WEST WING – MECHANICAL NEW WORK – FLOORS 2 THRU 4

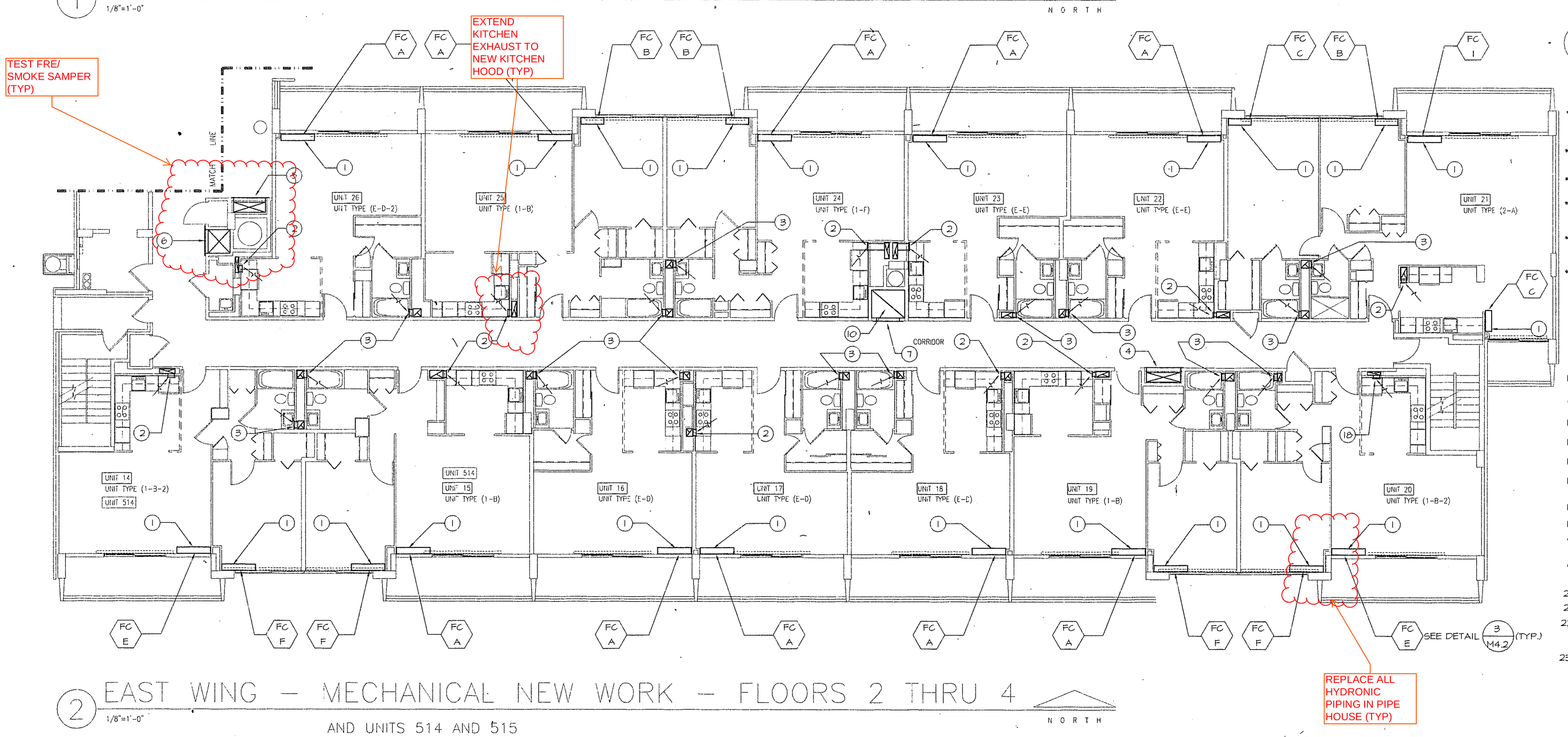
1/8"=1'-0"

NORTH



3 HANDICAPPED UNIT @214 ONLY

1/8"=1'-0"



2 EAST WING – MECHANICAL NEW WORK – FLOORS 2 THRU 4

1/8"=1'-0"

AND UNITS 514 AND 515

NORTH

MECHANICAL KEYNOTES - NEW WORK

*1. PROVIDE FAN COIL UNIT, CONNECT TO EXISTING PIPING (SUPPLY, RETURN, & DRAIN) IN WALL. MODIFY/EXTEND PIPING FULL SIZE & PATCH ALL AS REQ'D.

*2. PROVIDE OBD BEHIND EXIST. 10x6 EXHAUST GRILLE, 120 CFM MODIFY DUCT AS REQUIRED.

*3. PROVIDE OBD BEHIND EXIST.8 X 4 EXHAUST GRILLE, 50 CFM MODIFY DUCT AS REQUIRED.

*4. PROVIDE A 48x12 SUPPLY GRILLE (D) W/ 36x12 COMBINATION FIRE/SMOKE DAMPER BAL. FOR 625 CFM. REMOVE AND PATCH WALL AS REQ'D.-RUSKIN FSD60FA OR EQUIVALENT. SEE DETAIL 4/SHT. 4.1.

*5. PROVIDE A 36x12 SUPPLY GRILLE (D) W/ 24x12 COMBINATION FIRE/SMOKE DAMPER BAL. FOR 500 CFM. REMOVE AND PATCH WALL AS REQ'D.-RUSKIN FSD60FA OR EQUIVALENT. SEE DETAIL 4/SHT. 4.1.

*6. PROVIDE A 30x16 SUPPLY GRILLE (D) W/ 18x16 COMBINATION FIRE/SMOKE DAMPER BAL. FOR 500 CFM. REMOVE AND PATCH WALL AS REQ'D.-RUSKIN FSD60FA OR EQUIVALENT. SEE DETAIL 4/SHT. 4.1.

7. PROVIDE A 48x12 RETURN GRILLE (H) W/ 36x12 COMBINATION FIRE/SMOKE DAMPER. REMOVE AND PATCH WALL AS REQ'D. RUSKIN FSD60FA OR EQUIVALENT.

8. EXISTING 10x8 EXHAUST RISER

9. EXISTING 8 X 6 EXHAUST RISER

10. RETURN AIR SHAFT; SEAL ALL EXIST. WALL PENETRATIONS; SAW-CUT EXISTING FLOOR.

*11. EXISTING SMOKE RELIEF ASSEMBLY TO REMAIN

12. EXISTING OUTSIDE AIR INTAKE.

13. PROVIDE MOTORIZED DAMPER IN EXISTING OUTSIDE AIR DUCT.

14. PROVIDE NEW EXHAUST FAN. RECONNECT DUCTWORK TO EXISTING.

15. PROVIDE NEW AIR HANDLER. RECONNECT DUCTWORK, PIPING, ETC. TO EXISTING.

16. 54 X 16 SA. RISER-TRANS. TO UNIT AS REQ'D.

17. NOT USED

*18. PROVIDE 10x6 EXHAUST GRILLE W/OBD & FD (G), 120 CFM MODIFY & CONNECT TO EXIST. DUCT RISER AS REQ'D.

*19. PROVIDE 8x4 EXHAUST GRILLE W/OBD & FD (G), 50 CFM MODIFY & CONNECT TO EXIST. DUCT RISER AS REQ'D.

20. EXISTING 10x7 EXHAUST RISER.

21. CONNECT 3/4" CHWS/CHWR TO EXIST 3/4" ABOVE CEILING.

22. CONNETC 3/4" CHWS/CHWR TO EXIST. PIPING IN SHAFT. CONNECT 3/4" CONDENSATE DRAIN TO EXIST DRAIN LINE IN SHAFT. PROVIDE CLEAN OUT AT EACH CHANGE OF DIRECTION.

23. EXTEND 1-1/2" SUPPLY, 1" RETURN, & 1" DRAIN LINES FROM 1st FLOOR CEILING SPACE DOWN TO BASEMENT RECONECT LINES TO MAINS LOCATE IN BASEMENT. FIELD VERIFY SIZES.

* INDICATES THAT NOTE APPLIES TO THIS SHEET

SMU Mechanical Engineering, LLC
5447 East Fifth Street # 216
Tucson, Arizona 85711
520/327-7611
JOB # 26996

DRAFT

Poster Frost Associates, Inc.
Architecture Planning Urban Design
317 North Court Avenue Tucson, Arizona 85701 (520) 882-6310

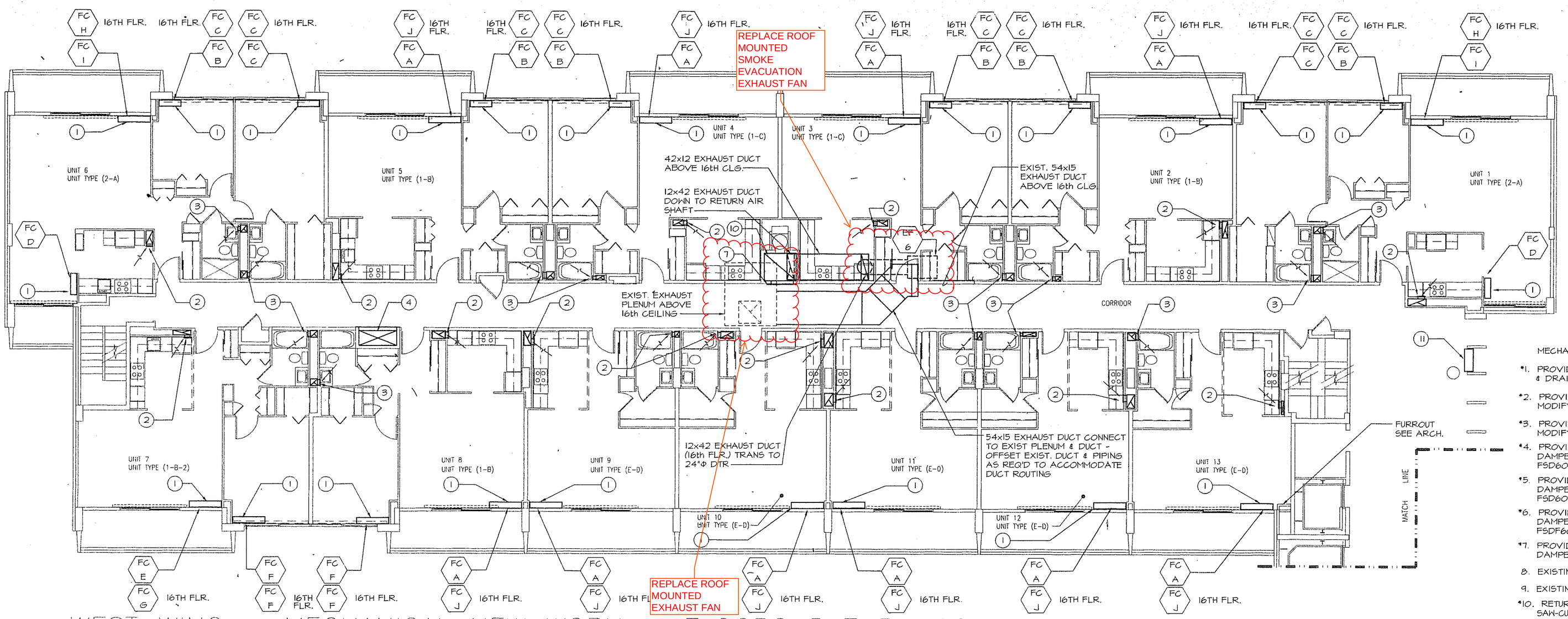
MECHANICAL PLAN
FLOORS 2 – 4

TUCSON HOUSE
TAX CREDIT
REHABILITATION

project no. 450
date AUGUST 1997
revised

M2.3

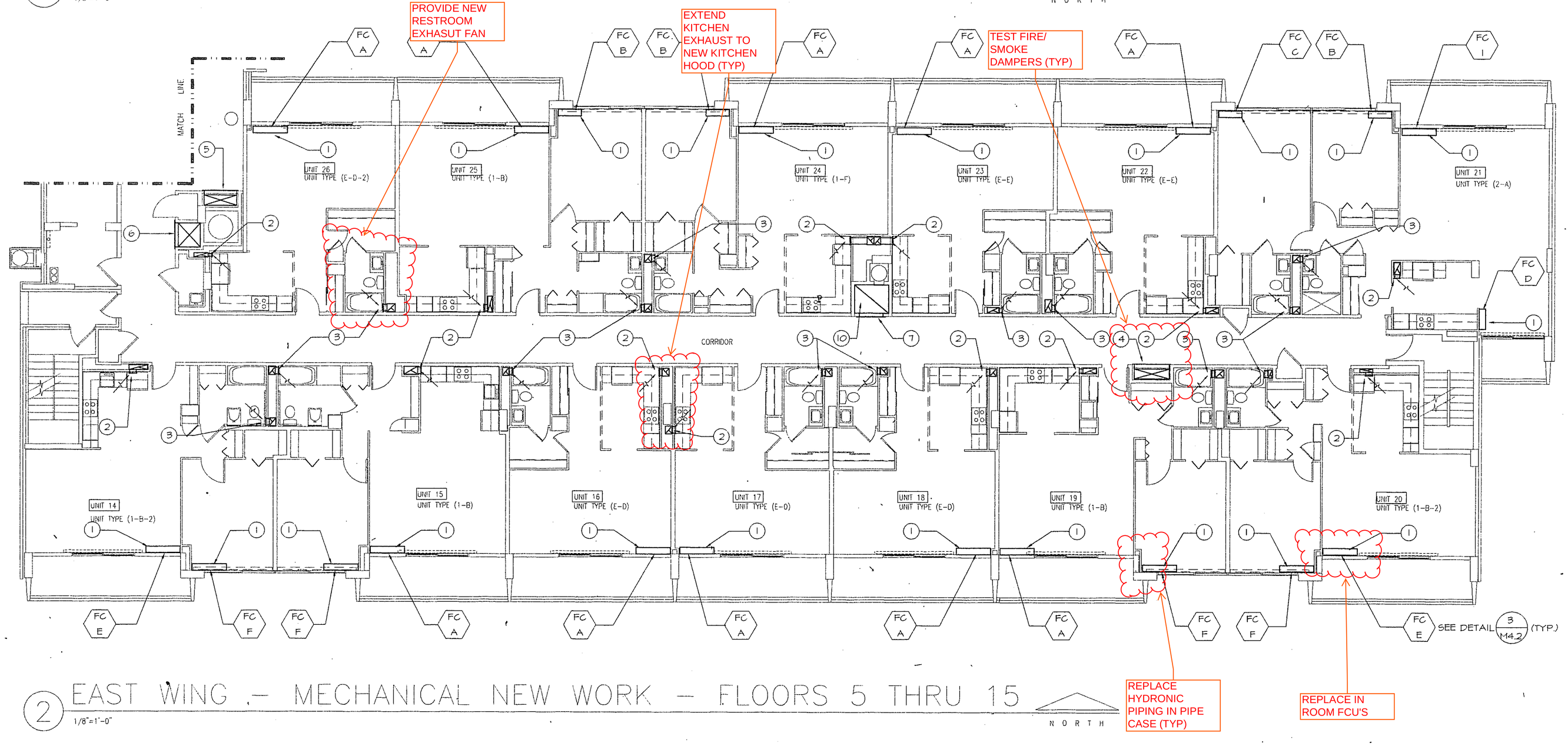
83 of 110



1 WEST WING – MECHANICAL NEW WORK – FLOORS 5 THRU 16

1/8"=1'-0"

NORTH



2 EAST WING – MECHANICAL NEW WORK – FLOORS 5 THRU 15

1/8"=1'-0"

NORTH

MECHANICAL KEYNOTES - NEW WORK

*1. PROVIDE FAN COIL UNIT, CONNECT TO EXISTING PIPING (SUPPLY, RETURN, & DRAIN) IN WALL. MODIFY/EXTEND PIPING FULL SIZE & PATCH ALL AS REQ'D.

*2. PROVIDE OBD BEHIND EXIST. 10x6 EXHAUST GRILLE, 120 CFM MODIFY DUCT AS REQUIRED.

*3. PROVIDE OBD BEHIND EXIST.8 X 4 EXHAUST GRILLE, 50 CFM MODIFY DUCT AS REQUIRED.

*4. PROVIDE A 48x12 SUPPLY GRILLE (D) W/ 36x12 COMBINATION FIRE/SMOKE DAMPER BAL. FOR 625 CFM. REMOVE AND PATCH WALL AS REQ'D.-RUSKIN FSD60FA OR EQUIVALENT.

*5. PROVIDE A 36x12 SUPPLY GRILLE (D) W/ 24x12 COMBINATION FIRE/SMOKE DAMPER BAL FOR 500 CFM. REMOVE AND PATCH WALL AS REQ'D.-RUSKIN FSD60FA OR EQUIVALENT.

*6. PROVIDE A 30x16 SUPPLY GRILLE (D) W/ 18x16 COMBINATION FIRE/SMOKE DAMPER BAL. FOR 500 CFM. REMOVE AND PATCH WALL AS REQ'D.-RUSKIN FSDF60FA OR EQUIVALENT.

*7. PROVIDE A 48x12 RETURN GRILLE (H) W/ 36x12 COMBINATION FIRE/SMOKE DAMPER. REMOVE AND PATCH WALL AS REQ'D.

8. EXISTING 10x8 EXHAUST RISER

9. EXISTING 8 X 6 EXHAUST RISER

*10. RETURN AIR SHAFT; SEAL ALL EXIST. WALL PENETRATIONS; SAW-CUT EXISTING FLOOR.

*11. EXISTING SMOKE RELIEF ASSEMBLY TO REMAIN

12. EXISTING OUTSIDE AIR INTAKE.

13. PROVIDE MOTORIZED DAMPER IN EXISTING OUTSIDE AIR DUCT.

14. PROVIDE NEW EXHAUST FAN. RECONNECT DUCTWORK TO EXISTING.

15. PROVIDE NEW AIR HANDLER. RECONNECT DUCTWORK, PIPING, ETC. TO EXISTING.

16. 54 X 16 SA. RISER-TRANS. TO UNIT AS REQ'D.

17. NOT USED

18. PROVIDE 10x6 EXHAUST GRILLE W/OBD & FD (G), 120 CFM MODIFY & CONNECT TO EXIST. DUCT RISER AS REQ'D.

19. PROVIDE 8x4 EXHAUST GRILLE W/OBD & FD (G), 50 CFM MODIFY & CONNECT TO EXIST. DUCT RISER AS REQ'D.

20. EXISTING 10x7 EXHAUST RISER.

21. CONNECT 3/4" CHWS/CHWR TO EXIST 3/4" ABOVE CEILING.

22. CONNETC 3/4" CHWS/CHWR TO EXIST. PIPING IN SHAFT. CONNECT 3/4" CONDENSATE DRAIN TO EXIST DRAIN LINE IN SHAFT. PROVIDE CLEAN OUT AT EACH CHANGE OF DIRECTION.

23. EXTEND 1-1/2" SUPPLY, 1" RETURN, & 1" DRAIN LINES FROM 1st FLOOR CEILING SPACE DOWN TO BASEMENT RECONECT LINES TO MAINS LOCATE IN BASEMENT. FIELD VERIFY SIZES.

* INDICATES THAT NOTE APPLIES TO THIS SHEET

SMU Mechanical Engineering, LLC
5447 East Fifth Street # 216
Tucson, Arizona 85711
520/327-7611

JOB # 26996

DRAFT

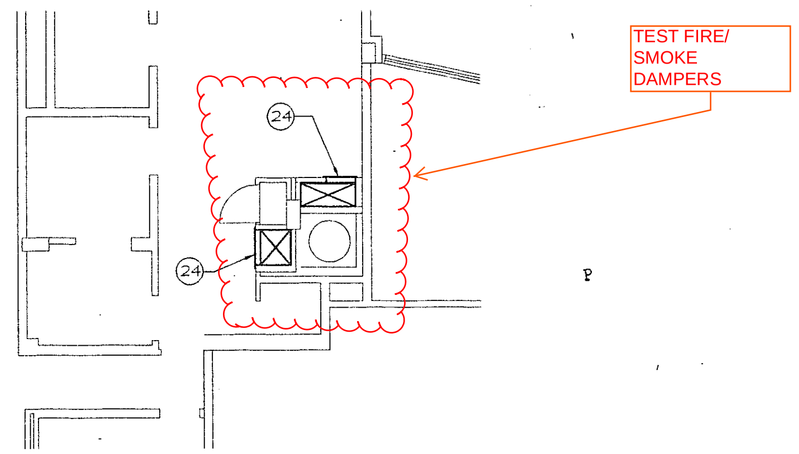
Poster Frost Associates, Inc.
Architecture Planning Urban Design
317 North Court Avenue Tucson, Arizona 85701 (520) 882-6310

MECHANICAL PLAN
FLOORS 5 – 15
16th FLOOR WEST

TUCSON HOUSE
TAX CREDIT
REHABILITATION

project no. 450
date AUGUST 1997
revised

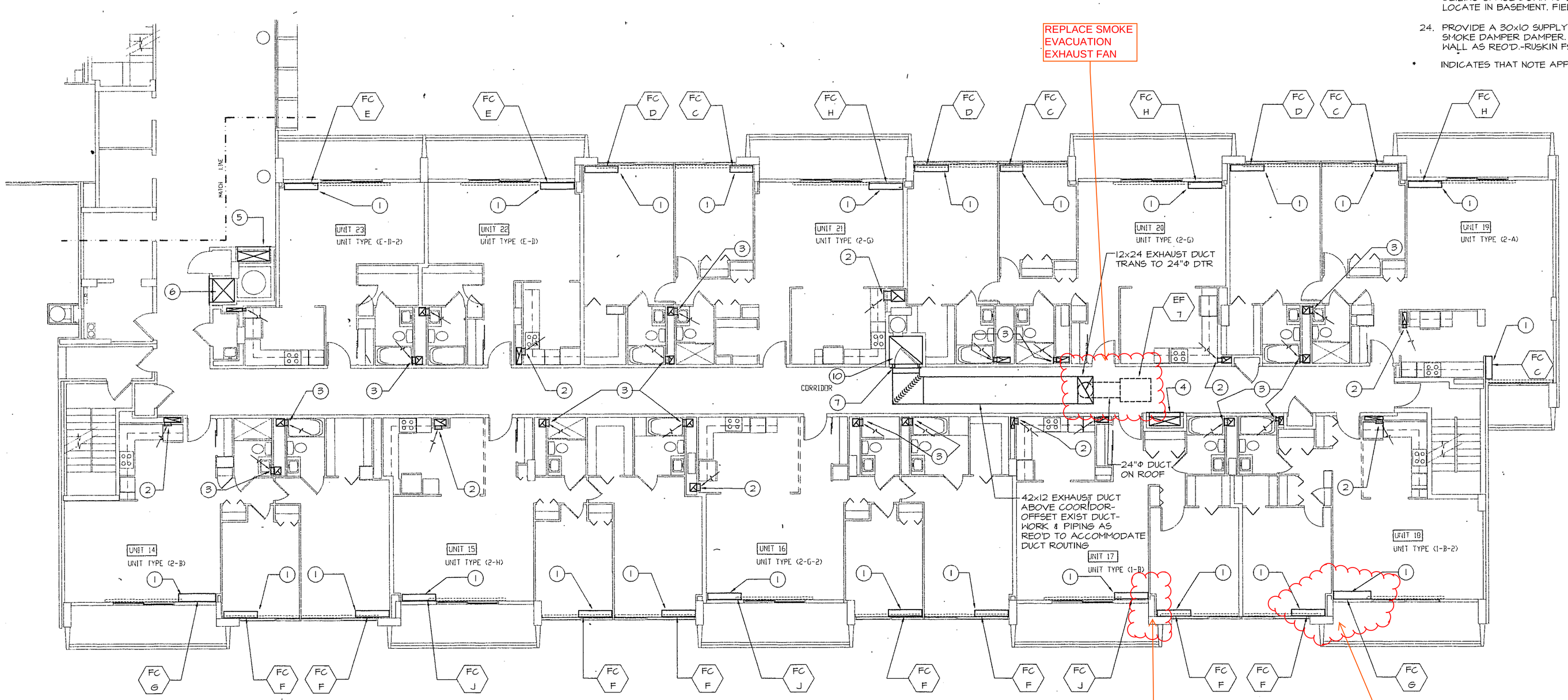
M2.4



2 17TH FLOOR - MECHANICAL PLAN

1/8"=1'-0"

NORTH



1 EAST WING - MECHANICAL NEW WORK - 16TH FLOOR

1/8"=1'-0"

FOR WEST WING SEE M2.4

NORTH

MECHANICAL KEYNOTES - NEW WORK

*1. PROVIDE FAN COIL UNIT. CONNECT TO EXISTING PIPING (SUPPLY, RETURN, & DRAIN) IN WALL. MODIFY/EXTEND PIPING FULL SIZE & PATCH ALL AS REQ'D.

*2. PROVIDE OBD BEHIND EXIST. 10x6 EXHAUST GRILLE, 120 CFM MODIFY DUCT AS REQUIRED.

*3. PROVIDE OBD BEHIND EXIST.8 X 4 EXHAUST GRILLE, 50 CFM MODIFY DUCT AS REQUIRED.

4. PROVIDE A 48x12 SUPPLY GRILLE (D) W/ 36x12 COMBINATION FIRE/SMOKE DAMPER BALANCE FOR 625 CFM. REMOVE AND PATCH WALL AS REQ'D.-RUSKIN FSD60FA OR EQUIVALENT.

5. PROVIDE A 36x12 SUPPLY GRILLE (D) W/ 24x12 COMBINATION FIRE/SMOKE DAMPER BALANCE FOR 500 CFM. REMOVE AND PATCH WALL AS REQ'D.-RUSKIN FSD60FA FOR EQUIVALENT.

6. PROVIDE A 30x16 SUPPLY GRILLE (D) W/ 18x16 COMBINATION FIRE/SMOKE DAMPER BALANCE FOR 500 CFM. REMOVE AND PATCH WALL AS REQ'D.-RUSKIN FSD60FA OR EQUIVALENT.

*7. PROVIDE A 48x12 RETURN GRILLE (H) W/ 36x12 COMBINATION FIRE/SMOKE DAMPER. REMOVE AND PATCH WALL AS REQ'D-RUSKIN FSD 60FA OR EQUIVALENT

8. EXISTING 10x8 EXHAUST RISER

9. EXISTING 8 X 6 EXHAUST RISER

*10. RETURN AIR SHAFT; SEAL ALL EXIST. WALL PENETRATIONS; SAW-CUT EXISTING FLOOR.

11. EXISTING SMOKE RELIEF ASSEMBLY TO REMAIN

12. EXISTING OUTSIDE AIR INTAKE.

13. PROVIDE MOTORIZED DAMPER IN EXISTING OUTSIDE AIR DUCT.

14. PROVIDE NEW EXHAUST FAN. RECONNECT DUCTWORK TO EXIST.

15. PROVIDE NEW AIR HANDLER. RECONNECT DUCTWORK, PIPING, ETC. TO EXIST.

16. 54 X 16 SA. RISER-TRANS. TO UNIT AS REQ'D.

17. NOT USED

18. PROVIDE 10x6 EXHAUST GRILLE W/OBD & FD (G), 120 CFM MODIFY & CONNECT TO EXIST. DUCT RISER AS REQ'D.

19. PROVIDE 8x4 EXHAUST GRILLE W/OBD & FD (G), 50 CFM MODIFY & CONNECT TO EXIST. DUCT RISER AS REQ'D.

20. EXISTING 10x7 EXHAUST RISER.

21. CONNECT 3/4" CHWS/CHWR TO EXIST 3/4" ABOVE CEILING.

22. CONNETC 3/4" CHWS/CHWR TO EXIST. PIPING IN SHAFT. CONNECT 3/4" CONDENSATE DRAIN TO EXIST DRAIN LINE IN SHAFT. PROVIDE CLEAN OUT AT EACH CHANGE OF DIRECTION.

23. EXTEND 1-1/2" SUPPLY, 1" RETURN, & 1" DRAIN LINES FROM 1st FLOOR CEILING SPACE DOWN TO BASEMENT RECONECT LINES TO MAINS LOCATE IN BASEMENT. FIELD VERIFY SIZES.

24. PROVIDE A 30x10 SUPPLY GRILLE (D) W/ 18x10 COMBINATION FIRE/SMOKE DAMPER DAMPER. BALANCE FOR 275 CFM. REMOVE AND PATCH WALL AS REQ'D.-RUSKIN FSD60FA OR EQUIVALENT.

* INDICATES THAT NOTE APPLIES TO THIS SHEET

DRAFT

SMU Mechanical Engineering, LLC
5447 East Fifth Street # 216
Tucson, Arizona 85711
520/327-7611
JOB # 26896

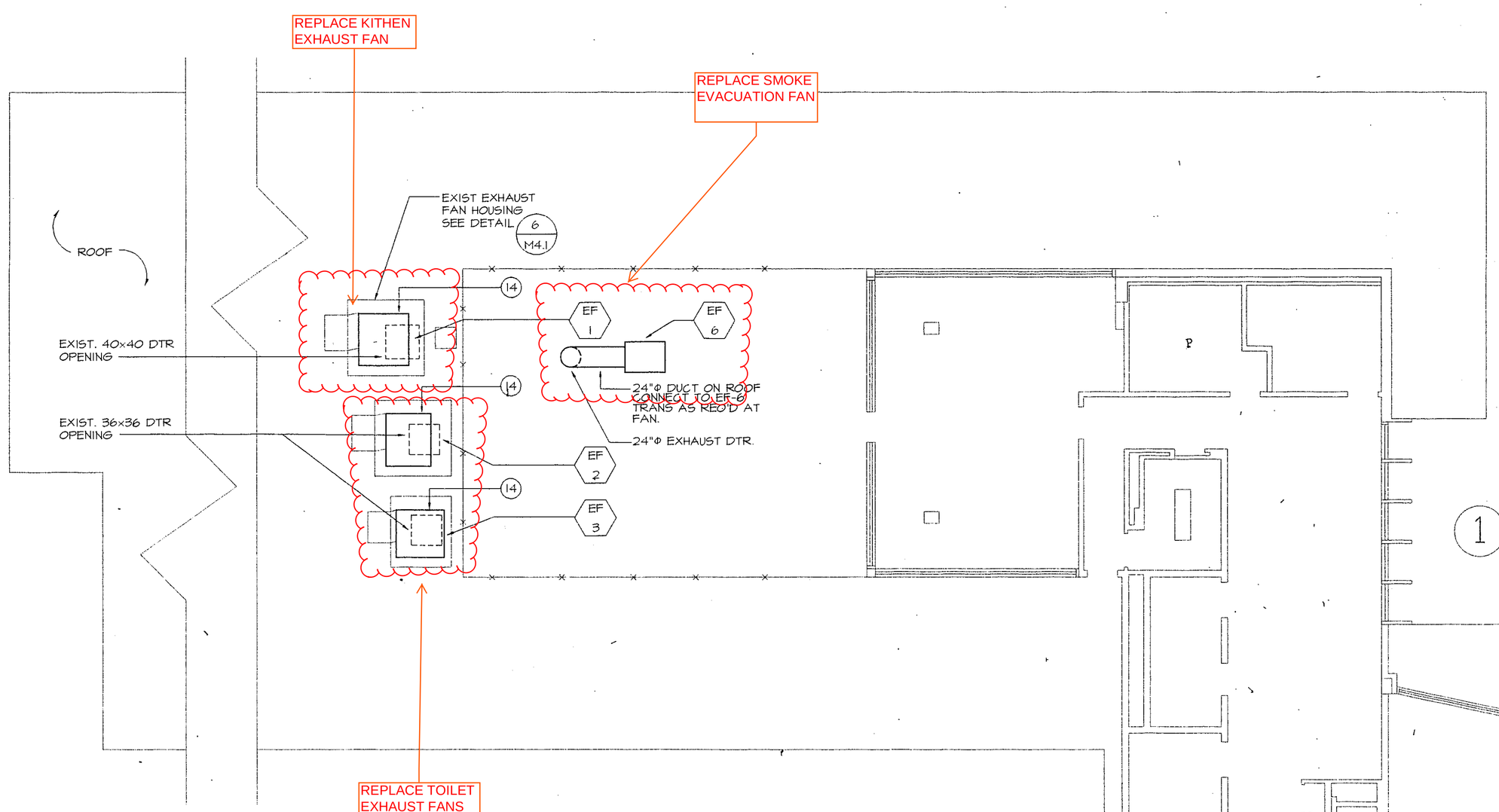
Poster Frost Associates, Inc.
Architecture Planning Urban Design
317 North Court Avenue Tucson, Arizona 85701 (520) 882-6310

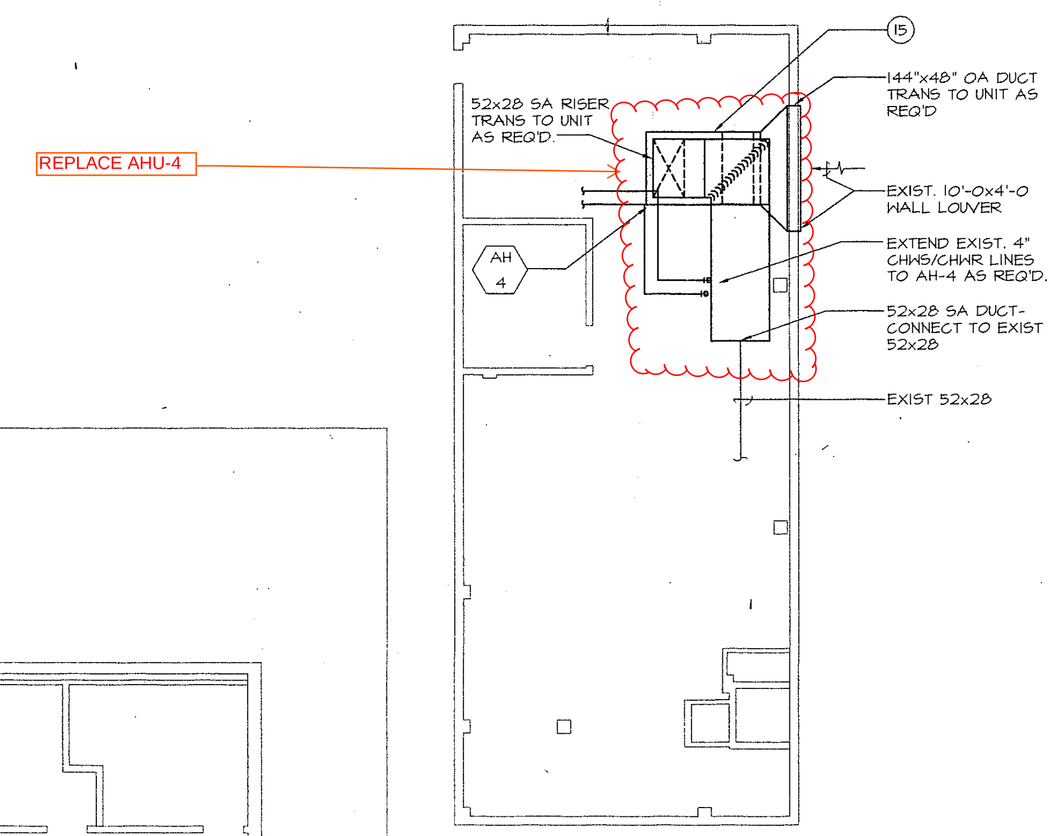
MECHANICAL PLAN
EAST WING
FLOOR 16th

TUCSON HOUSE
TAX CREDIT
REHABILITATION

project no. 450
date AUGUST 1997
revised

M2.5





MECHANICAL KEYNOTES - NEW WORK

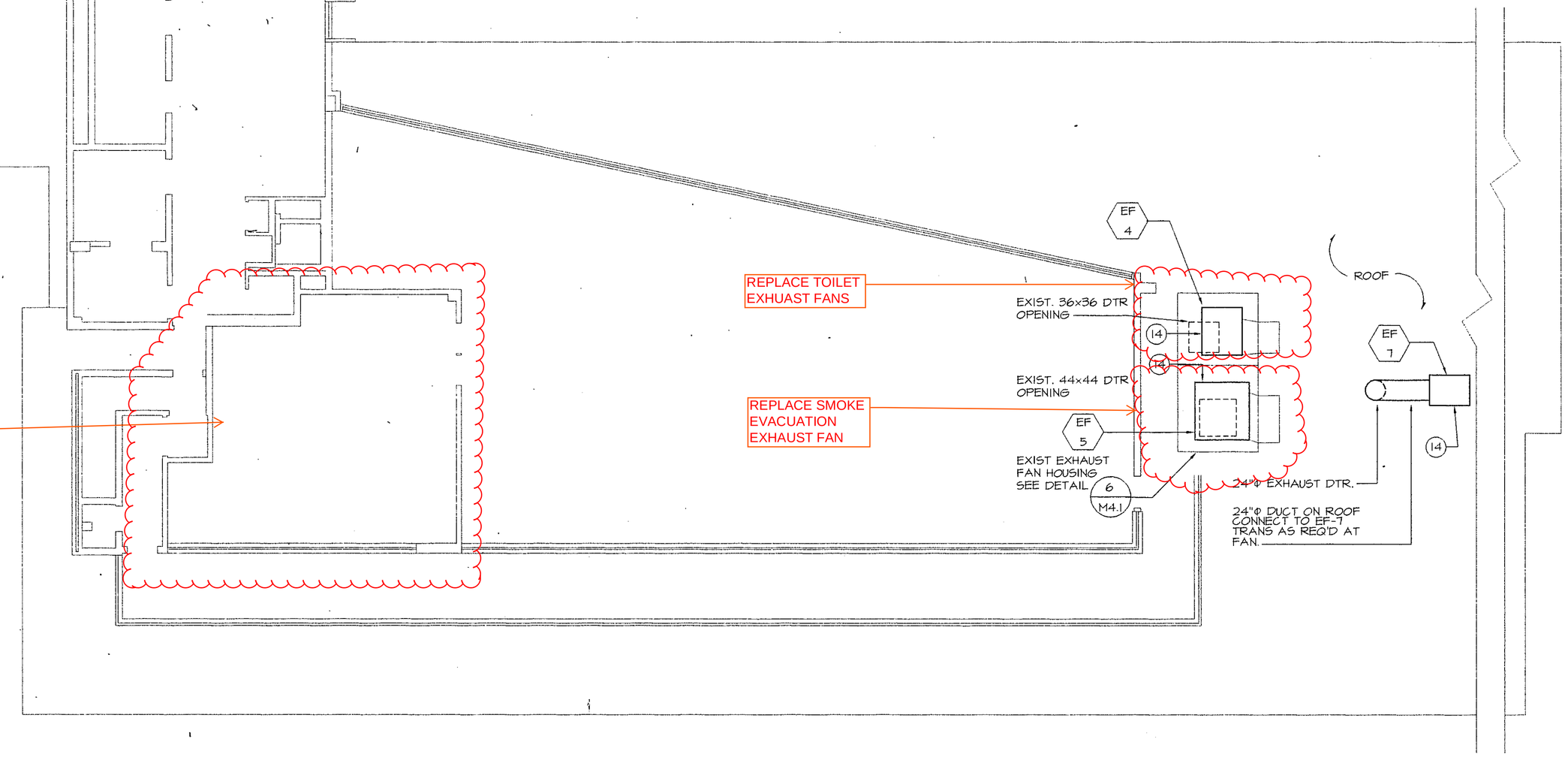
1. PROVIDE FAN COIL UNIT, CONNECT TO EXISTING PIPING (SUPPLY, RETURN, & DRAIN) IN WALL. MODIFY/EXTEND PIPING FULL SIZE & PATCH ALL AS REQ'D.
2. PROVIDE OBD BEHIND EXIST. 10x6 EXHAUST GRILLE, 120 CFM MODIFY DUCT AS REQUIRED.
3. PROVIDE OBD BEHIND EXIST.8 X 4 EXHAUST GRILLE, 50 CFM MODIFY DUCT AS REQUIRED.
4. PROVIDE A 48x12 SUPPLY GRILLE (D) W/ 36x12 COMBINATION FIRE/SMOKE DAMPER -625 CFM. REMOVE AND PATCH WALL AS REQ'D.-RUSKIN FSD60FA OR EQUIVALENT.
5. PROVIDE A 36x12 SUPPLY GRILLE (D) W/ 24x12 COMBINATION FIRE/SMOKE DAMPER -500 CFM. REMOVE AND PATCH WALL AS REQ'D.-RUSKIN FSD60FA OR EQUIVALENT.
6. PROVIDE A 30x16 SUPPLY GRILLE (D) W/ 18x16 COMBINATION FIRE/SMOKE DAMPER -500 CFM. REMOVE AND PATCH WALL AS REQ'D.-RUSKIN FSD60FA OR EQUIVALENT.
7. PROVIDE A 48x12 RETURN GRILLE (H) W/ 36x12 COMBINATION FIRE/SMOKE DAMPER. REMOVE AND PATCH WALL AS REQ'D.
8. EXISTING 10x8 EXHAUST RISER
9. EXISTING 8 X 6 EXHAUST RISER
10. RETURN AIR SHAFT; SEAL ALL EXIST. WALL PENETRATIONS; SAW-CUT EXISTING FLOOR.
11. EXISTING SMOKE RELIEF ASSEMBLY TO REMAIN
12. EXISTING OUTSIDE AIR INTAKE.
13. PROVIDE MOTORIZED DAMPER IN EXISTING OUTSIDE AIR DUCT.
*14. PROVIDE NEW EXHAUST FAN. RECONNECT DUCTWORK TO EXIST.
*15. PROVIDE NEW AIR HANDLER. RECONNECT DUCTWORK, PIPING, ETC. TO EXIST.
16. 54 X 16 SA. RISER-TRANS. TO UNIT AS REQ'D.
17. NOT USED
18. PROVIDE 10x6 EXHAUST GRILLE W/OBD & FD (G), 120 CFM MODIFY & CONNECT TO EXIST. DUCT RISER AS REQ'D.
19. PROVIDE 8x4 EXHAUST GRILLE W/OBD & FD (G), 50 CFM MODIFY & CONNECT TO EXIST. DUCT RISER AS REQ'D.
20. EXISTING 10x7 EXHAUST RISER.
21. CONNECT 3/4" CHWS/CHWR TO EXIST 3/4" ABOVE CEILING.
22. CONNETC 3/4" CHWS/CHWR TO EXIST. PIPING IN SHAFT. CONNECT 3/4" CONDENSATE DRAIN TO EXIST DRAIN LINE IN SHAFT. PROVIDE CLEAN OUT AT EACH CHANGE OF DIRECTION.
23. EXTEND 1-1/2" SUPPLY, 1" RETURN, & 1" DRAIN LINES FROM 1st FLOOR CEILING SPACE DOWN TO BASEMENT RECONECT LINES TO MAINS LOCATE IN BASEMENT. FIELD VERIFY SIZES.

* INDICATES THAT NOTE APPLIES TO THIS SHEET

1 MECHANICAL PLAN - PENTHOUSE

1/8"=1'-0"

NORTH



2 MECHANICAL PLAN - FLOOR 17

1/8"=1'-0"

NORTH

SMU Mechanical Engineering, LLC
5447 East Fifth Street # 216
Tucson, Arizona 85711
520/327-7611

JOB # 26996

DRAFT

Poster Frost Associates, Inc.
Architecture Planning Urban Design
317 North Court Avenue Tucson, Arizona 85701 (520) 882-6310

MECHANICAL PLAN
17th FLOOR &
PENTHOUSE

TUCSON HOUSE
TAX CREDIT
REHABILITATION

project no. 450
date AUGUST 1997
revised

M2.6

FAN SCHEDULE

MARK	EF-1	EF-2	EF-3	EF-4	EF-5	EF-6 & 7	EF-8
SERVICE	KITCHEN EXHAUST	TOILET EXHAUST	TOILET EXHAUST	TOILET EXHAUST	KITCHEN EXHAUST	SMOKE EXHAUST	GENERATOR EXHAUST
TYPE	CENTRIFUGAL	CENTRIFUGAL	CENTRIFUGAL	CENTRIFUGAL	CENTRIFUGAL	CENTRIFUGAL	CENTRIFUGAL
WHEEL TYPE	AF	AF	AF	AF	AF	BI	FC
AIR FLOW (CFM)	14020	13850	11400	11650	24480	3600	3000
E.S.P. ("w.g.)	1.5	1.5	1.5	1.5	1.5	1.5	.25
DRIVE TYPE	BELT	BELT	BELT	BELT	BELT	BELT	BELT
MAX. FAN SPEED (RPM)	775	775	875	880	575	1000	400
MOTOR HORSEPOWER	5	5	5	5	10	3	1/2
VOLTS/PHASE/HZ	208/3/60	208/3/60	208/3/60	208/3/60	208/3/60	208/3/60	208/3/60
REFERENCE	GREENHECK SERIES 21-30AFDW	GREENHECK SERIES 21-30AFDW	GREENHECK SERIES 21-27AFDW	GREENHECK SERIES 21-27AFDW	GREENHECK SERIES 21-40AFDW	GREENHECK SWB-22	GREENHECK SFB-18
NOTES	1,2,3,5	1,2,3,5	1,2,3,5	1,2,3,5	1,2,3,5	1,2,4	1,2,4,6

1. SCHEDULED CAPACITY SHALL BE FOR 2500 FT. ELEVATION.
2. FAN PERFORMANCE SHALL BE AMCA CERTIFIED.
3. PROVIDE INLET COLLARS & OUTLET FLANGES FOR DUCT CONNECTION.
4. PROVIDE WEATHERHOOD, BACKDRAFT DAMPER, & INLET/OUTLET GUARD.
5. PROVIDE MOTOR ON EXISTING ACCESS DOOR SIDE.
6. PROVIDE LINE VOLTAGE THERMOSTATE-SET @ 85°F TO CONTROL FAN.

AIR HANDLING UNIT SCHEDULE

MARK	AH-1	AH-2	AH-3	AH-4
TYPE	VERTICAL	VERTICAL	VEPTICAL	VERTICAL
MIN. TOT. CLG. CAP. (MBH)	130	190	210	848
MIN. SENS. CLG. CAP. (MBH)	126	190	210	848
ENT. AIR TEMP. (DEG. DB/WB)	79/63	75/63	75/63	106/69
ENT. CLG. WTR. TEMP. (DEG. F)	45	45	45	45
MIN. HEATING CAPACITY (MBH)	95	15	32	862
ENT. AIR TEMP. (DEG. DB)	65	70	70	28
WATER FLOW RATE (GPM)	26	38	42	170
MAX. COIL PRES. DROP (FT.)	10	10	10	10
ENT. HTG. WTR. TEMP. (DEG. F)	160	160	160	160
TOTAL SUPPLY AIR (CFM)	5300	10,000	10,200	18,000
OUTSIDE AIR (CFM)	600	0	0	18,000
EXT. STATIC PRESSURE ("w.g.)	0.75	3	3	3
DRIVE TYPE	BELT	BELT	BELT	BELT
MAX. FACE VELOCITY	500	500	500	500
FAN MOTOR HP	3.0	15.0	15.0	20.0
VOLTS/PHASE/HZ	208/3/60	208/3/60	208/3/60	208/3/60
MIN. FILTER AREA (SF)	13.5	23.0	23.0	45.0
MAX. OPERATING WEIGHT (LBS.)	850	1200	1200	7500
REFERENCE	WILLIAMS AV-5000	WILLIAMS AV-10000	WILLIAMS AV-10000	TEMTROL PF-36
NOTES	1 THRU 6	1 THRU 6	1 THRU 6	1 THRU 6

1. SCHEDULED CAPACITY SHALL BE FOR 2500 FT. ELEVATION.
2. SYSTEM SHALL BE 2-PIPE.
3. MAXIMUM 55°F LEAVING AIR DRY BULB.
4. UNITS ARE COMPOSED OF FAN, COIL, & FILTER SECTIONS.
5. FILTER SECTION SHALL HAVE 2" THICK DISPOSABLE FILTER SECTION WITH EASY ACCESS FOR FILTER REPLACEMENT.
6. PROVIDE CONTROL POWER TRANSFORMER WITH 2-PIPE THERMOSTAT TO CONTROL THREE-WAY MIXING VALVE AND SWITCHING SUBBASE.

FAN COIL UNIT SCHEDULE

MARK	FC-A	FC-B	FC-C	FC-D	FC-E	FC-F	FC-G	FC-H	FC-I	FC-J
TYPE	VERTICAL WALL MODEL	VERTICAL WALL MODEL	VERTICAL WALL MODEL	VERTICAL WALL MODEL	VERTICAL WALL MODEL	VERTICAL WALL MODEL	VERTICAL WALL MODEL	VERTICAL WALL MODEL	VERTICAL WALL MODEL	VERTICAL WALL MODEL
MIN. TOT. CLG. CAP. (MBH)	10.8	4.1	5.7	7.3	15.6	8.7	19.1	16.9	14.3	14.6
MIN. SENS. CLG. CAP. (MBH)	10.8	3.9	5.5	7.1	15.6	8.5	19.1	16.9	14.3	
ENT. AIR TEMP. (DEG. DB/WB)	89/66	75/63	75/63	75/63	84/65	75/63	83/65	87/66	92/67	86/66
ENT. CLG. WTR. TEMP. (DEG. F)	45	45	45	45	45	45	45	45	45	45
MIN. HEATING CAPACITY (MBH)	10.1	2.5	3.6	5.6	17.0	3.8	19.7	18.5	16.0	13.1
ENT. HEATING AIR TEMP. (DEG. DB)	52	72	72	72	59	72	61	55	47	56
WATER FLOW RATE (GPM)	2.5	1.0	1.5	1.5	3.5	2.0	4.0	3.5	3.0	3.0
MAX. COIL PRES. DROP (FT.)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
ENT. HTG. WTR. TEMP. (DEG. F)	160	160	160	160	160	160	160	160	160	160
TOTAL SUPPLY AIR (CFM)	400	200	300	400	600	400	700	600	400	500
OUTSIDE AIR (CFM)	175	0	0	0	175	0	175	225	225	175
EXT. STATIC PRESSURE ("w.g.)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
DRIVE TYPE	DIRECT	DIRECT	DIRECT	DIRECT	DIRECT	DIRECT	DIRECT	DIRECT	DIRECT	DIRECT
MAX. FACE VELOCITY	400	400	400	400	400	400	400	400	400	400
FAN MOTOR HP	1/15	1/20	1/20	1/15	1/8	1/15	1/4	1/8	1/15	1/8
VOLTS/PHASE/HZ	115/1/60	115/1/60	115/1/60	115/1/60	115/1/60	115/1/60	115/1/60	115/1/60	115/1/60	115/1/60
MAX. OPERATING WEIGHT (LBS.)	125	100	100	125	125	125	150	125	125	125
REFERENCE	WILLIAMS LV-04	WILLIAMS LV-02	WILLIAMS LV-03	WILLIAMS LV-04	WILLIAMS LV-06	WILLIAMS LV-04	WILLIAMS LV-08	WILLIAMS LV-06	WILLIAMS LV-04	WILLIAMS LV-06
NOTES	1,2,3,4	1,2,3,4	1,2,3,4	1,2,3,4	1,2,3,4	1,2,3,4	1,2,3,4	1,2,3,4	1,2,3,4	1,2,3,4

1. SCHEDULED CAPACITY SHALL BE FOR 2500 FT. ELEVATION.
2. PROVIDE SLOPE TOP, 3-SPEED MOTOR W/CONTROL SWITCH, 1" THROW AWAY FILTER AND OUTSIDE AIR WALL BOX W/LOUVERS & BUG SCREEN, MANUAL OUTSIDE AIR DAMPER, SINGLE POINT CONNECTION, DICONNECT, & LOUVER SHALL BE FLANGED ON ALL 4 SIDES.
3. SYSTEM SHALL BE 2-PIPE.
4. MAXIMUM 55°F LEAVING AIR DRY BULB.
5. PROVIDE RETURN AIR PLENUM, 1" THROW AWAY FILTER, SINGLE POINT POWER CONNECTION.
6. PROVIDE CONTROL POWER TRANSFORMER WITH 2-PIPE THERMOSTAT AND SWITCHING SUBBASE.

FAN COIL UNIT SCHEDULE

MARK	FC-1	FC-2	FC-3	FC-4	FC-5	FC-6	FC-7	FC-8	FC-9	FC-10	FC-11	FC-12	FC-13,14	FC-14,15
TYPE	HORIZONTAL	HORIZONTAL	VERTICAL	VERTICAL	HORIZONTAL	HORIZONTAL	HORIZONTAL	HORIZONTAL	HORIZONTAL	HORIZONTAL	HORIZ. CEILING	HORIZ. CEILING	HORIZ. CEILING	HORIZ. CEILING
MIN. TOT. CLG. CAP. (MBH)	22.9	24.6	41.4	13.0	11.4	15.6	10.1	18.5	13.6	18.9	15.3	8.2	19.6	15.8
MIN. SENS. CLG. CAP. (MBH)	21.9	22.7	40.6	12.4	11.0	15.3	9.8	17.2	13.0	18.4	14.8	8.0	18.8	14.9
ENT. AIR TEMP. (DEG. DB/WB)	78/63	83/65	78/63	78/63	79/63	78/63	78/63	82/64	79/63	78/63	80/63	79/63	82/64	84/65
ENT. CLG. WTR. TEMP. (DEG. F)	45	45	45	45	45	45	45	45	45	45	45	45	45	45
MIN. HEATING CAPACITY (MBH)	11	19	36	7	3	12.5	8	13.8	9.5	4.7	8.2	4.8	12.3	9.1
ENT. HEATING AIR TEMP. (DEG. DB)	65	60	66	65	64	68	67	60	65	67	65	66	62	58
WATER FLOW RATE (GPM)	4.5	5.0	8.5	2.5	2.5	3	2	4.0	3.0	3.5	3.0	2.0	4.0	3.5
MAX. COIL PRES. DROP (FT.)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
ENT. HTG. WTR. TEMP. (DEG. F)	160	160	160	160	160	160	160	160	160	160	160	160	160	160
TOTAL SUPPLY AIR (CFM)	900	800	1800	700	450	700	450	650	550	800	600	350	675	500
OUTSIDE AIR (CFM)	100	200	150	75	60	30	30	150	60	60	90	45	150	150
EXT. STATIC PRESSURE ("w.g.)	0.3	0.4	0.75	0.6	0.3	0.3	0.3	0.3	0.3	0.1	0.3	0.3	0.3	0.3
DRIVE TYPE	BELT	BELT	BELT	BELT	DIRECT	DIRECT	DIRECT	DIRECT	DIRECT	DIRECT	DIRECT	DIRECT	DIRECT	DIRECT
MAX. FACE VELOCITY	450	450	450	450	400	400	400	400	400	450	400	400	400	400
FAN MOTOR HP	1/4	1/4	1	1/2	1/4	(2)-1/4	1/4	(2)-1/4	1/4	1/4	(2)1/4	1/4	(2)1/4	1/4
VOLTS/PHASE/HZ	115/1/60	115/1/60	208/3/60	115/1/60	115/1/60	115/1/60	115/1/60	115/1/60	115/1/60	115/1/60	115/1/60	115/1/60	115/1/60	115/1/60
MAX. OPERATING WEIGHT (LBS.)	175	175	300	200	125	150	125	150	125	150	150	125	150	125
REFERENCE	WILLIAMS	WILLIAMS	WILLIAMS	WILLIAMS	ENVIRO-TEC	ENVIRO-TEC	ENVIRO-TEC	ENVIRO-TEC	ENVIRO-TEC	WILLIAMS	ENVIRO-TEC HL-60	ENVIRO-TEC HL-40	ENVIRO-TEC HL-60	ENVIRO-TEC HL-40
NOTES	1,2,3,4,5	1,2,3,4,5	1,2,3,4,5,7	1,2,3,4,5,7	1,2,3,4,5	1,2,3,4,5	1,2,3,4,5	1,2,3,4,5	1,2,3,4,5	1,2,3,4,5,6	1,3,4,5,6	1,3,4,5,6	1,3,4,5,6	1,3,4,5,6

1. SCHEDULED CAPACITY SHALL BE FOR 2500 FT. ELEVATION.
2. SYSTEM SHALL BE 2-PIPE.
3. MAXIMUM 55°F LEAVING AIR DRY BULB.
4. PROVIDE RETURN AIR PLENUM, 1" THROWAWAY FILTER, SINGLE POINT POWER CONNECTION & DISCONNECT.
5. PROVIDE CONTROL POWER TRANSFORMER WITH 2-PIPE THERMOSTAT TO CONTROL THREE-WAY MIXING VALVE AND SWITCHING SUBBASE.
6. ~~EXPOSED CABINET~~, 1" THROWAWAY FILTER, SINGLE POINT POWER CONNECTION.
7. PROVIDE 2" FILTERS.

P

AIR DEVICE SCHEDULE

MARK	A	B	C	D	E	F	G	H	I	J
SERVICE	SUPPLY	SUPPLY	SUPPLY	SUPPLY	RETURN	EXHAUST	EXHAUST	RETURN	TRANSFER	LOUVEP
MATERIAL	STEEL	STEEL	STEEL	STEEL	ALUM	ALUM	STEEL	STEEL	ALUM	ALUM
FINISH	WHITE	WHITE	WHITE	WHITE	WHITE	WHITE	WHITE	WHITE	WHITE	PRIMED
PATTERN	4-WAY	2-WAY	4-WAY	DOUBLE DEFLECTION	EGGCRATE	EGGCRATE	SINGLE DEFLECTION	SINGLE DEFLECTION	EGGCRATE	J-BLADE
REFERENCE	KRUEGER 6204	KRUEGER 6202	KRUEGER SH	KRUEGER 880H	KRUEGER EGC5	KRUEGER EGC5	KRUEGER S80H	KRUEGER S80H	KRUEGER EGC5	RUSKIN ELF811
NOTES	1,2,3,4	1,2,3,4	1,2	1,2	1,2	1,2	1,2	1,2	2	5

1. PROVIDE OPPOSED BLADE DAMPER.
2. PROVIDE FRAME STYLE SUITABLE FOR CEILING OR WALL SPECIFIED ON ARCHITECTUAL DRAWINGS.
3. CEILING DIFFUSER SHALL BE PERFORATED TYPE.
4. PROVIDE SQUARE TO ROUND ADAPTORS WHEN REQUIRED.
5. PROVIDE BIRDSCREEN

DRAFT

REPLACE ALL THE EQUIPMENT. SEE REPORT FOR DIFFERENT OPTIONS

Poster Frost Associates, Inc.
Architecture Planning Urban Design
317 North Court Avenue Tucson, Arizona 85701 (520) 882-6310

MECHANICAL SCHEDULES

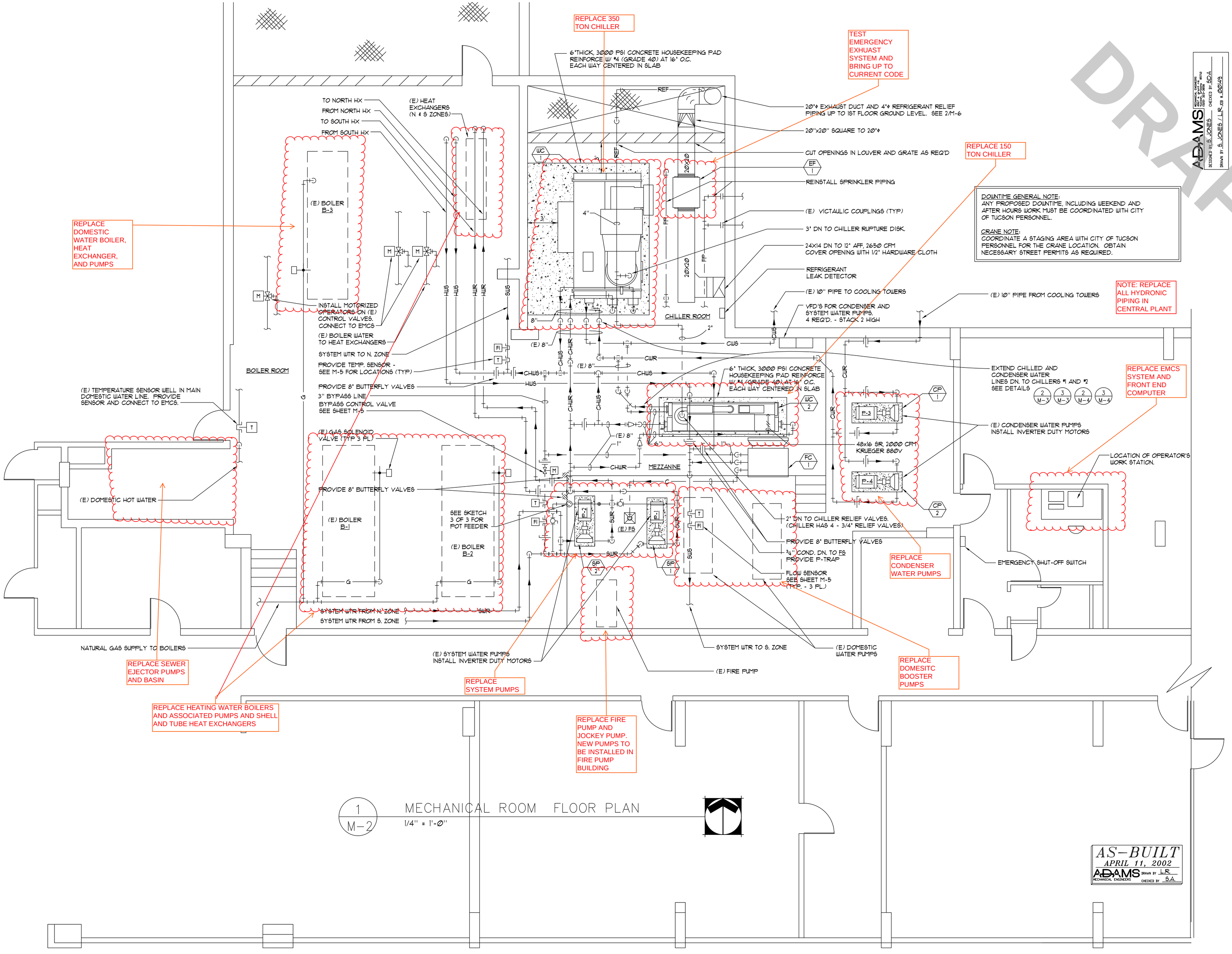
TUCSON HOUSE
TAX CREDIT
REHABILITATION

project no. 450
date AUGUST 1997
revised

M3.1

SMU Mechanical Engineering, LLC
5447 East Fifth Street # 216
Tucson, Arizona 85711
520/327-7611

JOB # 26996



DOWNTIME GENERAL NOTE:
ANY PROPOSED DOWNTIME, INCLUDING WEEKEND AND AFTER HOURS WORK MUST BE COORDINATED WITH CITY OF TUCSON PERSONNEL.

CRANE NOTE:
COORDINATE A STAGING AREA WITH CITY OF TUCSON PERSONNEL FOR THE CRANE LOCATION. OBTAIN NECESSARY STREET PERMITS AS REQUIRED.

DRAFT

ADAMS MECHANICAL ENGINEERS 2625 N. SILVERBELL ROAD TUCSON, AZ 85745 520-622-4506
DESIGNED BY: S. JONES CHECKED BY: SDA
DRAWN BY: S. JONES / L.R. JOB # 00149

DATE: April 16, 2001

JOB NO. 00189
PHASE: CD
DRAWN: TAC
CHECKED BY: TAC
REVISIONS:

SHEET TITLE:
MECHANICAL ROOM FLOOR PLAN

PROJECT:
Energy Star Program Project No. 4 - Tucson House Chiller and Mechanical Systems Upgrade

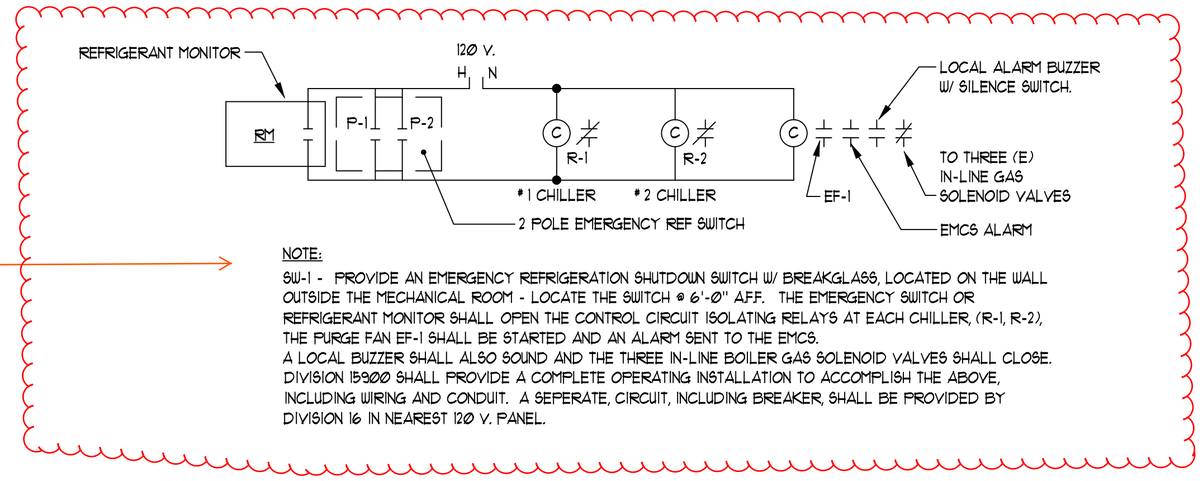
City of Tucson
Community Services Department
PO Box 27210
Tucson, AZ 85726-7210

APPROVALS:
OWNER: DATE:
USER: DATE:

the architecture company
at The Silverbell Ranch
2625 N. Silverbell Road
Tucson, Arizona 85745
520 622-4506
520 620-6097 fax

M-2
SHEET OF

00189 - Tucson House Chiller and Mechanical Systems Upgrade

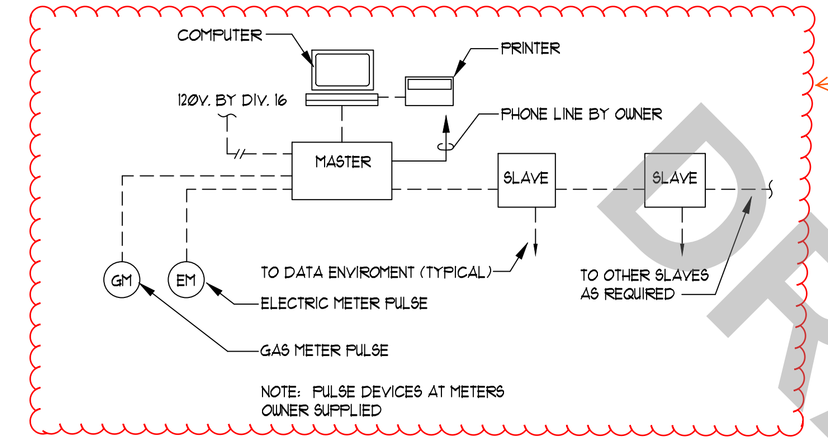


TEST EMERGENCY EXHAUST SYSTEM. PROVIDE ADDITIONAL CODE REQUIRED ITEMS CALLED FOR IN REPORT.

NOTE:
SW-1 - PROVIDE AN EMERGENCY REFRIGERATION SHUTDOWN SWITCH W/ BREAKGLASS, LOCATED ON THE WALL OUTSIDE THE MECHANICAL ROOM - LOCATE THE SWITCH @ 6'-0" AFF. THE EMERGENCY SWITCH OR REFRIGERANT MONITOR SHALL OPEN THE CONTROL CIRCUIT ISOLATING RELAYS AT EACH CHILLER, (R-1, R-2), THE PURGE FAN EF-1 SHALL BE STARTED AND AN ALARM SENT TO THE EMCS.
A LOCAL BUZZER SHALL ALSO SOUND AND THE THREE IN-LINE BOILER GAS SOLENOID VALVES SHALL CLOSE.
DIVISION 15900 SHALL PROVIDE A COMPLETE OPERATING INSTALLATION TO ACCOMPLISH THE ABOVE, INCLUDING WIRING AND CONDUIT. A SEPERATE, CIRCUIT, INCLUDING BREAKER, SHALL BE PROVIDED BY DIVISION 16 IN NEAREST 120 V. PANEL.

3 / M-6 CHILLER EMERGENCY SHUT DOWN CIRCUIT

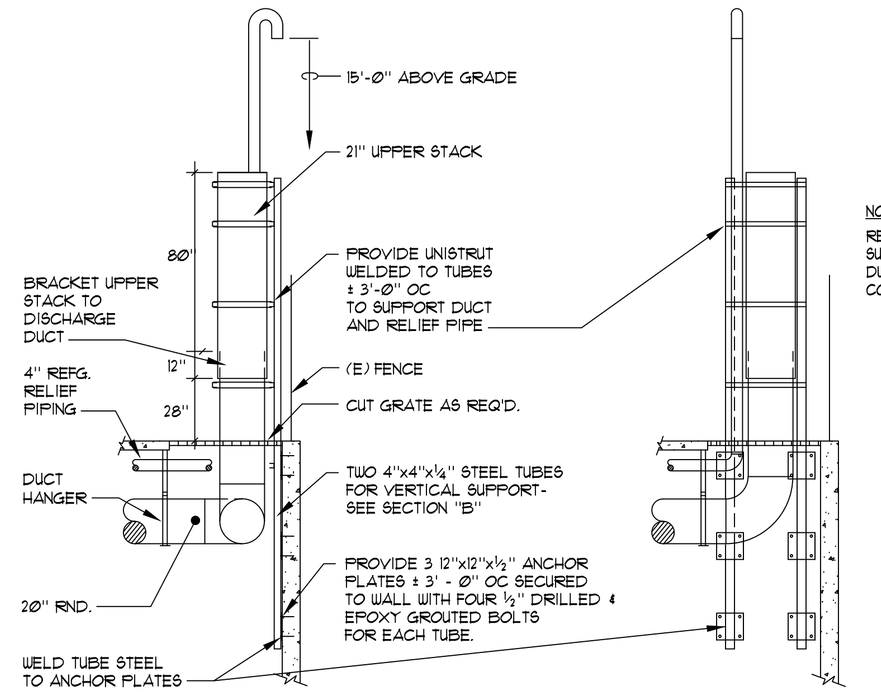
N.T.S.



PROVIDE NEW EMCS SYSTEM FOR THE ENTIRE BIULDING

1 / M-6 EMCS SYSTEM ARCHITECTURE

N.T.S.



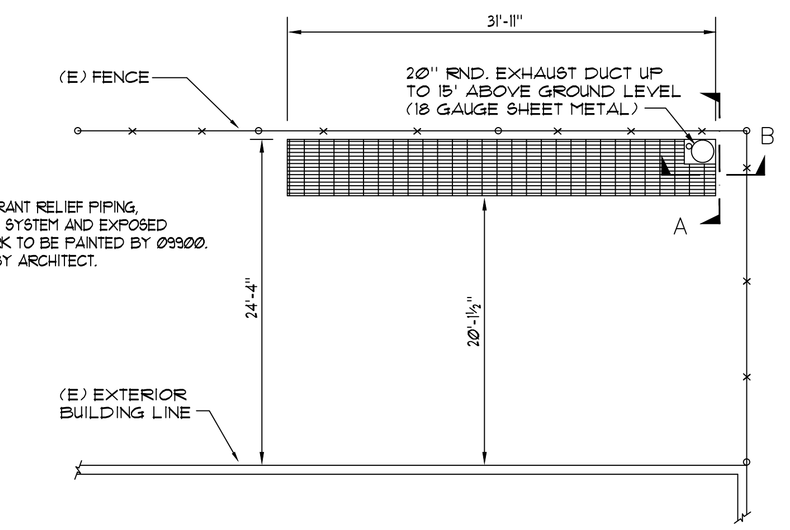
SECTION "A"

1/4" = 1'-0"

SECTION "B"

1/4" = 1'-0"

NOTE:
REFRIGERANT RELIEF PIPING, SUPPORT SYSTEM AND EXPOSED DUCTWORK TO BE PAINTED BY 09900. COLOR BY ARCHITECT.



2 / M-6 1st FLOOR EXHAUST DUCT LOCATION DETAIL

1/8" = 1'-0"

SEQUENCE OF OPERATION

SYSTEM WATER CONTROL:

THE SYSTEM IS A TWO PIPE MANUAL CHANGEOVER CHILLED AND HEATING WATER SYSTEM. THE NORTH AND SOUTH ZONES CAN BE OPERATED SEPARATELY, I.E. THE NORTH ZONE ON HEATING WHILE THE SOUTH ZONE IS ON COOLING. NO AUTOMATED CHANGEOVER IS DESIRED. THE CONTROL VALVES ON THE CHILLERS SHALL BE SHUT IF THE RETURN WATER TO THE CHILLER EXCEEDS 80°F.

THE NORTH AND SOUTH SYSTEM WATER PUMPS SHALL BE STARTED BY THE EMCS AND RUN CONTINUOUSLY. EACH PUMP SHALL HAVE A DIFFERENTIAL PRESSURE SWITCH TO PROVIDE A PROOF OF FLOW. THE SYSTEM PUMP SPEEDS SHALL BE ADJUSTED TO MAINTAIN A MINIMUM DIFFERENTIAL PRESSURE OF 20 FEET (USER ADJUSTABLE) AT ALL AHUS.

CHILLED WATER CONTROL

A COMPLETE START/STOP INTERFACE SHALL BE PROVIDED BETWEEN THE CHILLERS AND EMCS. THE CHILLERS SHALL BE UNDER LOCAL LOOP CONTROL AND SHALL BE SEQUENCED BY THE EMCS. TEMPERATURES, PRESSURE DROPS, AND ALARMS SHALL BE MONITORED. FLOW SWITCHES SHALL BE PROVIDED IN THE RETURN CHILLED AND CONDENSER WATER LINES AND INTERLOCKED WITH THEIR RESPECTIVE CHILLER CONTROL PANEL TO PREVENT OPERATION OF THE CHILLERS UNDER NO-FLOW CONDITIONS. FLOW AND TEMPERATURE SENSORS SHALL BE PROVIDED AS SHOWN TO MONITOR CHILLED WATER FLOW AND TEMPERATURE.

THE CHILLERS ARE NOT THE SAME SIZE. THE CENTRIFUGAL CHILLER SHALL BE DESIGNATED AS THE BASE CHILLER AND THE SCREW CHILLER SHALL BE THE SWING AND TRIM CHILLER. THE SWING CHILLER SHALL BE STARTED FIRST. WHEN THE BUILDING LOAD EXCEEDS ITS CAPACITY, THE BASE CHILLER SHALL BE STARTED AND THE SWING CHILLER SHUT DOWN. IF THE LOAD INCREASES FURTHER, THE TRIM CHILLER SHALL ALSO RUN TO HANDLE THE BUILDING LOAD. THE REVERSE SHALL HAPPEN ON A DROP IN THE BUILDING LOAD.

THE NEXT CHILLER SHALL BE STARTED WHENEVER THE 'CHILLED WATER ERROR' EXCEEDS AN OPERATOR SPECIFIED LIMIT. THE 'CHILLED WATER ERROR' SHALL BE A CALCULATION TAKING INTO ACCOUNT SYSTEM SUPPLY WATER TEMPERATURE DEVIATION FROM SETPOINT, DURATION OF THE DEVIATION, AND CHILLER WATER FLOW. WHEN THE 'CHILLED WATER ERROR' VALUE EXCEEDS THE SPECIFIED LIMIT CONTINUOUSLY FOR 15 MINUTES, THE EMCS SHALL INITIATE THE START OF THE NEXT CHILLER IN THE SEQUENCE. THE EMCS SHALL UNLOAD THE OPERATING CHILLER PRIOR TO STARTING THE NEXT CHILLER. THIS SHALL BE DONE TO PREVENT SYSTEM WATER FLOW DISTURBANCES CAUSED BY THE START OF THE NEXT CHILLER.

A CHILLER SHALL BE SHUT DOWN WHENEVER THE 'SUBTRACT CHILLED WATER ERROR' EXCEEDS AN OPERATOR SPECIFIED LIMIT. THE 'SUBTRACT CHILLED WATER ERROR' SHALL BE A CALCULATION TAKING INTO ACCOUNT SYSTEM WATER DELTA T, CAPACITY OF SYSTEM FOLLOWING SHUTDOWN OF CHILLER, CHILLED WATER FLOW, AND SYSTEM STABILITY. WHEN THE 'CHILLED WATER ERROR' VALUE EXCEEDS THE SPECIFIED CHILLER SUBTRACT LIMIT CONTINUOUSLY FOR 15 MINUTES THE NEXT CHILLER SHALL BE SHUT DOWN. THE EMCS SHALL NOT SHUTDOWN A CHILLER'S FLOW UNTIL ALL CHILLER COMPRESSORS ARE PROVEN OFF.

THE BYPASS VALVE SHALL MODULATE TO MAINTAIN THE MINIMUM FLOW REQUIRED (AS MEASURED BY THE DP ACROSS THE EVAPORATOR SHELL) FOR THE OPERATING CHILLER(S).

UPON SENSING A CHILLER FAILURE, THE EMCS SHALL LOCKOUT THAT CHILLER AND IMMEDIATELY INITIATE THE START OF THE OTHER CHILLER.

THE EMCS SHALL PROVIDE A USER ADJUSTABLE LOADING TIME, (SOFT START) AT SYSTEM START-UP. THIS SHALL LIMIT SYSTEM ELECTRICAL DEMAND DURING CHILLED WATER LOOP FULLDOWN.

THE EMCS SHALL HAVE SCREENS THAT ALLOWS EDITING OF THE SUPPLY WATER SETPOINT, CHILLER ADDITION SETPOINTS, CHILLER SUBTRACTION SETPOINTS, SOFT SPOT PARAMETERS, AND SECURITY SETUP.

COOLING TOWER CONTROL

WHEN THE FIRST CHILLER IS ENABLED THE LEAD COOLING TOWER AND CONDENSER WATER PUMP SHALL START. IF THE LEAD PUMP DOES NOT PROVE FLOW IN 30 SECONDS, THE BACKUP PUMP SHALL START AND AN ALARM SENT TO THE EMCS. WHEN BOTH CHILLERS ARE ENABLED, BOTH COOLING TOWERS AND CONDENSER WATER PUMPS SHALL BE ENABLED.

WHEN THE SWING CHILLER IS STARTED THE LEAD CONDENSER WATER PUMP SHALL BE STARTED AND RUN AT REDUCED SPEED TO PROVIDE 450 GPM. WHEN THE BASE CHILLER IS STARTED AND THE SWING CHILLER SHUT DOWN, THE LEAD CONDENSER WATER PUMP SHALL BE INCREASED IN SPEED TO PROVIDE 900 GPM. WHEN THE TRIM CHILLER IS STARTED, BOTH CONDENSER WATER PUMPS SHALL BE STARTED AND RUN AT SPEEDS TO PROVIDE 1350 GPM OR APPROXIMATELY 675 GPM PER PUMP.

THE COOLING TOWER FAN SPEED SHALL BE MODULATED TO MAINTAIN 82°F CONDENSER WATER. THE LEAD AND LAG CONDENSER WATER PUMPS AND TOWERS SHALL BE ALTERNATED EVERY 1 DAYS.

A CURRENT SWITCH SHALL BE PROVIDED ACROSS THE COOLING TOWER FAN MOTOR TO PROVIDE A PROOF OF FLOW. THE SUMP HEATER IN THE COOLING TOWER SHALL BE UNDER LOCAL LOOP CONTROL TO MAINTAIN A MINIMUM 40-DEGREE SUMP WATER TEMPERATURE. TEMPERATURE SENSORS SHALL BE PROVIDED AS SHOWN.

THE SWING CHILLER HEAD PRESSURE SHALL HAVE AN OUTPUT TO DIRECTLY CONTROL THE DISCHARGE CONDENSER WATER CONTROL VALVE TO MAINTAIN THE MINIMUM PRESSURE DIFFERENTIAL SPECIFIED BY THE CHILLER MANUFACTURER. THE CHILLER CONDENSER WATER AND COOLING TOWER ISOLATION VALVES SHALL CYCLE TO DIRECT THE WATER FLOW REQUIRED.

HEATING SYSTEM

THE HEATING WATER BOILERS ARE UNDER LOCAL LOOP CONTROL. THE EMCS SHALL MODULATE THE CONTROL VALVES TO THE HEAT EXCHANGERS TO MAINTAIN HEATING WATER SET POINTS. THE HEATING WATER SHALL BE RESET FROM 140°F TO 80°F AS OUTSIDE AIR VARIES FROM 40°F TO 70°F. (OPERATOR ADJUSTABLE)

DOMESTIC WATER:

THE RECIRCULATING PUMP RUNS CONTINUOUSLY. THE CONTROL VALVE FOR THE DOMESTIC WATER HEAT EXCHANGER SHALL BE SET TO MAINTAIN 120 DEGREE SUPPLY WATER TEMPERATURE. THE TEMPERATURE OF THE DOMESTIC WATER SUPPLY SHALL BE MONITORED.

AIR HANDLING CONTROL:

THE FOUR AHU FANS SHALL RUN CONTINUOUSLY AT A CONSTANT SPEED. THE EQUIPMENT ROOM FCU FAN SHALL RUN CONTINUOUSLY WHEN THE EQUIPMENT ROOM TEMPERATURE IS ABOVE 85°F. TEMPERATURE SENSORS SHALL BE PROVIDED IN THE SUPPLY AIR OF THE FOUR AHUS. THE FAN SHALL BE SHUT DOWN ANYTIME ITS SUPPLY AIR TEMPERATURE DROPS BELOW 45°F. A SPACE SENSOR SHALL BE PROVIDED FOR THE FCU. THE AHU CONTROL VALVES SHALL BE MODULATED TO MAINTAIN A 72°F SUPPLY AIR TEMPERATURE. THE FCU CONTROL VALVE SHALL BE MODULATED TO MAINTAIN SPACE TEMPERATURE AT 85°F. BELOW 85° F THE FCU FAN SHALL BE OFF AND ITS CONTROL VALVE HELD CLOSED. CURRENT SWITCHES SHALL BE LOCATED ACROSS ALL SUPPLY FANS TO MONITOR ON/OFF STATUS. DP SENSORS SHALL BE PROVIDED ACROSS THE CONTROL VALVES OF THE 4 AHUS.

EXHAUST FAN: EF-1

THE EXHAUST FAN SHALL BE MANUALLY OR AUTOMATICALLY STARTED. THE AUTOMATIC START SIGNAL SHALL BE PROVIDED FROM EITHER THE REFRIGERANT MONITOR OR EMERGENCY REFRIGERATION SHUTDOWN SWITCH

GENERAL:

ELECTRIC AND GAS PULSE METERS SHALL BE PROVIDED BY THE OWNER TO MONITOR KW CONSUMPTION, PEAK ELECTRIC DEMAND, AND GAS USAGE. AN OUTSIDE AIR DRY BULB SENSOR SHALL BE PROVIDED TO MONITOR AMBIENT AIR CONDITIONS. SUBMIT ALL ALARM TEMPERATURES FOR APPROVAL. ALL ALARM AND CONTROL SET POINTS SHALL BE USER ADJUSTABLE.

WATER COOLED CHILLER SCHEDULE

MARK	MANUFACTURER	MODEL	TONS	KW / TON	EVAP GPM	EWT	LWT	MAX PD	COND. GPM	EWT	LWT	MAX PD	RLA	VOLTAGE	OPER. WEIGHT	REMARKS
WC 1	TRANE	CVHE045D	350	.53	840	55	45	25'	900	85	95.8	22'	600	208/3/60	20,800	
WC 2	TRANE	RTHB150	150	.66	360	55	45	↓	450	85	95	↓	346	208/3/60	6,400	SEE NOTE 1

NOTE 1. PROVIDE OUPUT SIGNAL FOR CONTROL OF CONDENSER WATER VALVE WITH CHILLER NO. 2 - SEE CONTROL DETAIL 4, SHEET M-5

PUMP SCHEDULE

MARK	MFGR.	MODEL	DUTY	GPM	MOTOR RPM	MOTOR HP	MOTOR ELECT.	REMARKS
BP 1	B&G	4x6x12L	SYSTEM	600	1750	30	208/3/60	EXISTING PUMP -PROVIDE - AFC
BP 2	B&G	4x6x12L	SYSTEM	↓	1750	30	208/3/60	↓
CP 3	AURORA	5x6x11A	COOLING TOWER	900/675/450	1750	30	208/3/60	
CP 4	AURORA	5x6x11A	COOLING TOWER	↓	1750	30	208/3/60	↓

NOTE: EXISTING PUMPS TO BE REUSED - MOTOR TO BE CHANGED TO INVERTER DUTY HIGH EFFICIENCY MOTORS- BALANCE W/ AFC TO GPM SHOWN.

REPLACE EQUIPMENT. SEE REPORT FOR OPTIONS

EXHAUST FAN SCHEDULE

MARK	MFGR.	MODEL	TYPE	CFM	E.S.P.	H.P.	ELECT.	OPER. WEIGHT	REMARKS
EF 1	COOK	150 SQN-B	IN-LINE	2650	.50	1.0	115/1/60	---	INCLUDE STARTER AND DISCONNECT

FAN COIL UNIT SCHEDULE

MARK	MFG'R	MODEL	ACFM	ESP	GPM	HP	FILTER	ELECTRICAL	REMARKS
FC 1	ENV TECH	HLP-60	2000	.25	10	½	1" TA	115/1/60	OWNER FURNISHED CONTRACTOR INSTALLED

AS-BUILT
APRIL 11, 2002
ADAMS MECHANICAL ENGINEERS DRAWN BY LR CHECKED BY S.A.

DRAFT

ADAMS MECHANICAL ENGINEERS 6500 E. 22nd STREET TUCSON, AZ 85710 (520) 296-2888
DESIGNED BY: S. JONES CHECKED BY: S. ADAMS
DRAWN BY: W. G. JOHNSON JOB # 00149

DATE: April 16, 2001

JOB NO.	00189
PHASE:	CD
DRAWN:	TAC
CHECKED BY:	TAC

REVISIONS:

SHEET TITLE:

MECHANICAL SCHEDULES AND DETAILS

PROJECT:
Energy Star Program Project No. 4 - Tucson House Chiller and Mechanical Systems Upgrade

City of Tucson
Community Services Department
PO Box 27210
Tucson, AZ 85726-7210

APPROVALS:

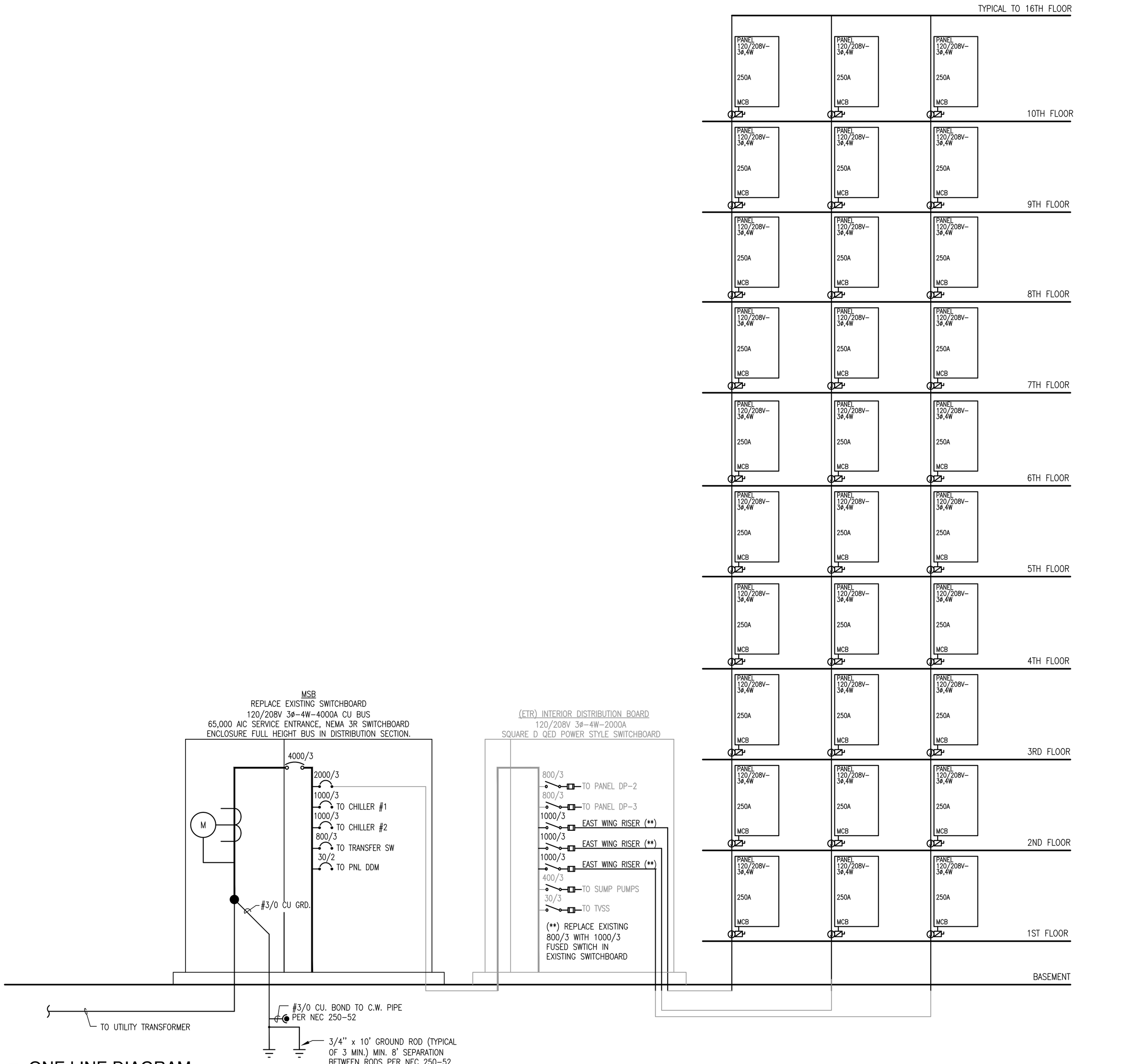
OWNER: DATE:

USER: DATE:

the architecture company
at The Silverbell Ranch
2625 N. Silverbell Road
Tucson, Arizona 85745
520 622-4506
520 620-6097 fax

M-6
SHEET OF

00189 - Tucson House Chiller and Mechanical Systems Upgrade



1 ONE LINE DIAGRAM
NO SCALE

GENERAL NOTES:

A. REPLACE MAIN SWITCHBOARD (MSB)

B. REPLACE FLOOR BY FLOOR APARTMENT PANELS TYPICAL FOR FLOORS 1 THROUGH 16. PROVIDE (1) 400A DISCONNECT AND (1) 250A MCB PANEL AT EACH FLOOR.

C. DUE TO INCREASED CIRCUITS, 250A MCB PANEL TO BE 42 CIRCUITS AND SUB-FEED 30-CIRCUIT SUB-PANEL.

D. PLAN FOR REVISED FEEDERS FOR ALL FLOORS SUCH THAT BREAKER FROM DISTRIBUTION BOARD IS UPSIZED TO 1000A.

DRAFT

Architecture & Engineering

City of Tucson
General Services Department

4004 S. Park Avenue, Bldg. 2
Tucson, AZ 85714
Tel: (520) 837-6375
Email: AE-Archivist@tucsonaz.gov

Project:

TUCSON HOUSE ASSESSMENT

Architect:

WSM ARCHITECTS

4330 NORTH CAMPBELL AVE
SUITE NO 268
TUCSON, ARIZONA 85718

520.408.1044 TEL
520.408.1170 FAX
WSMARCH.COM WEB

COPYRIGHT BY WSM ARCHITECTS, INC. - 2016

Seal:

Registered Professional Engineer (Civil) 32788 SARAH JEWETT BESKAY ARIZONA, U.S.A. PRELIMINARY NOT FOR CONSTRUCTION

Revision:

1	
2	
3	
4	
5	
6	
7	
8	
9	
10	

Date: 1-21-2016

A&E Plan No.: --

A&E Job No.: --

Consultant Job No.: 15118

Sheet Title:

ONE LINE DIAGRAM, PANEL SCHEDULES AND CALCULATIONS

7536 N. La Cholla Blvd.
Tucson, Arizona 85741
Phone (520) 622-2196
Fax (520) 622-2198
www.eda-az.com
Project #: 16006

EDA

Sheet:

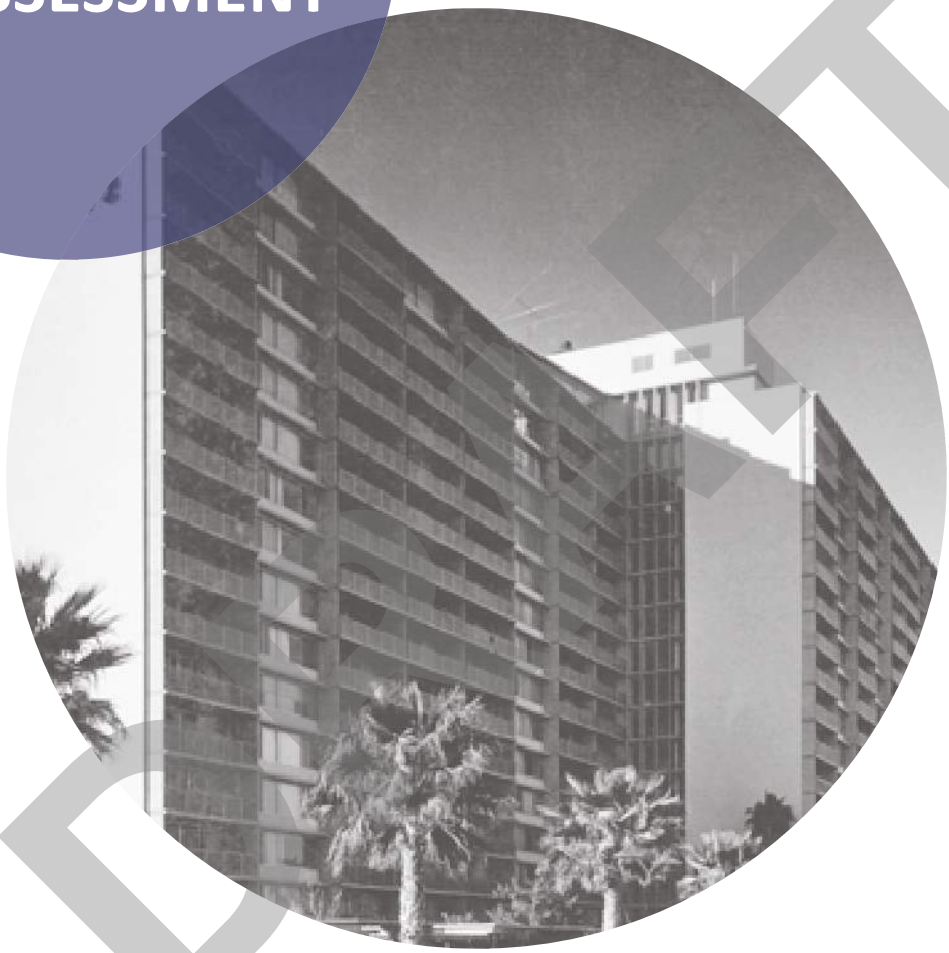
E5.0

Of

CAD File No.: **Plot Date:** 1/29/2016 1:03:51 PM

P:\XXXX Jobs\XX-XXX Job Name\ MONTH/YEAR OF PROJECT START

Elevator Assessment



DRAFT

1 Executive Summary

2 Facility History

3 Assessment Process

4 Component Conditions

5 Aggregate Capital Needs

6

7 Component Assessment Forms

8 Energy Data

City of Tucson

ELEVATOR

CONSULTING

SERVICES, INC.

17595 Italy Court · Lakeville, MN 55044 · Office: 952-435-2429 · Fax: 952-435-6994

www.elevatorconsultingservices.com · tom@elevatorconsultingservices.com

jim@elevatorconsultingservices.com · phil@elevatorconsultingservices.com

Maintenance Audits - Code Evaluations - Specifications – Design - Assistance

DRAFT

January 25th, 2016

Michael Becherer AIA
WSM Architects
4330 North Campbell Ave.
Tucson, Arizona, 85718

Re: City of Tucson

Dear Mr. Becherer

We have performed a required audit of the equipment in order to properly evaluate the need and scope of any upgrade. Based on the equipment base, we do believe an upgrade is prudent based on the mechanicals and to some degree the electronics. The machine is an old Montgomery and has literally no support for the drive or brake. Any failure of these will put the client in a very long and expensive emergency replacement situation.

In any modernization, we propose the equipment should get replaced so it has a minimum 15 year life cycle going forward. The machine, controller and door equipment are all weak links to get this unit to that level. In our world today, that means VVVF (Variable voltage, variable frequency) motor control. This is also the most efficient motor control available now and conceivably for the future both in technology and the labor needed to maintain it. Motion Control, Galaxy, Elevator Controls and SmartRise are some of the non-proprietary controllers that all elevator companies can install and maintain. These elevators also have special safety plank equipment that should be upgraded. The method it currently has requires a crank out device that is very old technology.

MODERNIZATION PLAN

Our plan for modernization includes:

1. New non-proprietary controllers and selectors
2. New machine / base bid geared, alternate gearless
3. New car and corridor fixtures
4. New door operators
5. New Governors
6. New Safety Planks, buffers
7. New corridor pushbutton fixtures
8. New door protection devices
9. Applicable code upgrades
10. Wiring
11. Modify cab interiors

Retain the following:

1. Rails and rail supports
2. Hoistway entrances
3. Cab shell

All A. D. A. modifications and code upgrades are included.

Additional Building Work to Be Done by Contractor

If the elevator modernization is undertaken, there will be additional building work relative to the elevators. Some of the work that is required is:

1. Upgrade machine room HVAC
2. Additional machine room lighting
3. Provide an earth ground
4. Interface smoke detectors
5. Additional pit lights
6. Miscellaneous Code mandated requirements

Any microprocessor requires an earth ground to eliminate repetitive and frequent conflicts. We only propose non-proprietary equipment to give the Owner options for future competitive ongoing maintenance. This pertains to the controller, fixtures and door equipment and to some degree the machine. OEM equipment by the majors put you at risk for exclusive single vendor mandates that can be highly toxic to the Owner.

DRAFT

Estimated Budget

Elevator Equipment and Labor ----------	$ 765,000.00
Building work, electrical, patching, code mandates -----	$ 145,000.00
Change order options, reserve ----------	$ 10,000.00
Consultant ---------- ----------	$ 24,000.00
Sub total, ----------	$ 944,000.00

This budget number was not intended to include your architectural fees or requirements. We identify specific equipment replacement and/or complete specifications for the elevator requirements. We do identify building work and we can make the elevator vendor prime to eliminate potential mobilization charges and coordination problems within our specifications.

If you have any questions, please contact Jim Skowron as he would be lead on the project. I am the specification writer and backup to Jim and you.

Respectfully

Thomas Branham

Cc: Jim S / ECS

DRAFT

Component Assessment Forms

DRAFT

1
Executive Summary

2
Facility History

3
Assessment Process

4
Component Conditions

5
Aggregate Capital Needs

6
Elevator Assessment

7

8
Energy DAta

CITY OF TUCSON

WSM Architects
Studio Dwelling Unit Assessments

Tucson House
Physical Needs Assessment

City of Tucson
HCD

Unit #:	117	Unit Type: Studio	Occupied: N	Condition			
				Good	Fair	Poor	
	Accessible Unit				X		
Living Area							Comments
Walls:	Surface Condition			X			Gypsum Wall Board and metal lath plaster - Painting needed
	Paint Condition				X		
Ceiling:	Surface Condition			X			Textured underside of Floor Slab - Painting needed
	Paint Condition				X		
Flooring:	12 x 12 VCT Throughout				X		Floor is well maintained but due to age has reached the end of its service life and is showing signs of shrinkage and will begin to fail. Wood base shows wear but is serviceable.
	Wood Base				X		
Doors:	HM Frame / Wd Door				X		Solid Core at Hallways, Hollow Core at interior unit doors
	ADA Hardware Throughout			X			
Windows:	Aluminum Sliding Glass Door				X		Doors do not show signs of failure but are reaching the end of their service life. Threshold at Sliding Glass Door To balcony is not accessible.
	Insulated Glazing				X		
	Blinds			X			
Kitchen:	Stove					X	Cabinets are in working order, but due to age are reaching the end of their service life and should be replaced. Pipe wrap under sink does not meet ADA requirements and needs to be addressed. Sink and faucet show significant wear. Due to the age and condition of the fixtures the kitchen should be fully remodeled
	Oven				X		
	Refrigerator				X		
	Sink					X	
	Cabinets				X		
Restroom:	Fixtures					X	Fixtures show rust and wear, will need to be replaced. Flooring shows significant wear as does the base cabinet. Walls need repair and paint. Overall the restroom has enough space to be accessible but due to the age and condition of the fixtures should be fully remodeled. Tub in a fiberglass insert into the original 1960's cast iron tub, shows wear and should be replace with a new Cast Iron Tub to minimize maintenance
	Walls				X		
	Floor					X	
	Ceiling				X		
	Cabinet				X		
	Tile				X		
	Tub					X	
Balcony:	Slab					X	Railings are original to the 1962 construction and should be refurbished/repainted. Balcony slab show significant cracking.
	Railing				X		
	Exterior stucco Wall			X			
Mechanical:	(1) Fancoil Unit				X		
Electrical:	Light Fixtures				X		Light Fixtures use a combination of T-8 and compact fluorescent bulbs, significant energy saving can be accomplished by installing either T-5 fixtures or LED. Receptacles are assorted and many have aged. Recommend replacement
	Devices					X	
Other:							

Unit #:	317	Unit Type: Studio	Occupied: Y	Condition			
				Good	Fair	Poor	
	Standard Unit			X			
Living Area							Comments
Walls:	Surface Condition			X			Gypsum Wall Board and metal lath plaster - Painting needed
	Paint Condition				X		
Ceiling:	Surface Condition			X			Textured underside of Floor Slab - Painting needed
	Paint Condition				X		
Flooring:	12 x 12 VCT Throughout				X		Floor is well maintained but due to age has reached the end of its service life and is showing signs of shrinkage and will begin to fail. Wood base shows wear but is serviceable.
	Wood Base				X		
Doors:	HM Frame / Wd Door				X		Solid Core at Hallways, Hollow Core at interior unit doors. Some ADA Hardware, Non ADA hardware needs replacement
	Hardware					X	
Windows:	Aluminum Sliding Glass Door				X		Doors do not show signs of failure but are reaching the end of their service life.
	Insulated Glazing				X		
	Blinds			X			
Kitchen:	Stove					X	Cabinets are in working order, but due to age are reaching the end of their service life and should be replaced. Sink and faucet show significant wear. Due to the age and condition of the fixtures the kitchen should be fully remodeled.
	Oven				X		
	Refrigerator				X		
	Sink					X	
	Cabinets				X		
Restroom:	Fixtures					X	Fixtures show rust and wear, will need to be replaced. Flooring shows significant wear. Wood laminate cabinet is showing signs of failure due to exposure to moisture. Walls need repair and paint. Due to the age and condition of the fixtures should be fully remodeled. Tub in a fiberglass insert into the original 1960's cast iron tub, shows wear and should be replace with a new Cast Iron Tub to minimize maintenance
	Walls				X		
	Floor					X	
	Ceiling				X		
	Cabinet					X	
	Tile				X		
	Bath Tub					X	
Balcony:	Slab					X	Railings are original to the 1962 construction and should be refurbished/repainted. Balcony slab show significant cracking.
	Railing				X		
	Exterior stucco Wall			X			
Mechanical:	(1) Fancoil Unit				X		
Electrical:	Light Fixtures				X		Light Fixtures use a combination of T-8 and compact fluorescent bulbs, significant energy saving can be accomplished by installing either T-5 fixtures or LED. Receptacles are assorted and many have aged. Recommend replacement
	Devices					X	
Other:							

DRAFT

Unit #:	323	Unit Type: Studio	Occupied: N	Condition			
				Good	Fair	Poor	
	Standard Unit				X		
Living Area							Comments
Walls:	Surface Condition				X		Gypsum Wall Board and metal lath plaster - Patching and Painting needed
	Paint Condition					X	
Ceiling:	Surface Condition				X		Textured underside of Floor Slab - Painting needed
	Paint Condition				X		
Flooring:	12 x 12 VCT Throughout				X		Floor is well maintained but due to age has reached the end of its service life and is showing signs of shrinkage and will begin to fail. Wood base is worn and needs repair or replacement
	Wood Base					X	
Doors:	HM Frame / Wd Door				X		Solid Core at Hallways, Hollow Core at interior unit doors.
	Hardware				X		
Windows:	Aluminum Sliding Glass Door				X		Doors do not show signs of failure but are reaching the end of their service life. Blinds do not function
	Insulated Glazing				X		
	Blinds					X	
Kitchen:	Stove					X	Cabinets are in working order, but due to age are reaching the end of their service life and should be replaced. Sink and faucet show significant wear. Due to the age and condition of the fixtures the kitchen should be fully remodeled.
	Oven				X		
	Refrigerator				X		
	Sink					X	
	Cabinets					X	
Restroom:	Fixtures					X	Fixtures show rust and wear, will need to be replaced. Flooring shows significant wear. Wood laminate cabinet is showing signs of failure due to exposure to moisture. Walls need repair and paint. Due to the age and condition of the fixtures should be fully remodeled. Tub in a fiberglass insert into the original 1960's cast iron tub, shows wear and should be replace with a new Cast Iron Tub to minimize maintenance
	Walls				X		
	Floor					X	
	Ceiling				X		
	Cabinet					X	
	Tile				X		
	Bath Tub					X	
Balcony:	Slab					X	Railings are original to the 1962 construction and should be refurbished/repainted. Balcony slab show significant cracking and appears to slope toward door instead of to the balcony edge, possibly introducing water into the building wall system. Joints at the Fin walls show cracking and separation.
	Railing				X		
	Exterior stucco Wall			X			
Mechanical:	(1) Fancoil Unit				X		
Electrical:	Light Fixtures				X		Light Fixtures use a combination of T-8 and compact fluorescent bulbs, significant energy saving can be accomplished by installing either T-5 fixtures or LED. Receptacles are assorted and many have aged. Recommend replacement
	Devices					X	
Other:							

DRAFT

WSM Architects
Studio Dwelling Unit Assessments

Tucson House
Physical Needs Assessment

City of Tucson
HCD

Unit #: 410	Unit Type: Studio	Occupied: Y	Condition			
			Good	Fair	Poor	
	Standard Unit		X			
Living Area						Comments
Walls:	Surface Condition		X			Gypsum Wall Board and metal lath plaster - Some Patching and Painting needed
	Paint Condition			X		
Ceiling:	Surface Condition			X		Textured underside of Floor Slab - Patch and Painting needed
	Paint Condition			X		
Flooring:	12 x 12 VCT Throughout			X		Floor is well maintained but due to age has reached the end of its service life and is showing signs of shrinkage and will begin to fail.
	Wood Base			X		
Doors:	HM Frame / Wd Door			X		Solid Core at Hallways, Hollow Core at interior. Mixture of Hardware, recent ADA hardware is in good condition, non ADA hardware should be replaced
	Hardware			X		
Windows:	Aluminum Sliding Glass Door			X		Doors do not show signs of failure but are reaching the end of their service life.
	Insulated Glazing			X		
	Blinds		X			
Kitchen:	Stove				X	Cabinets are in working order, but due to age are reaching the end of their service life and should be replaced. Sink and faucet show significant wear. Due to the age and condition of the fixtures the kitchen should be fully remodeled.
	Oven				X	
	Refrigerator			X		
	Sink				X	
	Cabinets				X	
Restroom:	Fixtures				X	Fixtures show rust and wear, will need to be replaced. Flooring shows significant wear. Wood laminate cabinet is showing signs of failure due to exposure to moisture. Walls need repair and paint. Due to the age and condition of the fixtures should be fully remodeled. Tub in a fiberglass insert into the original 1960's cast iron tub, shows wear and should be replace with a new Cast Iron Tub to minimize maintenance
	Walls			X		
	Floor				X	
	Ceiling			X		
	Cabinet				X	
	Tile			X		
	Bath Tub				X	
Balcony:	Slab				X	Railings are original to the 1962 construction and should be refurbished/repainted. Balcony slab show significant cracking and appears to slope toward door instead of to the balcony edge, possibly introducing water into the building wall system. Joints at the Fin walls show cracking and separation.
	Railing			X		
	Exterior stucco Wall		X			
Mechanical:	(1) Fancoil Unit			X		Code Violation - mixing valve required on bathtub facet
	Bathtub Faucet				X	
Electrical:	Light Fixtures			X		Light Fixtures use a combination of T-8 and compact fluorescent bulbs, significant energy saving can be accomplished by installing either T-5 fixtures or LED. Receptacles are assorted and many have aged. Recommend replacement
	Devices				X	
Other:						

DRAFT

Unit #:	422	Unit Type: Studio	Occupied: Y	Condition			
				Good	Fair	Poor	
	Standard Unit			X			
Living Area							Comments
Walls:	Surface Condition			X			Gypsum Wall Board and metal lath plaster - Some Patching and Painting needed
	Paint Condition				X		
Ceiling:	Surface Condition			X			Textured underside of Floor Slab
	Paint Condition				X		
Flooring:	12 x 12 VCT Throughout			X			Floor is well maintained but due to age has reached the end of its service life and is showing signs of shrinkage and will begin to fail.
	Wood Base				X		
Doors:	HM Frame / Wd Door				X		Solid Core at Hallways, Hollow Core at interior. Mixture of Hardware, hardware is aged and should be replaced
	Hardware					X	
Windows:	Aluminum Sliding Glass Door				X		Doors do not show signs of failure but are reaching the end of their service life.
	Insulated Glazing				X		
	Blinds			X			
Kitchen:	Stove					X	Cabinets are in working order, but due to age are reaching the end of their service life and should be replaced. Sink and faucet show significant wear. Due to the age and condition of the fixtures the kitchen should be fully remodeled.
	Oven				X		
	Refrigerator				X		
	Sink					X	
	Cabinets					X	
Restroom:	Fixtures					X	Fixtures show rust and wear, will need to be replaced. Flooring shows significant wear. Wood laminate cabinet is showing signs of failure due to exposure to moisture. Walls need repair and paint. Due to the age and condition of the fixtures should be fully remodeled. Tub in a fiberglass insert into the original 1960's cast iron tub, shows wear and should be replace with a new Cast Iron Tub to minimize maintenance
	Walls				X		
	Floor					X	
	Ceiling				X		
	Cabinet					X	
	Tile				X		
	Bath Tub					X	
Balcony:	Slab					X	Railings are original to the 1962 construction and should be refurbished/repainted. Balcony slab show significant cracking.
	Railing				X		
	Exterior stucco Wall			X			
Mechanical:	(1) Fancoil Unit				X		Code Violation - mixing valve required on bathtub facet
	Bathtub Faucet					X	
Electrical:	Light Fixtures				X		Light Fixtures use a combination of T-8 and compact fluorescent bulbs, significant energy saving can be accomplished by installing either T-5 fixtures or LED. Receptacles are assorted and many have aged. Recommend replacement
	Devices					X	
Other:							

DRAFT

WSM Architects
Studio Dwelling Unit Assessments

Tucson House
Physical Needs Assessment

City of Tucson
HCD

Unit #: 512	Unit Type: Studio	Occupied: N	Condition			
			Good	Fair	Poor	
	Standard Unit				X	Currently being rehabilitated after tenant vacated
Living Area						Comments
Walls:	Surface Condition				X	Gypsum Wall Board and metal lath plaster - Patching and Painting needed
	Paint Condition				X	
Ceiling:	Surface Condition		X			Textured underside of Floor Slab
	Paint Condition			X		
Flooring:	12 x 12 VCT Throughout		X			Floor is well maintained but due to age has reached the end of its service life and is showing signs of shrinkage and will begin to fail. Base board is damaged and worn, need repair and paint.
	Wood Base				X	
Doors:	HM Frame / Wd Door			X		Solid Core at Hallways, Hollow Core at interior. Hardware is aged and should be replaced
	Hardware				X	
Windows:	Aluminum Sliding Glass Door			X		Doors do not show signs of failure but are reaching the end of their service life. Screen is damaged and needs to be replaced
	Insulated Glazing			X		
	Blinds		X			
	Screen				X	
Kitchen:	Stove				X	Cabinets are in working order, but due to age are reaching the end of their service life and should be replaced. Sink and faucet show significant wear. Due to the age and condition of the fixtures the kitchen should be fully remodeled.
	Oven			X		
	Refrigerator				X	
	Sink				X	
	Cabinets				X	
Restroom:	Fixtures				X	Fixtures show rust and wear, will need to be replaced. Flooring shows significant wear. Wood laminate cabinet is showing signs of failure due to exposure to moisture. Walls need repair and paint. Due to the age and condition of the fixtures should be fully remodeled. Tub in a fiberglass insert into the original 1960's cast iron tub, shows wear and should be replace with a new Cast Iron Tub to minimize maintenance
	Walls			X		
	Floor				X	
	Ceiling			X		
	Cabinet				X	
	Tile			X		
	Bath Tub				X	
Balcony:	Slab				X	Railings are original to the 1962 construction and should be refurbished/repainted. Balcony slab show significant cracking.
	Railing			X		
	Exterior stucco Wall		X			
Mechanical:	(1) Fancoil Unit			X		
	Bathtub Faucet			X		
Electrical:	Light Fixtures			X		Light Fixtures use a combination of T-8 and compact fluorescent bulbs, significant energy saving can be accomplished by installing either T-5 fixtures or LED. Receptacles are assorted and many have aged. Recommend replacement
	Devices				X	
Other:						

DRAFT

WSM Architects
Studio Dwelling Unit Assessments

Tucson House
Physical Needs Assessment

City of Tucson
HCD

Unit #: 526	Unit Type: Studio	Occupied: N	Condition			
			Good	Fair	Poor	
	Standard Unit			X		
Living Area						Comments
Walls:	Surface Condition			X		Gypsum Wall Board and metal lath plaster - Some Patching and Painting needed
	Paint Condition			X		
Ceiling:	Surface Condition		X			Textured underside of Floor Slab
	Paint Condition			X		
Flooring:	12 x 12 VCT Throughout			X		Floor is well maintained but due to age has reached the end of its service life and is showing signs of shrinkage and will begin to fail.
	Wood Base			X		
Doors:	HM Frame / Wd Door			X		Solid Core at Hallways, Hollow Core at interior. Hardware is aged and should be replaced
	Hardware				X	
Windows:	Aluminum Sliding Glass Door				X	Door rollers show signs of failure and reaching the end of their service life. Screen is damaged and needs to be replaced
	Insulated Glazing			X		
	Blinds		X			
	Screen				X	
Kitchen:	Stove				X	Cabinets are in working order, but due to age are reaching the end of their service life and should be replaced. Sink and faucet show significant wear. Due to the age and condition of the fixtures the kitchen should be fully remodeled.
	Oven			X		
	Refrigerator				X	
	Sink				X	
	Cabinets				X	
Restroom:	Fixtures				X	Fixtures show rust and wear, will need to be replaced. Flooring shows significant wear. Wood laminate cabinet is showing signs of failure due to exposure to moisture. Walls need repair and paint. Due to the age and condition of the fixtures should be fully remodeled. Tub in a fiberglass insert into the original 1960's cast iron tub, shows wear and should be replace with a new Cast Iron Tub to minimize maintenance. Tile surround shows signifigant signs of Cracking
	Walls			X		
	Floor				X	
	Ceiling			X		
	Cabinet				X	
	Tile				X	
	Bath Tub				X	
Balcony:	Slab				X	Railings are original to the 1962 construction and should be refurbished/repainted. Balcony slab show significant cracking. Wing walls show some seperation from the buildng structure and should be addressed
	Railing			X		
	Exterior stucco Wall		X			
Mechanical:	(1) Fancoil Unit			X		Code Violation - mixing valve required on bathtub facet
	Bathtub Faucet				X	
Electrical:	Light Fixtures			X		Light Fixtures use a combination of T-8 and compact fluorescent bulbs, significant energy saving can be accomplished by installing either T-5 fixtures or LED. Receptacles are assorted and many have aged. Recommend replacement
	Devices				X	
Other:						

DRAFT

WSM Architects
Studio Dwelling Unit Assessments

Tucson House
Physical Needs Assessment

City of Tucson
HCD

Unit #:	613	Unit Type: Studio	Occupied: Y	Condition			
				Good	Fair	Poor	
	Standard Unit				X		
Living Area							Comments
Walls:	Surface Condition				X		Gypsum Wall Board and metal lath plaster - Painting needed
	Paint Condition					X	
Ceiling:	Surface Condition				X		Textured underside of Floor Slab - Need some patch and paint
	Paint Condition				X		
Flooring:	12 x 12 VCT Throughout				X		Floor is well maintained but due to age has reached the end of its service life and is showing signs of shrinkage and will begin to fail. Base is damaged in some areas, needs patch and repair
	Wood Base				X		
Doors:	HM Frame / Wd Door				X		Solid Core at Hallways, Hollow Core at interior. Hardware is aged and should be replaced
	Hardware					X	
Windows:	Aluminum Sliding Glass Door				X		Doors do not show signs of failure but are reaching the end of their service life.
	Insulated Glazing				X		
	Blinds			X			
	Screen				X		
Kitchen:	Stove					X	Cabinets are in working order, but due to age are reaching the end of their service life and should be replaced. Sink and faucet show significant wear. Due to the age and condition of the fixtures the kitchen should be fully remodeled.
	Oven				X		
	Refrigerator				X		
	Sink					X	
	Cabinets					X	
Restroom:	Fixtures					X	Fixtures show rust and wear, will need to be replaced. Flooring shows significant wear. Wood laminate cabinet is showing signs of failure due to exposure to moisture. Walls need repair and paint. Due to the age and condition of the fixtures should be fully remodeled. Tub in a fiberglass insert into the original 1960's cast iron tub, shows wear and should be replace with a new Cast Iron Tub to minimize maintenance.
	Walls				X		
	Floor					X	
	Ceiling				X		
	Cabinet					X	
	Tile				X		
	Bath Tub					X	
Balcony:	Slab					X	Railings are original to the 1962 construction and should be refurbished/repainted. Balcony slab show significant cracking and appears to slope toward door instead of to the balcony edge, possibly introducing water into the building wall system. Wing walls show some seperation from the buildng structure and should be addressed
	Railing				X		
	Exterior stucco Wall			X			
Mechanical:	(1) Fancoil Unit				X		Code Violation - mixing valve required on bathtub facet
	Bathtub Faucet					X	
Electrical:	Light Fixtures				X		Light Fixtures use a combination of T-8 and compact fluorescent bulbs, significant energy saving can be accomplished by installing either T-5 fixtures or LED. Receptacles are assorted and many have aged. Recommend replacement
	Devices					X	
Other:							

DRAFT

Unit #:	713	Unit Type: Studio	Occupied: Y	Condition			
				Good	Fair	Poor	
	Standard Unit			X			
Living Area							Comments
Walls:	Surface Condition			X			Gypsum Wall Board and metal lath plaster
	Paint Condition				X		
Ceiling:	Surface Condition			X			Textured underside of Floor Slab
	Paint Condition				X		
Flooring:	12 x 12 VCT Throughout				X		Floor is well maintained but due to age has reached the end of its service life and is showing signs of shrinkage and will begin to fail.
	Wood Base			X			
Doors:	HM Frame / Wd Door				X		Solid Core at Hallways, Hollow Core at interior. Hardware is aged and should be replaced
	Hardware					X	
Windows:	Aluminum Sliding Glass Door				X		Door rollers show signs of failure and reaching the end of their service life. Blinds are the incorrect type and need to be replaced
	Insulated Glazing				X		
	Blinds					X	
	Screen				X		
Kitchen:	Stove					X	Cabinets are in working order, but due to age are reaching the end of their service life and should be replaced. Sink and faucet show significant wear. Due to the age and condition of the fixtures the kitchen should be fully remodeled.
	Oven				X		
	Refrigerator				X		
	Sink					X	
	Cabinets					X	
Restroom:	Fixtures					X	Fixtures show rust and wear, will need to be replaced. Flooring shows significant wear. Wood laminate cabinet is showing signs of failure due to exposure to moisture. Walls need repair and paint. Due to the age and condition of the fixtures should be fully remodeled. Tub in a fiberglass insert into the original 1960's cast iron tub, shows wear and should be replace with a new Cast Iron Tub to minimize maintenance.
	Walls				X		
	Floor					X	
	Ceiling				X		
	Cabinet					X	
	Tile				X		
	Bath Tub					X	
Balcony:	Slab				X		Railings are original to the 1962 construction and should be refurbished/repainted. Balcony slab show some cracking and appears to slope toward door instead of to the balcony edge, possibly introducing water into the building wall system. Wing walls show some seperation from the building structure and should be addressed
	Railing				X		
	Exterior stucco Wall			X			
Mechanical:	(1) Fancoil Unit				X		Code Violation - mixing valve required on bathtub facet
	Bathtub Faucet					X	
Electrical:	Light Fixtures				X		Light Fixtures use a combination of T-8 and compact fluorescent bulbs, significant energy saving can be accomplished by installing either T-5 fixtures or LED. Receptacles are assorted and many have aged. Recommend replacement
	Devices					X	
Other:							

DRAFT

Unit #:	1011	Unit Type: Studio	Occupied: Y	Condition			
				Good	Fair	Poor	
	Standard Unit			X			
Living Area							Comments
Walls:	Surface Condition			X			Gypsum Wall Board and metal lath plaster
	Paint Condition				X		
Ceiling:	Surface Condition				X		Textured underside of Floor Slab - some paint touch up
	Paint Condition				X		
Flooring:	12 x 12 VCT Throughout				X		Floor is well maintained but due to age has reached the end of its service life and is showing signs of shrinkage and will begin to fail.
	Wood Base			X			
Doors:	HM Frame / Wd Door				X		Solid Core at Hallways, Hollow Core at interior. Hardware is aged and should be replaced
	Hardware					X	
Windows:	Aluminum Sliding Glass Door				X		Door rollers show signs of failure and reaching the end of their service life.
	Insulated Glazing				X		
	Blinds			X			
	Screen				X		
Kitchen:	Stove					X	Cabinets are in working order, but due to age are reaching the end of their service life and should be replaced. Sink and faucet show significant wear. Due to the age and condition of the fixtures the kitchen should be fully remodeled.
	Oven				X		
	Refrigerator				X		
	Sink					X	
	Cabinets					X	
Restroom:	Fixtures					X	Fixtures show rust and wear, will need to be replaced. Flooring shows significant wear. Wood laminate cabinet is showing signs of failure due to exposure to moisture. Walls need repair and paint. Due to the age and condition of the fixtures should be fully remodeled. Tub in a fiberglass insert into the original 1960's cast iron tub, shows wear and should be replace with a new Cast Iron Tub to minimize maintenance.
	Walls				X		
	Floor					X	
	Ceiling				X		
	Cabinet					X	
	Tile			X			
	Bath Tub					X	
Balcony:	Slab				X		Railings are original to the 1962 construction and should be refurbished/repainted. Balcony slab show some cracking. Wing walls show some seperation from the building structure and should be addressed
	Railing				X		
	Exterior stucco Wall			X			
Mechanical:	(1) Fancoil Unit				X		Code Violation - mixing valve required on bathtub facet
	Bathtub Faucet					X	
Electrical:	Light Fixtures				X		Light Fixtures use a combination of T-8 and compact fluorescent bulbs, significant energy saving can be accomplished by installing either T-5 fixtures or LED. Receptacles are assorted and many have aged. Recommend replacement
	Devices					X	
Other:							

DRAFT

Unit #:	1016	Unit Type:	Studio	Occupied: Y	Condition			
					Good	Fair	Poor	
	Standard Unit				X			
Living Area								Comments
Walls:	Surface Condition				X			Gypsum Wall Board and metal lath plaster - Some paint touch up
	Paint Condition					X		
Ceiling:	Surface Condition					X		Textured underside of Floor Slab - some Damage at conduit intallation
	Paint Condition					X		
Flooring:	12 x 12 VCT Throughout					X		Floor is well maintained but due to age has reached the end of its service life and is showing signs of shrinkage and will begin to fail.
	Wood Base				X			
Doors:	HM Frame / Wd Door					X		Solid Core at Hallways, Hollow Core at interior. Mixture of Hardware, recent ADA hardware is in good condition, non ADA hardware should be replaced
	Hardware					X		
Windows:	Aluminum Sliding Glass Door					X		Door rollers show signs of failure and reaching the end of their service life.
	Insulated Glazing					X		
	Blinds				X			
	Screen					X		
Kitchen:	Stove						X	Cabinets are in working order, but due to age are reaching the end of their service life and should be replaced. Sink and faucet show significant wear. Due to the age and condition of the fixtures the kitchen should be fully remodeled.
	Oven					X		
	Refrigerator					X		
	Sink						X	
	Cabinets						X	
Restroom:	Fixtures						X	Fixtures show rust and wear, will need to be replaced. Flooring shows significant wear. Wood laminate cabinet is showing signs of failure due to exposure to moisture. Walls need repair and paint. Due to the age and condition of the fixtures should be fully remodeled. Tub in a fiberglass insert into the original 1960's cast iron tub, shows wear and should be replace with a new Cast Iron Tub to minimize maintenance.
	Walls					X		
	Floor						X	
	Ceiling					X		
	Cabinet						X	
	Tile					X		
	Bath Tub						X	
Balcony:	Slab					X		Railings are original to the 1962 construction and should be refurbished/repainted. Balcony slab show signifigant cracking. Wing walls show some seperation from the building structure and should be addressed
	Railing					X		
	Exterior stucco Wall				X			
Mechanical:	(1) Fancoil Unit					X		Code Violation - mixing valve required on bathtub facet
	Bathtub Faucet						X	
Electrical:	Light Fixtures					X		Light Fixtures use a combination of T-8 and compact fluorescent bulbs, significant energy saving can be accomplished by installing either T-5 fixtures or LED. Receptacles are assorted and many have aged. Recommend replacement
	Devices						X	
Other:								

DRAFT

Unit #:	1111	Unit Type: Studio	Occupied: Y	Condition			
				Good	Fair	Poor	
	Standard Unit			X			
Living Area							Comments
Walls:	Surface Condition			X			Gypsum Wall Board and metal lath plaster
	Paint Condition			X			
Ceiling:	Surface Condition			X			Textured underside of Floor Slab
	Paint Condition			X			
Flooring:	12 x 12 VCT Throughout				X		Floor is well maintained but due to age has reached the end of its service life and is showing signs of shrinkage and will begin to fail.
	Wood Base			X			
Doors:	HM Frame / Wd Door				X		Solid Core at Hallways, Hollow Core at interior. Hardware is aged and should be replaced
	Hardware					X	
Windows:	Aluminum Sliding Glass Door				X		Door rollers show signs of failure and reaching the end of their service life.
	Insulated Glazing				X		
	Blinds			X			
	Screen				X		
Kitchen:	Stove					X	Cabinets are in working order, but due to age are reaching the end of their service life and should be replaced. Sink and faucet show significant wear. Due to the age and condition of the fixtures the kitchen should be fully remodeled.
	Oven					X	
	Refrigerator					X	
	Sink					X	
	Cabinets					X	
Restroom:	Fixtures					X	Fixtures show rust and wear, will need to be replaced. Flooring shows significant wear. Wood laminate cabinet is showing signs of failure due to exposure to moisture. Walls need repair and paint. Due to the age and condition of the fixtures should be fully remodeled. Tub in a fiberglass insert into the original 1960's cast iron tub, shows wear and should be replace with a new Cast Iron Tub to minimize maintenance.
	Walls				X		
	Floor					X	
	Ceiling				X		
	Cabinet					X	
	Tile			X			
	Bath Tub					X	
Balcony:	Slab					X	Railings are original to the 1962 construction and should be refurbished/repainted. Balcony slab show some cracking and appears to slope toward door instead of to the balcony edge, possibly introducing water into the building wall system. Wing walls show some seperation from the building structure and should be addressed
	Railing				X		
	Exterior stucco Wall			X			
Mechanical:	(1) Fancoil Unit				X		Code Violation - mixing valve required on bathtub facet
	Bathtub Faucet					X	
Electrical:	Light Fixtures				X		Light Fixtures use a combination of T-8 and compact fluorescent bulbs, significant energy saving can be accomplished by installing either T-5 fixtures or LED. Receptacles are assorted and many have aged. Recommend replacement
	Devices					X	
Other:							Occupant requested that no photos be taken

DRAFT

Unit #:	1117	Unit Type: Studio	Occupied: Y	Condition			
				Good	Fair	Poor	
	Standard Unit				X		
Living Area							Comments
Walls:	Surface Condition			X			Gypsum Wall Board and metal lath plaster - Some painting needed
	Paint Condition				X		
Ceiling:	Surface Condition			X			Textured underside of Floor Slab
	Paint Condition			X			
Flooring:	12 x 12 VCT Throughout				X		Floor is well maintained but due to age has reached the end of its service life and is showing signs of shrinkage and will begin to fail.
	Wood Base			X			
Doors:	HM Frame / Wd Door				X		Solid Core at Hallways, Hollow Core at interior. Hardware is aged and should be replaced
	Hardware					X	
Windows:	Aluminum Sliding Glass Door				X		Door rollers show signs of failure and reaching the end of their service life. Blinds not functioning properly
	Insulated Glazing				X		
	Blinds					X	
	Screen				X		
Kitchen:	Stove					X	Cabinets are in working order, but due to age are reaching the end of their service life and should be replaced. Sink and faucet show significant wear. Due to the age and condition of the fixtures the kitchen should be fully remodeled.
	Oven					X	
	Refrigerator				X		
	Sink					X	
	Cabinets					X	
Restroom:	Fixtures					X	Fixtures show rust and wear, will need to be replaced. Flooring shows significant wear. Wood laminate cabinet is showing signs of failure due to exposure to moisture. Walls need repair and paint. Due to the age and condition of the fixtures should be fully remodeled. Tub in a fiberglass insert into the original 1960's cast iron tub, shows wear and should be replace with a new Cast Iron Tub to minimize maintenance.
	Walls				X		
	Floor					X	
	Ceiling				X		
	Cabinet					X	
	Tile				X		
	Bath Tub					X	
Balcony:	Slab				X		Railings are original to the 1962 construction and should be refurbished/repainted. Balcony slab show some cracking.
	Railing				X		
	Exterior stucco Wall			X			
Mechanical:	(1) Fancoil Unit				X		Code Violation - mixing valve required on bathtub facet
	Bathtub Faucet					X	
Electrical:	Light Fixtures				X		Light Fixtures use a combination of T-8 and compact fluorescent bulbs, significant energy saving can be accomplished by installing either T-5 fixtures or LED. Receptacles are assorted and many have aged. Recommend replacement
	Devices					X	
Other:							All walls show damage at approx. 18" due to occupant using a wheel chair, unit will need patch and repair at all doors, door jambs and walls.

DRAFT

WSM Architects
Studio Dwelling Unit Assessments

Tucson House
Physical Needs Assessment

City of Tucson
HCD

Unit #: 1126	Unit Type: Studio	Occupied: Y	Condition			
			Good	Fair	Poor	
	Standard Unit			X		
Living Area						Comments
Walls:	Surface Condition			X		Gypsum Wall Board and metal lath plaster - Patch and paint requried
	Paint Condition			X		
Ceiling:	Surface Condition		X			Textured underside of Floor Slab
	Paint Condition		X			
Flooring:	12 x 12 VCT Throughout			X		Floor is well maintained but due to age has reached the end of its service life and is showing signs of shrinkage and will begin to fail.
	Wood Base		X			
Doors:	HM Frame / Wd Door			X		Solid Core at Hallways, Hollow Core at interior. Hardware is aged and should be replaced
	Hardware				X	
Windows:	Aluminum Sliding Glass Door			X		Door rollers show signs of failure and reaching the end of their service life. Blinds not functioning properly
	Insulated Glazing			X		
	Blinds				X	
	Screen			X		
Kitchen:	Stove				X	Cabinets are in working order, but due to age are reaching the end of their service life and should be replaced. Sink and faucet show significant wear. Due to the age and condition of the fixtures the kitchen should be fully remodeled.
	Oven				X	
	Refrigerator				X	
	Sink				X	
	Cabinets				X	
Restroom:	Fixtures				X	Fixtures show rust and wear, will need to be replaced. Flooring shows significant wear. Wood laminate cabinet is showing signs of failure due to exposure to moisture. Walls need repair and paint. Due to the age and condition of the fixtures should be fully remodeled. Tub in a fiberglass insert into the original 1960's cast iron tub, shows wear and should be replace with a new Cast Iron Tub to minimize maintenance.
	Walls			X		
	Floor				X	
	Ceiling			X		
	Cabinet				X	
	Tile			X		
	Bath Tub				X	
Balcony:	Slab			X		Railings are original to the 1962 construction and should be refurbished/repainted. Balcony slab show some cracking.
	Railing			X		
	Exterior stucco Wall		X			
Mechanical:	(1) Fancoil Unit			X		Code Violation - mixing valve required on bathtub facet
	Bathtub Faucet				X	
Electrical:	Light Fixtures			X		Light Fixtures use a combination of T-8 and compact fluorescent bulbs, significant energy saving can be accomplished by installing either T-5 fixtures or LED. Receptacles are assorted and many have aged. Recommend replacement
	Devices				X	
Other:						All walls show damage at approx. 18" due to occupant using a wheel chair, unit will need patch and repair at all doors, door jambs and walls.

DRAFT

WSM Architects
Studio Dwelling Unit Assessments

Tucson House
Physical Needs Assessment

City of Tucson
HCD

Unit #:	1209	Unit Type: Studio	Occupied: N	Condition			
				Good	Fair	Poor	
	Standard Unit				X		
Living Area							Comments
Walls:	Surface Condition				X		Gypsum Wall Board and metal lath plaster - Vertical crack in west wall needs patch and paint
	Paint Condition				X		
Ceiling:	Surface Condition			X			Textured underside of Floor Slab
	Paint Condition			X			
Flooring:	12 x 12 VCT Throughout				X		Floor is well maintained but due to age has reached the end of its service life and is showing signs of shrinkage and will begin to fail.
	Wood Base			X			
Doors:	HM Frame / Wd Door				X		Solid Core at Hallways, Hollow Core at interior. Hardware is aged and should be replaced
	Hardware					X	
Windows:	Aluminum Sliding Glass Door				X		Door rollers show signs of failure and reaching the end of their service life.
	Insulated Glazing				X		
	Blinds			X			
	Screen				X		
Kitchen:	Stove					X	Cabinets are in working order, but due to age are reaching the end of their service life and should be replaced. Sink and faucet show significant wear. Due to the age and condition of the fixtures the kitchen should be fully remodeled.
	Oven				X		
	Refrigerator				X		
	Sink					X	
	Cabinets					X	
Restroom:	Fixtures					X	Fixtures show rust and wear, will need to be replaced. Flooring shows significant wear. Wood laminate cabinet is showing signs of failure due to exposure to moisture. Walls need repair and paint. Due to the age and condition of the fixtures should be fully remodeled. Tub in a fiberglass insert into the original 1960's cast iron tub, shows wear and should be replace with a new Cast Iron Tub to minimize maintenance.
	Walls				X		
	Floor					X	
	Ceiling				X		
	Cabinet					X	
	Tile				X		
	Bath Tub					X	
Balcony:	Slab					X	Railings are original to the 1962 construction and should be refurbished/repainted. Balcony slab show some cracking and appears to slope toward door instead of to the balcony edge, possibly introducing water into the building wall system. Wing walls show some seperation from the building structure and should be addressed
	Railing				X		
	Exterior stucco Wall			X			
Mechanical:	(1) Fancoil Unit				X		Code Violation - mixing valve required on bathtub facet
	Bathtub Faucet					X	
Electrical:	Light Fixtures				X		Light Fixtures use a combination of T-8 and compact fluorescent bulbs, significant energy saving can be accomplished by installing either T-5 fixtures or LED. Receptacles are assorted and many have aged. Recommend replacement
	Devices					X	
Other:							All walls show damage at approx. 18" due to occupant using a wheel chair, unit will need patch and repair at all doors, door jambs and walls.

DRAFT

WSM Architects
Studio Dwelling Unit Assessments

Tucson House
Physical Needs Assessment

City of Tucson
HCD

Unit #:	1210	Unit Type: Studio	Occupied: Y	Condition			
				Good	Fair	Poor	
	Standard Unit				X		
Living Area							Comments
Walls:	Surface Condition			X			Gypsum Wall Board and metal lath plaster
	Paint Condition			X			
Ceiling:	Surface Condition			X			Textured underside of Floor Slab
	Paint Condition			X			
Flooring:	12 x 12 VCT Throughout				X		Floor is well maintained but due to age has reached the end of its service life and is showing signs of shrinkage and will begin to fail.
	Wood Base			X			
Doors:	HM Frame / Wd Door				X		Solid Core at Hallways, Hollow Core at interior. Hardware is aged and should be replaced
	Hardware					X	
Windows:	Aluminum Sliding Glass Door				X		Door rollers show signs of failure and reaching the end of their service life.
	Insulated Glazing				X		
	Blinds			X			
	Screen				X		
Kitchen:	Stove					X	Cabinets are in working order, but due to age are reaching the end of their service life and should be replaced. Sink and faucet show significant wear. Due to the age and condition of the fixtures the kitchen should be fully remodeled.
	Oven				X		
	Refrigerator				X		
	Sink					X	
	Cabinets					X	
Restroom:	Fixtures					X	Fixtures show rust and wear, will need to be replaced. Flooring shows significant wear. Wood laminate cabinet is showing signs of failure due to exposure to moisture. Walls need repair and paint. Due to the age and condition of the fixtures should be fully remodeled. Tub in a fiberglass insert into the original 1960's cast iron tub, shows wear and should be replace with a new Cast Iron Tub to minimize maintenance.
	Walls				X		
	Floor					X	
	Ceiling				X		
	Cabinet					X	
	Tile				X		
	Bath Tub					X	
Balcony:	Slab					X	Railings are original to the 1962 construction and should be refurbished/repainted. Balcony slab show some cracking and appears to slope toward door instead of to the balcony edge, possibly introducing water into the building wall system. Wing walls show some seperation from the building structure and should be addressed
	Railing				X		
	Exterior stucco Wall			X			
Mechanical:	(1) Fancoil Unit				X		Code Violation - mixing valve required on bathtub facet
	Bathtub Faucet					X	
Electrical:	Light Fixtures				X		Light Fixtures use a combination of T-8 and compact fluorescent bulbs, significant energy saving can be accomplished by installing either T-5 fixtures or LED. Receptacles are assorted and many have aged. Recommend replacement
	Devices					X	
Other:							

DRAFT

WSM Architects
Studio Dwelling Unit Assessments

Tucson House
Physical Needs Assessment

City of Tucson
HCD

Unit #:	1211	Unit Type: Studio	Occupied: Y	Condition			
				Good	Fair	Poor	
	Standard Unit				X		
Living Area							Comments
Walls:	Surface Condition				X		Gypsum Wall Board and metal lath plaster
	Paint Condition				X		
Ceiling:	Surface Condition			X			Textured underside of Floor Slab
	Paint Condition			X			
Flooring:	12 x 12 VCT Throughout				X		Floor is well maintained but due to age has reached the end of its service life and is showing signs of shrinkage and will begin to fail.
	Wood Base			X			
Doors:	HM Frame / Wd Door				X		Solid Core at Hallways, Hollow Core at interior. Mixture of Hardware, recent ADA hardware is in good condition, non ADA hardware should be replaced
	Hardware				X		
Windows:	Aluminum Sliding Glass Door				X		Door rollers show signs of failure and reaching the end of their service life.
	Insulated Glazing				X		
	Blinds			X			
	Screen				X		
Kitchen:	Stove					X	Cabinets are in working order, but due to age are reaching the end of their service life and should be replaced. Sink and faucet show significant wear. Due to the age and condition of the fixtures the kitchen should be fully remodeled.
	Oven				X		
	Refrigerator				X		
	Sink					X	
	Cabinets					X	
Restroom:	Fixtures					X	Fixtures show rust and wear, will need to be replaced. Flooring shows significant wear. Wood laminate cabinet is showing signs of failure due to exposure to moisture. Walls need repair and paint. Due to the age and condition of the fixtures should be fully remodeled. Tub in a fiberglass insert into the original 1960's cast iron tub, shows wear and should be replace with a new Cast Iron Tub to minimize maintenance.
	Walls				X		
	Floor					X	
	Ceiling				X		
	Cabinet					X	
	Tile				X		
	Bath Tub					X	
Balcony:	Slab					X	Railings are original to the 1962 construction and should be refurbished/repainted. Balcony slab show signifigant cracking. Wing walls show some seperation from the building structure and should be addressed
	Railing				X		
	Exterior stucco Wall			X			
Mechanical:	(1) Fancoil Unit				X		Code Violation - mixing valve required on bathtub facet
	Bathtub Faucet					X	
Electrical:	Light Fixtures				X		Light Fixtures use a combination of T-8 and compact fluorescent bulbs, significant energy saving can be accomplished by installing either T-5 fixtures or LED. Receptacles are assorted and many have aged. Recommend replacement
	Devices					X	
Other:							

DRAFT

WSM Architects
Studio Dwelling Unit Assessments

Tucson House
Physical Needs Assessment

City of Tucson
HCD

Unit #: 1311	Unit Type: Studio	Occupied: Y	Condition			
			Good	Fair	Poor	
	Standard Unit			X		
Living Area						Comments
Walls:	Surface Condition			X		Gypsum Wall Board and metal lath plaster - some cracking at door headers
	Paint Condition			X		
Ceiling:	Surface Condition		X			Textured underside of Floor Slab
	Paint Condition		X			
Flooring:	12 x 12 VCT Throughout			X		Floor is well maintained but due to age has reached the end of its service life and is showing signs of shrinkage and will begin to fail.
	Wood Base		X			
Doors:	HM Frame / Wd Door			X		Solid Core at Hallways, Hollow Core at interior. Mixture of Hardware, recent ADA hardware is in good condition, non ADA hardware should be replaced
	Hardware			X		
Windows:	Aluminum Sliding Glass Door			X		Door rollers show signs of failure and reaching the end of their service life.
	Insulated Glazing			X		
	Blinds		X			
	Screen			X		
Kitchen:	Stove				X	Cabinets are in working order, but due to age are reaching the end of their service life and should be replaced. Sink and faucet show significant wear. Due to the age and condition of the fixtures the kitchen should be fully remodeled.
	Oven				X	
	Refrigerator			X		
	Sink				X	
	Cabinets				X	
Restroom:	Fixtures				X	Fixtures show rust and wear, will need to be replaced. Flooring shows significant wear. Wood laminate cabinet is showing signs of failure due to exposure to moisture. Walls need repair and paint. Due to the age and condition of the fixtures should be fully remodeled. Tub in a fiberglass insert into the original 1960's cast iron tub, shows wear and should be replace with a new Cast Iron Tub to minimize maintenance.
	Walls			X		
	Floor				X	
	Ceiling			X		
	Cabinet				X	
	Tile			X		
	Bath Tub				X	
Balcony:	Slab		X			Railings are original to the 1962 construction and should be refurbished/repainted. Balcony slab show Minor cracking. Wing walls show some seperation from the building structure and should be addressed
	Railing			X		
	Exterior stucco Wall		X			
Mechanical:	(1) Fancoil Unit			X		Code Violation - mixing valve required on bathtub facet
	Bathtub Faucet				X	
Electrical:	Light Fixtures			X		Light Fixtures use a combination of T-8 and compact fluorescent bulbs, significant energy saving can be accomplished by installing either T-5 fixtures or LED. Receptacles are assorted and many have aged. Recommend replacement
	Devices				X	
Other:						

DRAFT

WSM Architects
Studio Dwelling Unit Assessments

Tucson House
Physical Needs Assessment

City of Tucson
HCD

Unit #: 1316	Unit Type: Studio	Occupied: Y	Condition			
			Good	Fair	Poor	
	Standard Unit		X			
Living Area						Comments
Walls:	Surface Condition		X			Gypsum Wall Board and metal lath plaster
	Paint Condition		X			
Ceiling:	Surface Condition			X		Textured underside of Floor Slab - some roughness at conduit installation
	Paint Condition			X		
Flooring:	12 x 12 VCT Throughout			X		Floor is well maintained but due to age has reached the end of its service life and is showing signs of shrinkage and will begin to fail.
	Wood Base		X			
Doors:	HM Frame / Wd Door			X		Solid Core at Hallways, Hollow Core at interior. Mixture of Hardware, recent ADA hardware is in good condition, non ADA hardware should be replaced
	Hardware			X		
Windows:	Aluminum Sliding Glass Door			X		Door rollers show signs of failure and reaching the end of their service life.
	Insulated Glazing			X		
	Blinds		X			
	Screen			X		
Kitchen:	Stove				X	Cabinets are in working order, but due to age are reaching the end of their service life and should be replaced. Sink and faucet show significant wear. Due to the age and condition of the fixtures the kitchen should be fully remodeled.
	Oven			X		
	Refrigerator			X		
	Sink				X	
	Cabinets				X	
Restroom:	Fixtures				X	Fixtures show rust and wear, will need to be replaced. Flooring shows significant wear. Wood laminate cabinet is showing signs of failure due to exposure to moisture. Walls need repair and paint. Due to the age and condition of the fixtures should be fully remodeled. Tub in a fiberglass insert into the original 1960's cast iron tub, shows wear and should be replace with a new Cast Iron Tub to minimize maintenance.
	Walls			X		
	Floor				X	
	Ceiling			X		
	Cabinet				X	
	Tile			X		
	Bath Tub				X	
Balcony:	Slab		X			Railings are original to the 1962 construction and should be refurbished/repainted. Balcony slab show Minor cracking. Wing walls show horizontal cracking between precast units and should be addressed
	Railing			X		
	Exterior stucco Wall		X			
Mechanical:	(1) Fancoil Unit			X		Code Violation - mixing valve required on bathtub facet
	Bathtub Faucet				X	
Electrical:	Light Fixtures			X		Light Fixtures use a combination of T-8 and compact fluorescent bulbs, significant energy saving can be accomplished by installing either T-5 fixtures or LED. Receptacles are assorted and many have aged. Recommend replacement
	Devices				X	
Other:						

DRAFT

Unit #:	1323	Unit Type: Studio	Occupied: Y	Condition			
				Good	Fair	Poor	
	Standard Unit			X			
Living Area							Comments
Walls:	Surface Condition				X		Gypsum Wall Board and metal lath plaster - needs some patch and paint
	Paint Condition				X		
Ceiling:	Surface Condition				X		Textured underside of Floor Slab - some rough areas
	Paint Condition				X		
Flooring:	12 x 12 VCT Throughout				X		Floor is well maintained but due to age has reached the end of its service life and is showing signs of shrinkage and will begin to fail.
	Wood Base			X			
Doors:	HM Frame / Wd Door				X		Solid Core at Hallways, Hollow Core at interior. Mixture of Hardware, recent ADA hardware is in good condition, non ADA hardware should be replaced
	Hardware				X		
Windows:	Aluminum Sliding Glass Door				X		Door rollers show signs of failure and reaching the end of their service life. Blinds not working smoothly
	Insulated Glazing				X		
	Blinds				X		
	Screen				X		
Kitchen:	Stove					X	Cabinets are in working order, but due to age are reaching the end of their service life and should be replaced. Sink and faucet show significant wear. Due to the age and condition of the fixtures the kitchen should be fully remodeled.
	Oven				X		
	Refrigerator				X		
	Sink					X	
	Cabinets					X	
Restroom:	Fixtures					X	Fixtures show rust and wear, will need to be replaced. Flooring shows significant wear. Wood laminate cabinet is showing signs of failure due to exposure to moisture. Walls need repair and paint. Due to the age and condition of the fixtures should be fully remodeled. Tub in a fiberglass insert into the original 1960's cast iron tub, shows wear and should be replace with a new Cast Iron Tub to minimize maintenance. Stains on Ceiling
	Walls				X		
	Floor					X	
	Ceiling					X	
	Cabinet					X	
	Tile				X		
	Bath Tub					X	
Balcony:	Slab				X		Railings are original to the 1962 construction and should be refurbished/repainted. Balcony slab show some cracking and appears to slope toward door instead of to the balcony edge, possibly introducing water into the building wall system. Wing walls show some seperation from the building structure and should be addressed
	Railing				X		
	Exterior stucco Wall			X			
Mechanical:	(1) Fancoil Unit				X		Code Violation - mixing valve required on bathtub facet
	Bathtub Faucet					X	
Electrical:	Light Fixtures				X		Light Fixtures use a combination of T-8 and compact fluorescent bulbs, significant energy saving can be accomplished by installing either T-5 fixtures or LED. Receptacles are assorted and many have aged. Recommend replacement
	Devices					X	
Other:							

DRAFT

WSM Architects
Studio Dwelling Unit Assessments

Tucson House
Physical Needs Assessment

City of Tucson
HCD

Unit #: 1410	Unit Type: Studio	Occupied: Y	Condition			
			Good	Fair	Poor	
	Standard Unit		X			
Living Area						Comments
Walls:	Surface Condition		X			Gypsum Wall Board and metal lath plaster
	Paint Condition		X			
Ceiling:	Surface Condition		X			Textured underside of Floor Slab
	Paint Condition		X			
Flooring:	12 x 12 VCT Throughout			X		Floor is well maintained but due to age has reached the end of its service life and is showing signs of shrinkage and will begin to fail.
	Wood Base		X			
Doors:	HM Frame / Wd Door			X		Solid Core at Hallways, Hollow Core at interior. Mixture of Hardware, recent ADA hardware is in good condition, non ADA hardware should be replaced
	Hardware			X		
Windows:	Aluminum Sliding Glass Door			X		Door rollers show signs of failure and reaching the end of their service life.
	Insulated Glazing			X		
	Blinds		X			
	Screen			X		
Kitchen:	Stove				X	Cabinets are in working order, but due to age are reaching the end of their service life and should be replaced. Sink and faucet show significant wear. Due to the age and condition of the fixtures the kitchen should be fully remodeled.
	Oven			X		
	Refrigerator			X		
	Sink				X	
	Cabinets				X	
Restroom:	Fixtures				X	Fixtures show rust and wear, will need to be replaced. Flooring shows significant wear. Wood laminate cabinet is showing signs of failure due to exposure to moisture. Walls need repair and paint. Due to the age and condition of the fixtures should be fully remodeled. Tub in a fiberglass insert into the original 1960's cast iron tub, shows wear and should be replace with a new Cast Iron Tub to minimize maintenance.
	Walls			X		
	Floor			X		
	Ceiling				X	
	Cabinet				X	
	Tile		X			
	Bath Tub				X	
Balcony:	Slab		X			Railings are original to the 1962 construction and should be refurbished/repainted. Balcony slab show some cracking . Wing walls show some seperation from the building structure and should be addressed
	Railing			X		
	Exterior stucco Wall		X			
Mechanical:	(1) Fancoil Unit			X		Code Violation - mixing valve required on bathtub facet
	Bathtub Faucet				X	
Electrical:	Light Fixtures			X		Light Fixtures use a combination of T-8 and compact fluorescent bulbs, significant energy saving can be accomplished by installing either T-5 fixtures or LED. Receptacles are assorted and many have aged. Recommend replacement
	Devices				X	
Other:						

DRAFT

Unit #:	1509	Unit Type: Studio	Occupied: Y	Condition			
				Good	Fair	Poor	
	Standard Unit			X			
Living Area							Comments
Walls:	Surface Condition				X		Gypsum Wall Board and metal lath plaster - Cracks in west wall, will need patch and repair
	Paint Condition				X		
Ceiling:	Surface Condition			X			Textured underside of Floor Slab
	Paint Condition			X			
Flooring:	12 x 12 VCT Throughout				X		Floor is well maintained but due to age has reached the end of its service life and is showing signs of shrinkage and will begin to fail.
	Wood Base			X			
Doors:	HM Frame / Wd Door				X		Solid Core at Hallways, Hollow Core at interior. Hardware is aged and should be replaced
	Hardware					X	
Windows:	Aluminum Sliding Glass Door				X		Door rollers show signs of failure and reaching the end of their service life.
	Insulated Glazing				X		
	Blinds			X			
	Screen				X		
Kitchen:	Stove					X	Cabinets are in working order, but due to age are reaching the end of their service life and should be replaced. Sink and faucet show significant wear. Due to the age and condition of the fixtures the kitchen should be fully remodeled.
	Oven				X		
	Refrigerator				X		
	Sink					X	
	Cabinets					X	
Restroom:	Fixtures					X	Fixtures show rust and wear, will need to be replaced. Flooring shows significant wear. Wood laminate cabinet is showing signs of failure due to exposure to moisture. Walls need repair and paint. Due to the age and condition of the fixtures should be fully remodeled. Fiberglass shower surround, appears in fair condition but shows wear and should be replace with a propoer shower pan and tile surround to minimize future maintenance.
	Walls				X		
	Floor				X		
	Ceiling					X	
	Cabinet					X	
	Tile			X			
	Shower Surround					X	
Balcony:	Slab			X			Railings are original to the 1962 construction and should be refurbished/repainted. Balcony slab show some cracking .
	Railing				X		
	Exterior stucco Wall			X			
Mechanical:	(1) Fancoil Unit				X		
	Bathtub Faucet				X		
Electrical:	Light Fixtures				X		Light Fixtures use a combination of T-8 and compact fluorescent bulbs, significant energy saving can be accomplished by installing either T-5 fixtures or LED. Receptacles are assorted and many have aged. Recommend replacement
	Devices					X	
Other:							

DRAFT

WSM Architects

1 Bd Rm Dwelling Unit Assessments

Tucson House

Physical Needs Assessment

City of Tucson

HCD

Unit #:	302	Unit Type: 1 Bd Rm	Occupied: N	Condition			
				Good	Fair	Poor	
	Standard Unit				X		
Living Area:							Comments
Walls:	Surface Condition			X			Gypsum Wall Board and metal lath plaster
	Paint Condition			X			
Ceiling:	Surface Condition			X			Textured underside of Floor Slab
	Paint Condition			X			
Flooring:	12 x 12 VCT Throughout				X		Floor is well maintained but due to age has reached the end of its service life and is showing signs of shrinkage and will begin to fail.
	Wood Base			X			
Doors:	HM Frame / Wd Door				X		Solid Core at Hallways, Hollow Core at interior. Mixture of Hardware, recent ADA hardware is in good condition, non ADA hardware should be replaced
	Hardware				X		
Windows:	Aluminum Sliding Glass Door				X		Doors show signs of wear and are reaching the end of their service life.
	Insulated Glazing				X		
	Blinds			X			
	Screen				X		
Kitchen:	Stove					X	Cabinets are in working order, but due to age are reaching the end of their service life and should be replaced. Sink and faucet show significant wear. Due to the age and condition of the fixtures the kitchen should be fully remodeled.
	Oven				X		
	Refrigerator				X		
	Sink					X	
	Cabinets					X	
Balcony:	Slab			X			Railings are original to the 1962 construction and should be refurbished/repainted.
	Railing				X		
	Exterior stucco Wall			X			
Bedroom:							Comments
Walls:	Surface Condition				X		Gypsum Wall Board and metal lath plaster - Needs some patch and paint - 2 vertuical cracks in West wall.
	Paint Condition				X		
Ceiling:	Surface Condition			X			Textured underside of Floor Slab
	Paint Condition			X			
Flooring:	12 x 12 VCT Throughout				X		Floor is well maintained but due to age has reached the end of its service life and is showing signs of shrinkage and will begin to fail.
	Wood Base			X			
Window:	Window Unit				X		Window show signs of wear and reaching the end of it's service life.
	Insulated Glazing				X		
	Blinds			X			
	Screen				X		
Restroom:	Fixtures				X		Fixtures show rust and wear, will need to be replaced. Wood laminate cabinet is showing signs of failure due to exposure to moisture. Walls need repair and paint. Due to the age and condition of the fixtures should be fully remodeled. Tub is a fiberglass insert into the original 1960's cast iron tub, shows wear and should be replace with a
	Walls				X		
	Floor				X		
	Ceiling				X		

DRAFT

	Cabinet			X	new Cast Iron Tub to minimize maintenance.
	Tile			X	
	Bath Tub			X	
Mechanical:	(2) Fancoil Units		X		Code Violation - mixing valve required on bathtub facet
	Bathtub Faucet			X	
Electrical:	Light Fixtures		X		Light Fixtures use a combination of T-8 and compact fluorescent bulbs, significant energy saving can be accomplished by installing either T-5 fixtures or LED. Receptacles are assorted and many have aged. Recommend replacement
	Devices			X	
Other:					

Unit #:	402	Unit Type: 1 Bd Rm	Occupied: Y	Condition			
				Good	Fair	Poor	
	Standard Unit				X		
Living Area:							Comments
Walls:	Surface Condition			X			Gypsum Wall Board and metal lath plaster
	Paint Condition			X			
Ceiling:	Surface Condition			X			Textured underside of Floor Slab
	Paint Condition			X			
Flooring:	12 x 12 VCT Throughout				X		Floor is well maintained but due to age has reached the end of its service life and is showing signs of shrinkage and will begin to fail.
	Wood Base			X			
Doors:	HM Frame / Wd Door				X		Solid Core at Hallways, Hollow Core at interior. Mixture of Hardware, recent ADA hardware is in good condition, non ADA hardware should be replaced
	Hardware				X		
Windows:	Aluminum Sliding Glass Door				X		Door signs of failure and reaching the end of it's service life. Blind Needs replacment
	Insulated Glazing				X		
	Blinds					X	
	Screen				X		
Kitchen:	Stove					X	Cabinets are in working order, but due to age are reaching the end of their service life and should be replaced. Sink and faucet show significant wear. Due to the age and condition of the fixtures the kitchen should be fully remodeled.
	Oven					X	
	Refrigerator				X		
	Sink					X	
	Cabinets					X	
Balcony:	Slab				X		Railings are original to the 1962 construction and should be refurbished/repainted. Balcony slab show some cracking and appears to slope toward door instead of to the balcony edge, possibly introducing water into the building wall system.
	Railing				X		
	Exterior stucco Wall			X			
Bedroom:							Comments
Walls:	Surface Condition				X		Gypsum Wall Board and metal lath plaster - Needs some patch and paint

DRAFT

	Paint Condition		X		
Ceiling:	Surface Condition	X			Textured underside of Floor Slab
	Paint Condition	X			
Flooring:	12 x 12 VCT Throughout		X		Floor is well maintained but due to age has reached the end of its service life and is showing signs of shrinkage and will begin to fail.
	Wood Base	X			
Window:	Window Unit		X		Window show signs of failure and reaching the end of it's service life.
	Insulated Glazing		X		
	Blinds	X			
	Screen		X		
Restroom:	Fixtures			X	Fixtures show rust and wear, will need to be replaced. Flooring shows significant wear. Wood laminate cabinet is showing signs of failure due to exposure to moisture. Walls need repair and paint. Due to the age and condition of the fixtures should be fully remodeled. Tub in a fiberglass insert into the original 1960's cast iron tub, shows wear and should be replace with a new Cast Iron Tub to minimize maintenance.
	Walls		X		
	Floor		X		
	Ceiling			X	
	Cabinet			X	
	Tile			X	
	Bath Tub			X	
Mechanical:	(2) Fancoil Units		X		Code Violation - mixing valve required on bathtub facet
	Bathtub Faucet			X	
Electrical:	Light Fixtures		X		Light Fixtures use a combination of T-8 and compact fluorescent bulbs, significant energy saving can be accomplished by installing either T-5 fixtures or LED. Receptacles are assorted and many have aged. Recommend replacement
	Devices			X	
Other:					

Unit #:	707	Unit Type: 1 Bd Rm	Occupied: Y	Condition			
				Good	Fair	Poor	
	Standard Unit			X			
Living Area:							Comments
Walls:	Surface Condition			X			Gypsum Wall Board and metal lath plaster
	Paint Condition			X			
Ceiling:	Surface Condition			X			Textured underside of Floor Slab
	Paint Condition			X			
Flooring:	12 x 12 VCT Throughout				X		Floor is well maintained but due to age has reached the end of its service life and is showing signs of shrinkage and will begin to fail.
	Wood Base			X			
Doors:	HM Frame / Wd Door				X		Solid Core at Hallways, Hollow Core at interior. Mixture of Hardware, recent ADA hardware is in good condition, non ADA hardware should be replaced
	Hardware				X		
Windows:	Aluminum Sliding Glass Door				X		Door signs of failure and reaching the end of it's service life.
	Insulated Glazing				X		
	Blinds			X			

DRAFT

	Screen		X		
Kitchen:	Stove			X	Cabinets are in working order, but due to age are reaching the end of their service life and should be replaced. Sink and faucet show significant wear. Due to the age and condition of the fixtures the kitchen should be fully remodeled.
	Oven		X		
	Refrigerator		X		
	Sink			X	
	Cabinets			X	
Balcony:	Slab			X	Railings are original to the 1962 construction and should be refurbished/repainted Balcony slab show signifigant cracking. Wing walls show some seperation from the building structure and should be addressed
	Railing		X		
	Exterior stucco Wall	X			
Bedroom:					Comments
Walls:	Surface Condition		X		Gypsum Wall Board and metal lath plaster - Needs some patch and paint
	Paint Condition		X		
Ceiling:	Surface Condition	X			Textured underside of Floor Slab
	Paint Condition	X			
Flooring:	12 x 12 VCT Throughout		X		Floor is well maintained but due to age has reached the end of its service life and is showing signs of shrinkage and will begin to fail.
	Wood Base	X			
Window:	Window Unit		X		Window show signs of failure and reaching the end of it's service life.
	Insulated Glazing		X		
	Blinds	X			
	Screen		X		
Restroom:	Fixtures			X	Fixtures show rust and wear, will need to be replaced. Flooring shows significant wear. Wood laminate cabinet is showing signs of failure due to exposure to moisture. Walls need repair and paint. Due to the age and condition of the fixtures should be fully remodeled. Tub in a fiberglass insert into the original 1960's cast iron tub, shows wear and should be replace with a new Cast Iron Tub to minimize maintenance.
	Walls		X		
	Floor		X		
	Ceiling			X	
	Cabinet			X	
	Tile			X	
	Bath Tub			X	
Mechanical:	(2) Fancoil Units		X		Code Violation - mixing valve required on bathtub facet
	Bathtub Faucet			X	
Electrical:	Light Fixtures		X		Light Fixtures use a combination of T-8 and compact fluorescent bulbs, significant energy saving can be accomplished by installing either T-5 fixtures or LED. Receptacles are assorted and many have aged. Recommend replacement
	Devices			X	
Other:					

Unit #:	814	Unit Type:	1 Bd Rm	Occupied: N	Condition			
					Good	Fair	Poor	
	Standard Unit					X		Accessible Unit

DRAFT

WSM Architects

1 Bd Rm Dwelling Unit Assessments

Tucson House

Physical Needs Assessment

City of Tucson

HCD

Living Area:					Comments
Walls:	Surface Condition		X		Gypsum Wall Board and metal lath plaster - some patching and painting needed
	Paint Condition		X		
Ceiling:	Surface Condition	X			Textured underside of Floor Slab - Some paining needed
	Paint Condition		X		
Flooring:	12 x 12 VCT Throughout		X		Floor is well maintained but due to age has reached the end of its service life and is showing signs of shrinkage and will begin to fail.
	Wood Base	X			
Doors:	HM Frame / Wd Door		X		Solid Core at Hallways, Hollow Core at interior. All hardware is ADA compliant
	Hardware	X			
Windows:	Aluminum Sliding Glass Door		X		Door , rollers are failing, door shows signs of failure and reaching the end of it's service life. Blinds have failed
	Insulated Glazing		X		
	Blinds			X	
	Screen		X		
Kitchen:	Stove		X		Cabinets are in working order and newer countertops have been installed, but due to age are reaching the end of their service life and should be replaced. Sink and faucet show significant wear. Due to the age and condition of the fixtures the kitchen should be fully remodeled. Pipe wrap and accessibility to sink do not meet ADA standards.
	Oven		X		
	Refrigerator		X		
	Sink			X	
	Cabinets			X	
Balcony:	Slab	X			Railings are original to the 1962 construction and should be refurbished/repainted. Balcony appears to slope toward door instead of to the balcony edge, possibly introducing water into the building wall system.
	Railing		X		
	Exterior stucco Wall	X			
Bedroom:					Comments
Walls:	Surface Condition	X			Gypsum Wall Board and metal lath plaster
	Paint Condition	X			
Ceiling:	Surface Condition	X			Textured underside of Floor Slab
	Paint Condition	X			
Flooring:	12 x 12 VCT Throughout		X		Floor is well maintained but due to age has reached the end of its service life and is showing signs of shrinkage and will begin to fail.
	Wood Base	X			
Window:	Window Unit		X		Window show signs of failure and reaching the end of it's service life.
	Insulated Glazing		X		
	Blinds	X			
	Screen		X		
Restroom:	Fixtures			X	Fixtures show rust and wear, will need to be replaced. Flooring shows significant wear. Wood laminate cabinet is showing signs of failure due to exposure to moisture. Walls need repair and paint. Due to the age and condition of the fixtures should be fully remodeled. Accessible shower unit has been installed, grab bars and fixure are compliant, seat is not. Is not fully ADA accessible.
	Walls		X		
	Floor		X		
	Ceiling			X	
	Cabinet			X	
	Tile		X		
	Shower Unit		X		
Mechanical:	(2) Fancoil Units		X		

DRAFT

	Bathtub Faucet		X		
Electrical:	Light Fixtures		X		Light Fixtures use a combination of T-8 and compact fluorescent bulbs, significant energy saving can be accomplished by installing either T-5 fixtures or LED. Receptacles are assorted and many have aged. Recommend replacement
	Devices			X	
Other:					

Unit #:	1024	Unit Type: 1 Bd Rm	Occupied: N	Condition			
				Good	Fair	Poor	
	Standard Unit				X		
Living Area:							Comments
Walls:	Surface Condition				X		Gypsum Wall Board and metal lath plaster - Needs patch and paint
	Paint Condition				X		
Ceiling:	Surface Condition			X			Textured underside of Floor Slab - Needs paint
	Paint Condition				X		
Flooring:	12 x 12 VCT Throughout				X		Floor is well maintained but due to age has reached the end of its service life and is showing signs of shrinkage and will begin to fail.
	Wood Base			X			
Doors:	HM Frame / Wd Door				X		Solid Core at Hallways, Hollow Core at interior. Hardware is aged and should be replaced
	Hardware					X	
Windows:	Aluminum Sliding Glass Door				X		Door signs of failure and reaching the end of it's service life.
	Insulated Glazing				X		
	Blinds			X			
	Screen				X		
Kitchen:	Stove					X	Cabinets are in working order, but due to age are reaching the end of their service life and should be replaced. Sink and faucet show significant wear. Due to the age and condition of the fixtures the kitchen should be fully remodeled.
	Oven				X		
	Refrigerator				X		
	Sink					X	
	Cabinets					X	
Balcony:	Slab					X	Railings are original to the 1962 construction and should be refurbished/repainted. Balcony slab show some cracking. Wing walls show some seperation from the building structure and should be addressed
	Railing				X		
	Exterior stucco Wall			X			
Bedroom:							Comments
Walls:	Surface Condition				X		Gypsum Wall Board and metal lath plaster - Needs some patch and paint - vertical cracking on East Wall
	Paint Condition				X		
Ceiling:	Surface Condition			X			Textured underside of Floor Slab - Needs paint
	Paint Condition				X		
Flooring:	12 x 12 VCT Throughout				X		Floor is well maintained but due to age has reached the end of its service life and is

DRAFT

	Wood Base	X			showing signs of shrinkage and will begin to fail.
Window:	Window Unit		X		Window show signs of failure and reaching the end of it's service life. Blind needs replacement
	Insulated Glazing		X		
	Blinds			X	
	Screen		X		
Restroom:	Fixtures			X	Fixtures show rust and wear, will need to be replaced. Flooring shows significant wear. Wood laminate cabinet is showing signs of failure due to exposure to moisture. Walls need repair and paint. Due to the age and condition of the fixtures should be fully remodeled. Tub in a fiberglass insert into the original 1960's cast iron tub, shows wear and should be replace with a new Cast Iron Tub to minimize maintenance.
	Walls		X		
	Floor		X		
	Ceiling			X	
	Cabinet			X	
	Tile		X		
	Bath Tub			X	
Mechanical:	(2) Fancoil Units		X		Code Violation - mixing valve required on bathtub facet
	Bathtub Faucet			X	
Electrical:	Light Fixtures		X		Light Fixtures use a combination of T-8 and compact fluorescent bulbs, significant energy saving can be accomplished by installing either T-5 fixtures or LED. Receptacles are assorted and many have aged. Recommend replacement
	Devices			X	
Other:					

Unit #:	1025	Unit Type:	1 Bd Rm	Occupied: Y	Condition			
					Good	Fair	Poor	
	Standard Unit				X			
Living Area:								Comments
Walls:	Surface Condition				X			Gypsum Wall Board and metal lath plaster
	Paint Condition				X			
Ceiling:	Surface Condition				X			Textured underside of Floor Slab
	Paint Condition				X			
Flooring:	12 x 12 VCT Throughout					X		Floor is well maintained but due to age has reached the end of its service life and is showing signs of shrinkage and will begin to fail.
	Wood Base				X			
Doors:	HM Frame / Wd Door					X		Solid Core at Hallways, Hollow Core at interior. Hardware is aged and should be replaced
	Hardware						X	
Windows:	Aluminum Sliding Glass Door					X		Door signs of failure and reaching the end of it's service life.
	Insulated Glazing					X		
	Blinds				X			
	Screen					X		
Kitchen:	Stove						X	Cabinets are in working order, but due to age are reaching the end of their service life and should be replaced. Sink and faucet show significant wear. Due to the age and condition of the fixtures the kitchen should be fully remodeled.
	Oven					X		
	Refrigerator					X		

DRAFT

	Sink			X	
	Cabinets			X	
Balcony:	Slab	X			Railings are original to the 1962 construction and should be refurbished/repainted.
	Railing		X		
	Exterior stucco Wall	X			
Bedroom:					Comments
Walls:	Surface Condition	X			Gypsum Wall Board and metal lath plaster
	Paint Condition	X			
Ceiling:	Surface Condition	X			Textured underside of Floor Slab
	Paint Condition	X			
Flooring:	12 x 12 VCT Throughout		X		Floor is well maintained but due to age has reached the end of its service life and is showing signs of shrinkage and will begin to fail.
	Wood Base	X			
Window:	Window Unit		X		Window show signs of failure and reaching the end of it's service life.
	Insulated Glazing		X		
	Blinds	X			
	Screen		X		
Restroom:	Fixtures			X	Fixtures show rust and wear, will need to be replaced. Flooring shows significant wear. Wood laminate cabinet is showing signs of failure due to exposure to moisture. Walls need repair and paint. Due to the age and condition of the fixtures should be fully remodeled. Tub in a fiberglass insert into the original 1960's cast iron tub, shows wear and should be replace with a new Cast Iron Tub to minimize maintenance.
	Walls		X		
	Floor		X		
	Ceiling			X	
	Cabinet			X	
	Tile		X		
	Bath Tub			X	
Mechanical:	(2) Fancoil Units		X		Code Violation - mixing valve required on bathtub facet
	Bathtub Faucet			X	
Electrical:	Light Fixtures		X		Light Fixtures use a combination of T-8 and compact fluorescent bulbs, significant energy saving can be accomplished by installing either T-5 fixtures or LED. Receptacles are assorted and many have aged. Recommend replacement
	Devices			X	
Other:					

Unit #:	1125	Unit Type: 1 Bd Rm	Occupied: N	Condition	
		Good	Fair	Poor	
	Standard Unit			X	Recently Vacated
Living Area:					Comments
Walls:	Surface Condition		X		Gypsum Wall Board and metal lath plaster - Needs patch and paint
	Paint Condition		X		
Ceiling:	Surface Condition		X		Textured underside of Floor Slab - Needs patch and paint

DRAFT

	Paint Condition		X		
Flooring:	12 x 12 VCT Throughout		X		Floor is well maintained but due to age has reached the end of its service life and is showing signs of shrinkage and will begin to fail.
	Wood Base	X			
Doors:	HM Frame / Wd Door		X		Solid Core at Hallways, Hollow Core at interior. Hardware is aged and should be replaced
	Hardware			X	
Windows:	Aluminum Sliding Glass Door		X		Door signs of failure and reaching the end of it's service life.
	Insulated Glazing		X		
	Blinds	X			
	Screen		X		
Kitchen:	Stove			X	Cabinets are in working order, but due to age are reaching the end of their service life and should be replaced. Sink and faucet show significant wear. Due to the age and condition of the fixtures the kitchen should be fully remodeled.
	Oven			X	
	Refrigerator		X		
	Sink			X	
	Cabinets			X	
Balcony:	Slab		X		Railings are original to the 1962 construction and should be refurbished/repainted. Balcony slab show some cracking. Wing walls show some seperation from the building structure and should be addressed
	Railing		X		
	Exterior stucco Wall	X			
Bedroom:					Comments
Walls:	Surface Condition	X			Gypsum Wall Board and metal lath plaster
	Paint Condition	X			
Ceiling:	Surface Condition		X		Textured underside of Floor Slab - some minor cracking
	Paint Condition	X			
Flooring:	12 x 12 VCT Throughout		X		Floor is well maintained but due to age has reached the end of its service life and is showing signs of shrinkage and will begin to fail.
	Wood Base	X			
Window:	Window Unit		X		Window show signs of failure and reaching the end of it's service life. Screen Torn
	Insulated Glazing		X		
	Blinds	X			
	Screen			X	
Restroom:	Fixtures			X	Fixtures show rust and wear, will need to be replaced. Flooring shows significant wear. Wood laminate cabinet is showing signs of failure due to exposure to moisture. Walls need repair and paint. Due to the age and condition of the fixtures should be fully remodeled. Tub in a fiberglass insert into the original 1960's cast iron tub, shows wear and should be replace with a new Cast Iron Tub to minimize maintenance.
	Walls		X		
	Floor		X		
	Ceiling			X	
	Cabinet			X	
	Tile		X		
	Bath Tub			X	
Mechanical:	(2) Fancoil Units		X		Code Violation - mixing valve required on bathtub facet
	Bathtub Faucet			X	
Electrical:	Light Fixtures		X		Light Fixtures use a combination of T-8 and compact fluorescent bulbs, significant energy saving can be accomplished by installing either T-5 fixtures or LED. Receptacles are assorted and many have aged. Recommend replacement
	Devices			X	

DRAFT

Other:					

Unit #:	1204	Unit Type: 1 Bd Rm	Occupied: Y	Condition		
			Good	Fair	Poor	
	Standard Unit		X			
Living Area:						Comments
Walls:	Surface Condition			X		Gypsum Wall Board and metal lath plaster - Needs patch and paint
	Paint Condition			X		
Ceiling:	Surface Condition		X			Textured underside of Floor Slab
	Paint Condition		X			
Flooring:	12 x 12 VCT Throughout			X		Floor is well maintained but due to age has reached the end of its service life and is showing signs of shrinkage and will begin to fail.
	Wood Base		X			
Doors:	HM Frame / Wd Door			X		Solid Core at Hallways, Hollow Core at interior. Hardware is aged and should be replaced
	Hardware				X	
Windows:	Aluminum Sliding Glass Door			X		Door signs of failure and reaching the end of it's service life. Blinds need replacement
	Insulated Glazing			X		
	Blinds				X	
	Screen			X		
Kitchen:	Stove				X	Cabinets are in working order, but due to age are reaching the end of their service life and should be replaced. Sink and faucet show significant wear. Due to the age and condition of the fixtures the kitchen should be fully remodeled.
	Oven				X	
	Refrigerator			X		
	Sink				X	
	Cabinets				X	
Balcony:	Slab			X		Railings are original to the 1962 construction and should be refurbished/repainted. Balcony slab show some cracking. Wing walls show some seperation from the building structure and should be addressed
	Railing			X		
	Exterior stucco Wall		X			
Bedroom:						Comments
Walls:	Surface Condition					Not Accessible
	Paint Condition					
Ceiling:	Surface Condition					Not Accessible
	Paint Condition					
Flooring:	12 x 12 VCT Throughout					Not Accessible
	Wood Base					
Window:	Window Unit					Not Accessible
	Insulated Glazing					
	Blinds					

DRAFT

	Screen				
Restroom:	Fixtures			X	Fixtures show rust and wear, will need to be replaced. Flooring shows significant wear. Wood laminate cabinet is showing signs of failure due to exposure to moisture. Walls need repair and paint. Due to the age and condition of the fixtures should be fully remodeled. Tub in a fiberglass insert into the original 1960's cast iron tub, shows wear and should be replace with a new Cast Iron Tub to minimize maintenance.
	Walls		X		
	Floor		X		
	Ceiling			X	
	Cabinet			X	
	Fiberglass tub surround		X		
	Bath Tub			X	
Mechanical:	(2) Fancoil Units		X		Code Violation - mixing valve required on bathtub facet
	Bathtub Faucet			X	
Electrical:	Light Fixtures		X		Light Fixtures use a combination of T-8 and compact fluorescent bulbs, significant energy saving can be accomplished by installing either T-5 fixtures or LED. Receptacles are assorted and many have aged. Recommend replacement
	Devices			X	
Other:					

Unit #:	1224	Unit Type:	1 Bd Rm	Occupied: Y	Condition			
					Good	Fair	Poor	
	Standard Unit				X			
Living Area:								Comments
Walls:	Surface Condition				X			Gypsum Wall Board and metal lath plaster
	Paint Condition				X			
Ceiling:	Surface Condition					X		Textured underside of Floor Slab - Needs patch and paint
	Paint Condition					X		
Flooring:	12 x 12 VCT Throughout					X		Floor is well maintained but due to age has reached the end of its service life and is showing signs of shrinkage and will begin to fail.
	Wood Base				X			
Doors:	HM Frame / Wd Door					X		Solid Core at Hallways, Hollow Core at interior. Mixture of Hardware, recent ADA hardware is in good condition, non ADA hardware should be replaced
	Hardware					X		
Windows:	Aluminum Sliding Glass Door					X		Door signs of failure and reaching the end of it's service life.
	Insulated Glazing					X		
	Blinds				X			
	Screen					X		
Kitchen:	Stove						X	Cabinets are in working order, but due to age are reaching the end of their service life and should be replaced. Sink and faucet show significant wear. Due to the age and condition of the fixtures the kitchen should be fully remodeled.
	Oven						X	
	Refrigerator					X		
	Sink						X	
	Cabinets						X	
Balcony:	Slab					X		Railings are original to the 1962 construction and should be refurbished/repainted.

DRAFT

	Railing		X		Balcony slab show some cracking. Wing walls show some seperation from the building structure and should be addressed
	Exterior stucco Wall	X			
Bedroom:					Comments
Walls:	Surface Condition		X		Gypsum Wall Board and metal lath plaster - Crack in east wall, needs patch and paint
	Paint Condition	X			
Ceiling:	Surface Condition		X		Textured underside of Floor Slab - some minor cracking
	Paint Condition	X			
Flooring:	12 x 12 VCT Throughout		X		Floor is well maintained but due to age has reached the end of its service life and is showing signs of shrinkage and will begin to fail.
	Wood Base	X			
Window:	Window Unit		X		Window show signs of failure and reaching the end of it's service life.
	Insulated Glazing		X		
	Blinds	X			
	Screen		X		
Restroom:	Fixtures			X	Fixtures show rust and wear, will need to be replaced. Flooring shows significant wear. Wood laminate cabinet is showing signs of failure due to exposure to moisture. Walls need repair and paint. Due to the age and condition of the fixtures should be fully remodeled. Tub in a fiberglass insert into the original 1960's cast iron tub, shows wear and should be replace with a new Cast Iron Tub to minimize maintenance.
	Walls		X		
	Floor		X		
	Ceiling			X	
	Cabinet			X	
	Tile		X		
	Bath Tub			X	
Mechanical:	(2) Fancoil Units		X		Code Violation - mixing valve required on bathtub facet
	Bathtub Faucet			X	
Electrical:	Light Fixtures		X		Light Fixtures use a combination of T-8 and compact fluorescent bulbs, significant energy saving can be accomplished by installing either T-5 fixtures or LED. Receptacles are assorted and many have aged. Recommend replacement
	Devices			X	
Other:					

Unit #:	1405	Unit Type: 1 Bd Rm	Occupied: Y	Condition			
				Good	Fair	Poor	
	Standard Unit			X			
Living Area:							Comments
Walls:	Surface Condition				X		Gypsum Wall Board and metal lath plaster - Crack in West wall needs repair
	Paint Condition			X			
Ceiling:	Surface Condition			X			Textured underside of Floor Slab
	Paint Condition			X			
Flooring:	12 x 12 VCT Throughout				X		Floor is well maintained but due to age has reached the end of its service life and is showing signs of shrinkage and will begin to fail.
	Wood Base			X			

DRAFT

WSM Architects

1 Bd Rm Dwelling Unit Assessments

Tucson House

Physical Needs Assessment

City of Tucson

HCD

Doors:	HM Frame / Wd Door		X		Solid Core at Hallways, Hollow Core at interior. Mixture of Hardware, recent ADA hardware is in good condition, non ADA hardware should be replaced
	Hardware		X		
Windows:	Aluminum Sliding Glass Door		X		Door signs of failure and reaching the end of it's service life.
	Insulated Glazing		X		
	Blinds	X			
	Screen		X		
Kitchen:	Stove			X	Cabinets are in working order, but due to age are reaching the end of their service life and should be replaced. Sink and faucet show significant wear. Due to the age and condition of the fixtures the kitchen should be fully remodeled.
	Oven		X		
	Refrigerator		X		
	Sink			X	
	Cabinets			X	
Balcony:	Slab		X		Railings are original to the 1962 construction and should be refurbished/repainted. Balcony slab show some cracking and appears to slope toward door instead of to the balcony edge, possibly introducing water into the building wall system. Wing walls show some seperation from the building structure and should be addressed
	Railing		X		
	Exterior stucco Wall	X			
Bedroom:					Comments
Walls:	Surface Condition		X		Gypsum Wall Board and metal lath plaster - Needs patch and paint
	Paint Condition		X		
Ceiling:	Surface Condition	X			Textured underside of Floor Slab
	Paint Condition	X			
Flooring:	12 x 12 VCT Throughout		X		Floor is well maintained but due to age has reached the end of its service life and is showing signs of shrinkage and will begin to fail.
	Wood Base	X			
Window:	Window Unit		X		Window show signs of failure and reaching the end of it's service life.
	Insulated Glazing		X		
	Blinds	X			
	Screen		X		
Restroom:	Fixtures			X	Fixtures show rust and wear, will need to be replaced. Flooring shows significant wear. Wood laminate cabinet is showing signs of failure due to exposure to moisture. Walls need repair and paint. Due to the age and condition of the fixtures should be fully remodeled. Tub in a fiberglass insert into the original 1960's cast iron tub, shows wear and should be replace with a new Cast Iron Tub to minimize maintenance.
	Walls		X		
	Floor		X		
	Ceiling		X		
	Cabinet			X	
	Tile		X		
	Bath Tub			X	
Mechanical:	(2) Fancoil Units		X		Code Violation - mixing valve required on bathtub facet
	Bathtub Faucet			X	
Electrical:	Light Fixtures		X		Light Fixtures use a combination of T-8 and compact fluorescent bulbs, significant energy saving can be accomplished by installing either T-5 fixtures or LED. Receptacles are assorted and many have aged. Recommend replacement
	Devices			X	
Other:					

DRAFT

Unit #:	1414	Unit Type: 1 Bd Rm	Occupied: Y	Condition			
				Good	Fair	Poor	
	Standard Unit			X			
Living Area:							Comments
Walls:	Surface Condition			X			Gypsum Wall Board and metal lath plaster
	Paint Condition			X			
Ceiling:	Surface Condition			X			Textured underside of Floor Slab
	Paint Condition			X			
Flooring:	12 x 12 VCT Throughout				X		Floor is well maintained but due to age has reached the end of its service life and is showing signs of shrinkage and will begin to fail.
	Wood Base			X			
Doors:	HM Frame / Wd Door				X		Solid Core at Hallways, Hollow Core at interior. All hardware is ADA compliant
	Hardware				X		
Windows:	Aluminum Sliding Glass Door				X		Door signs of failure and reaching the end of it's service life. Screen Torn
	Insulated Glazing				X		
	Blinds			X			
	Screen					X	
Kitchen:	Stove					X	Cabinets are in working order, but due to age are reaching the end of their service life and should be replaced. Sink and faucet show significant wear. Due to the age and condition of the fixtures the kitchen should be fully remodeled.
	Oven					X	
	Refrigerator				X		
	Sink					X	
	Cabinets					X	
Balcony:	Slab				X		Railings are original to the 1962 construction and should be refurbished/repainted. Balcony slab show some cracking. Wing walls show some seperation from the building structure and should be addressed
	Railing				X		
	Exterior stucco Wall			X			
Bedroom:							Comments
Walls:	Surface Condition			X			Gypsum Wall Board and metal lath plaster
	Paint Condition			X			
Ceiling:	Surface Condition			X			Textured underside of Floor Slab
	Paint Condition			X			
Flooring:	12 x 12 VCT Throughout				X		Floor is well maintained but due to age has reached the end of its service life and is showing signs of shrinkage and will begin to fail.
	Wood Base			X			
Window:	Window Unit					X	Window show signs of failure, rollers are stiff and cause window to be difficult to open. Window is reaching the end of it's service life. Blinds need replacement
	Insulated Glazing				X		
	Blinds					X	
	Screen				X		
Restroom:	Fixtures					X	Fixtures show rust and wear, will need to be replaced. Flooring shows significant wear. Wood laminate cabinet is showing signs of failure due to exposure to moisture. Walls need repair and paint. Due to the age and condition of the fixtures should be fully
	Walls				X		
	Floor				X		

DRAFT

	Ceiling		X		remodeled. Tub in a fiberglass insert into the original 1960's cast iron tub, shows wear and should be replace with a new Cast Iron Tub to minimize maintenance.
	Cabinet			X	
	Tile		X		
	Bath Tub			X	
Mechanical:	(2) Fancoil Units		X		
	Bathtub Faucet		X		
Electrical:	Light Fixtures		X		Light Fixtures use a combination of T-8 and compact fluorescent bulbs, significant energy saving can be accomplished by installing either T-5 fixtures or LED. Receptacles are assorted and many have aged. Recommend replacement
	Devices			X	
Other:					

Unit #:	1514	Unit Type: 1 Bd Rm	Occupied: Y	Condition			
				Good	Fair	Poor	
	Standard Unit				X		
Living Area:							Comments
Walls:	Surface Condition				X		Gypsum Wall Board and metal lath plaster. Needs some repair
	Paint Condition			X			
Ceiling:	Surface Condition			X			Textured underside of Floor Slab
	Paint Condition			X			
Flooring:	12 x 12 VCT Throughout				X		Floor is well maintained but due to age has reached the end of its service life and is showing signs of shrinkage and will begin to fail.
	Wood Base			X			
Doors:	HM Frame / Wd Door				X		Solid Core at Hallways, Hollow Core at interior. All hardware is ADA compliant
	Hardware				X		
Windows:	Aluminum Sliding Glass Door					X	Door signs of failure, rollers are still and make door difficult to open. Door has reached the end of it's service life.
	Insulated Glazing				X		
	Blinds			X			
	Screen				X		
Kitchen:	Stove					X	Cabinets are in working order, but due to age are reaching the end of their service life and should be replaced. Sink and faucet show significant wear. Due to the age and condition of the fixtures the kitchen should be fully remodeled.
	Oven					X	
	Refrigerator					X	
	Sink					X	
	Cabinets					X	
Balcony:	Slab				X		Railings are original to the 1962 construction and should be refurbished/repainted. Balcony slab show some cracking. Wing walls show some seperation from the building structure and should be addressed
	Railing				X		
	Exterior stucco Wall			X			
Bedroom:							Comments

DRAFT

Walls:	Surface Condition	X			Gypsum Wall Board and metal lath plaster
	Paint Condition	X			
Ceiling:	Surface Condition	X			Textured underside of Floor Slab
	Paint Condition	X			
Flooring:	12 x 12 VCT Throughout		X		Floor is well maintained but due to age has reached the end of its service life and is showing signs of shrinkage and will begin to fail.
	Wood Base	X			
Window:	Window Unit			X	Window show signs of failure, rollers are stiff and cause window to be difficult to open. Window is reaching the end of it's service life.
	Insulated Glazing		X		
	Blinds	X			
	Screen		X		
Restroom:	Fixtures			X	Fixtures show rust and wear, will need to be replaced. Flooring shows significant wear. Wood laminate cabinet is showing signs of failure due to exposure to moisture. Walls need repair and paint. Due to the age and condition of the fixtures should be fully remodeled. Tub in a fiberglass insert into the original 1960's cast iron tub, shows wear and should be replace with a new Cast Iron Tub to minimize maintenance.
	Walls			X	
	Floor			X	
	Ceiling		X		
	Cabinet			X	
	Tile		X		
	Bath Tub			X	
Mechanical:	(2) Fancoil Units		X		
	Bathtub Faucet		X		
Electrical:	Light Fixtures		X		Light Fixtures use a combination of T-8 and compact fluorescent bulbs, significant energy saving can be accomplished by installing either T-5 fixtures or LED. Receptacles are assorted and many have aged. Recommend replacement
	Devices			X	
Other:					

Unit #:	1524	Unit Type:	1 Bd Rm	Occupied: Y	Condition			
					Good	Fair	Poor	
	Standard Unit				X			
Living Area:								Comments
Walls:	Surface Condition				X			Gypsum Wall Board and metal lath plaster. Needs some Paint
	Paint Condition					X		
Ceiling:	Surface Condition					X		Textured underside of Floor Slab . Needs some patch and paint
	Paint Condition					X		
Flooring:	12 x 12 VCT Throughout					X		Floor is well maintained but due to age has reached the end of its service life and is showing signs of shrinkage and will begin to fail.
	Wood Base				X			
Doors:	HM Frame / Wd Door					X		Solid Core at Hallways, Hollow Core at interior. Mixture of Hardware, recent ADA hardware is in good condition, non ADA hardware should be replaced
	Hardware						X	
Windows:	Aluminum Sliding Glass Door					X		Door signs of failure, has reached the end of it's service life.
	Insulated Glazing					X		

DRAFT

	Blinds	X			
	Screen		X		
Kitchen:	Stove			X	Cabinets are in working order, but due to age are reaching the end of their service life and should be replaced. Sink and faucet show significant wear. Due to the age and condition of the fixtures the kitchen should be fully remodeled.
	Oven		X		
	Refrigerator		X		
	Sink			X	
	Cabinets			X	
Balcony:	Slab			X	Railings are original to the 1962 construction and should be refurbished/repainted. Balcony slab show signifigant cracking and appears to slope toward door instead of to the balcony edge, possibly introducing water into the building wall system. Wing walls show some seperation from the building structure and should be addressed
	Railing		X		
	Exterior stucco Wall	X			
Bedroom:					Comments
Walls:	Surface Condition	X			Gypsum Wall Board and metal lath plaster
	Paint Condition	X			
Ceiling:	Surface Condition	X			Textured underside of Floor Slab
	Paint Condition	X			
Flooring:	12 x 12 VCT Throughout		X		Floor is well maintained but due to age has reached the end of its service life and is showing signs of shrinkage and will begin to fail.
	Wood Base	X			
Window:	Window Unit		X		Window show signs of failure. Window is reaching the end of it's service life.
	Insulated Glazing		X		
	Blinds	X			
	Screen		X		
Restroom:	Fixtures			X	Fixtures show rust and wear, will need to be replaced. Flooring shows significant wear. Wood laminate cabinet is showing signs of failure due to exposure to moisture. Walls need repair and paint. Due to the age and condition of the fixtures should be fully remodeled. Tub in a fiberglass insert into the original 1960's cast iron tub, shows wear and should be replace with a new Cast Iron Tub to minimize maintenance.
	Walls		X		
	Floor		X		
	Ceiling		X		
	Cabinet			X	
	Tile		X		
	Bath Tub			X	
Mechanical:	(2) Fancoil Units		X		Code Violation - mixing valve required on bathtub facet
	Bathtub Faucet			X	
Electrical:	Light Fixtures		X		Light Fixtures use a combination of T-8 and compact fluorescent bulbs, significant energy saving can be accomplished by installing either T-5 fixtures or LED. Receptacles are assorted and many have aged. Recommend replacement
	Devices			X	
Other:					

DRAFT

Unit #:	B7	Unit Type: 2 Bd Rm	Occupied: Y	Condition			
				Good	Fair	Poor	
	Standard Unit			X			
Living Area:							Comments
Walls:	Surface Condition			X			Gypsum Wall Board and metal lath plaster
	Paint Condition			X			
Ceiling:	Surface Condition			X			Textured underside of Floor Slab
	Paint Condition			X			
Flooring:	12 x 12 VCT Throughout				X		Floor is well maintained but due to age has reached the end of its service life and is showing signs of shrinkage and will begin to fail.
	Wood Base			X			
Doors:	HM Frame / Wd Door				X		Solid Core at Hallways, Hollow Core at interior. Mixture of Hardware, recent ADA hardware is in good condition, non ADA hardware should be replaced
	Hardware				X		
Windows:	(2) Aluminum Sliding Glass Door				X		Doors show signs of wear and are reaching the end of their service life.
	Insulated Glazing				X		
	Blinds			X			
	Screen				X		
Kitchen:	Stove					X	Cabinets are in working order, but due to age are reaching the end of their service life and should be replaced. Sink and faucet show significant wear. Due to the age and condition of the fixtures the kitchen should be fully remodeled.
	Oven				X		
	Refrigerator				X		
	Sink					X	
	Cabinets					X	
Balcony:	Slab						Not applicable, ground floor unit
	Railing						
	Exterior stucco Wall						
Bedroom 1:							Comments
Walls:	Surface Condition						Not Accessible
	Paint Condition						
Ceiling:	Surface Condition						Not Accessible
	Paint Condition						
Flooring:	12 x 12 VCT Throughout						Not Accessible
	Wood Base						
Window:	Window Unit						Not Accessible
	Insulated Glazing						
	Blinds						
	Screen						
Restroom 1:	Fixtures				X		Fixtures show rust and wear, will need to be replaced. Wood laminate cabinet is showing signs of failure due to exposure to moisture. Walls need repair and paint. Due to the age and condition of the fixtures should be fully remodeled. Tub is a fiberglass insert into the original 1960's cast iron tub, shows wear and should be replace with a
	Walls				X		
	Floor				X		
	Ceiling				X		

DRAFT

	Cabinet			X	new Cast Iron Tub to minimize maintenance.
	Tile		X		
	Bath Tub			X	
Bedroom 2:					Comments
Walls:	Surface Condition	X			Gypsum Wall Board and metal lath plaster
	Paint Condition	X			
Ceiling:	Surface Condition	X			Textured underside of Floor Slab
	Paint Condition	X			
Flooring:	12 x 12 VCT Throughout		X		Floor is well maintained but due to age has reached the end of its service life and is showing signs of shrinkage and will begin to fail.
	Wood Base	X			
Window:	Window Unit		X		Window show signs of wear and reaching the end of it's service life.
	Insulated Glazing		X		
	Blinds	X			
	Screen		X		
Restroom 2:	Fixtures		X		Fixtures show rust and wear, will need to be replaced. Wood laminate cabinet is showing signs of failure due to exposure to moisture. Walls need repair and paint. Due to the age and condition of the fixtures should be fully remodeled. Tub is a fiberglass insert into the original 1960's cast iron tub, shows wear and should be replace with a new Cast Iron Tub to minimize maintenance.
	Walls		X		
	Floor		X		
	Ceiling		X		
	Cabinet			X	
	Tile		X		
	Bath Tub			X	
Mechanical:	(3) Fancoil Units		X		
	Bathtub Faucet		X		
Electrical:	Light Fixtures		X		Light Fixtures use a combination of T-8 and compact fluorescent bulbs, significant energy saving can be accomplished by installing either T-5 fixtures or LED. Receptacles are assorted and many have aged. Recommend replacement
	Devices			X	
Other:					

Unit #:	123	Unit Type:	2 Bd Rm	Occupied: N	Condition			
					Good	Fair	Poor	
	Standard Unit						X	Recent Vacancy - Accessible Unit
Living Area:								Comments
Walls:	Surface Condition					X		Gypsum Wall Board and metal lath plaster - Need patch and painting
	Paint Condition						X	
Ceiling:	Surface Condition				X			Textured underside of Floor Slab
	Paint Condition				X			
Flooring:	12 x 12 VCT Throughout					X		Floor is well maintained but due to age has reached the end of its service life and is showing signs of shrinkage and will begin to fail.
	Wood Base				X			

DRAFT

Doors:	HM Frame / Wd Door		X		Solid Core at Hallways, Hollow Core at interior. All Hardware currently ADA compliant
	Hardware		X		
Windows:	(2) Aluminum Sliding Glass Door		X		Doors show signs of wear and are reaching the end of their service life.
	Insulated Glazing		X		
	Blinds	X			
	Screen		X		
Kitchen:	Stove			X	Cabinets are in working order, but due to age are reaching the end of their service life and should be replaced. Sink and faucet show significant wear. Due to the age and condition of the fixtures the kitchen should be fully remodeled.. Pipe insulation damaged under accessible kitchen sink, needs repair.
	Oven		X		
	Refrigerator		X		
	Sink			X	
	Cabinets			X	
Balcony:	Slab				Not applicable, ground floor unit
	Railing				
	Exterior stucco Wall				
Bedroom 1:					Comments
Walls:	Surface Condition	X			Gypsum Wall Board and metal lath plaster - Needs paint
	Paint Condition		X		
Ceiling:	Surface Condition	X			Textured underside of Floor Slab
	Paint Condition	X			
Flooring:	12 x 12 VCT Throughout		X		Floor is well maintained but due to age has reached the end of its service life and is showing signs of shrinkage and will begin to fail.
	Wood Base	X			
Window:	Window Unit		X		Window show signs of wear and reaching the end of it's service life. Blinds Broken
	Insulated Glazing		X		
	Blinds			X	
	Screen		X		
Restroom 1:	Fixtures		X		Appears ADA Compliant. Fixtures show rust and wear, will need to be replaced. Walls need repair and paint. Due to the age and condition of the fixtures should be fully remodeled. Tile surround and floor are in fair condition.
	Walls		X		
	Floor		X		
	Ceiling		X		
	Cabinet			X	
	Tile		X		
	Bath Tub			X	
Bedroom 2:					Comments
Walls:	Surface Condition	X			Gypsum Wall Board and metal lath plaster - Needs paint
	Paint Condition		X		
Ceiling:	Surface Condition	X			Textured underside of Floor Slab
	Paint Condition	X			
Flooring:	12 x 12 VCT Throughout		X		Floor is well maintained but due to age has reached the end of its service life and is showing signs of shrinkage and will begin to fail.
	Wood Base	X			
Window:	Window Unit		X		Window show signs of wear and reaching the end of it's service life. Blinds Broken
	Insulated Glazing		X		

DRAFT

	Blinds			X	
	Screen		X		
Restroom 2:	Fixtures		X		Fixtures show rust and wear, will need to be replaced. Wood laminate cabinet is showing signs of failure due to exposure to moisture. Walls need repair and paint. Due to the age and condition of the fixtures should be fully remodeled. Tub is a fiberglass insert into the original 1960's cast iron tub, shows wear and should be replace with a new Cast Iron Tub to minimize maintenance.
	Walls		X		
	Floor		X		
	Ceiling		X		
	Cabinet			X	
	Tile		X		
	Bath Tub			X	
Mechanical:	(3) Fancoil Units		X		
	Bathtub Faucet		X		
Electrical:	Light Fixtures		X		Light Fixtures use a combination of T-8 and compact fluorescent bulbs, significant energy saving can be accomplished by installing either T-5 fixtures or LED. Receptacles are assorted and many have aged. Recommend replacement
	Devices			X	
Other:					

Unit #:	221	Unit Type:	2 Bd Rm	Occupied: Y	Condition			
					Good	Fair	Poor	
	Standard Unit					X		
Living Area:								Comments
Walls:	Surface Condition					X		Gypsum Wall Board and metal lath plaster - Need patch and painting
	Paint Condition					X		
Ceiling:	Surface Condition					X		Textured underside of Floor Slab
	Paint Condition					X		
Flooring:	12 x 12 VCT Throughout							Floor was covered with tenant carpeting, could not verify condition
	Wood Base				X			
Doors:	HM Frame / Wd Door					X		Solid Core at Hallways, Hollow Core at interior. All Hardware currently ADA compliant
	Hardware					X		
Windows:	(2) Aluminum Sliding Glass Door					X		Doors show signs of wear and are reaching the end of their service life.
	Insulated Glazing					X		
	Blinds				X			
	Screen					X		
Kitchen:	Stove						X	Cabinets are in working order, but due to age are reaching the end of their service life and should be replaced. Sink and faucet show significant wear. Due to the age and condition of the fixtures the kitchen should be fully remodeled.
	Oven					X		
	Refrigerator					X		
	Sink						X	
	Cabinets						X	

DRAFT

Balcony:	Slab				Not accessible
	Railing				
	Exterior stucco Wall				
Bedroom 1:					Comments
Walls:	Surface Condition	X			Gypsum Wall Board and metal lath plaster - Needs paint
	Paint Condition		X		
Ceiling:	Surface Condition	X			Textured underside of Floor Slab
	Paint Condition	X			
Flooring:	12 x 12 VCT Throughout				Floor was covered with tenant carpeting, could not verify condition
	Wood Base	X			
Window:	Window Unit		X		Window show signs of wear and reaching the end of it's service life.
	Insulated Glazing		X		
	Blinds	X		X	
	Screen		X		
Restroom 1:	Fixtures		X		Appears ADA Compliant. Fixtures show rust and wear, will need to be replaced. Walls need repair and paint. Due to the age and condition of the fixtures should be fully remodeled. Tile surround and floor are in fair condition.
	Walls		X		
	Floor		X		
	Ceiling		X		
	Cabinet			X	
	Tile		X		
	Bath Tub			X	
Bedroom 2:					Comments
Walls:	Surface Condition	X			Gypsum Wall Board and metal lath plaster - Needs paint
	Paint Condition		X		
Ceiling:	Surface Condition	X			Textured underside of Floor Slab
	Paint Condition	X			
Flooring:	12 x 12 VCT Throughout				Floor was covered with tenant carpeting, could not verify condition
	Wood Base	X			
Window:	Window Unit		X		Window show signs of wear and reaching the end of it's service life.
	Insulated Glazing		X		
	Blinds	X		X	
	Screen		X		
Restroom 2:	Fixtures		X		Fixtures show rust and wear, will need to be replaced. Wood laminate cabinet is showing signs of failure due to exposure to moisture. Walls need repair and paint. Due to the age and condition of the fixtures should be fully remodeled. Tub is a fiberglass insert into the original 1960's cast iron tub, shows wear and should be replace with a new Cast Iron Tub to minimize maintenance.
	Walls		X		
	Floor		X		
	Ceiling		X		
	Cabinet			X	
	Tile		X		
	Bath Tub			X	
Mechanical:	(3) Fancoil Units		X		
	Bathtub Faucet			X	
Electrical:	Light Fixtures		X		Light Fixtures use a combination of T-8 and compact fluorescent bulbs, significant

DRAFT

	Devices			X	energy saving can be accomplished by installing either T-5 fixtures or LED. Receptacles are assorted and many have aged. Recommend replacement
Other:					

Unit #:	521	Unit Type:	2 Bd Rm	Occupied: Y	Condition			
					Good	Fair	Poor	
	Standard Unit					X		
Living Area:								Comments
Walls:	Surface Condition					X		Gypsum Wall Board and metal lath plaster - Need patch and painting
	Paint Condition					X		
Ceiling:	Surface Condition					X		Textured underside of Floor Slab
	Paint Condition					X		
Flooring:	12 x 12 VCT Throughout							Floor was covered with tenant carpeting, could not verify condition
	Wood Base				X			
Doors:	HM Frame / Wd Door					X		Solid Core at Hallways, Hollow Core at interior. All Hardware currently ADA compliant
	Hardware					X		
Windows:	(2) Aluminum Sliding Glass Door						X	Doors show signs of wear and are reaching the end of their service life. Rollers are failing and doors are difficult to open
	Insulated Glazing					X		
	Blinds				X			
	Screen					X		
Kitchen:	Stove						X	Cabinets are in working order, but due to age are reaching the end of their service life and should be replaced. Sink and faucet show significant wear. Due to the age and condition of the fixtures the kitchen should be fully remodeled.
	Oven					X		
	Refrigerator					X		
	Sink						X	
	Cabinets						X	
Balcony:	Slab				X			Railings are original to the 1962 construction and should be refurbished/repainted.
	Railing					X		
	Exterior stucco Wall				X			
Bedroom 1:								Comments
Walls:	Surface Condition							Not accessible
	Paint Condition							
Ceiling:	Surface Condition							
	Paint Condition							
Flooring:	12 x 12 VCT Throughout							
	Wood Base							
Window:	Window Unit							

DRAFT

	Insulated Glazing				
	Blinds				
	Screen				
Restroom 1:	Fixtures		X		Fixtures show rust and wear, will need to be replaced. Wood laminate cabinet is showing signs of failure due to exposure to moisture. Walls need repair and paint. Due to the age and condition of the fixtures should be fully remodeled. Shower surround is in fair condition, as is shower door
	Walls		X		
	Floor		X		
	Ceiling		X		
	Cabinet			X	
	Tile		X		
	Shower			X	
Bedroom 2:					Comments
Walls:	Surface Condition				Not Accessible
	Paint Condition				
Ceiling:	Surface Condition				
	Paint Condition				
Flooring:	12 x 12 VCT Throughout				
	Wood Base				
Window:	Window Unit				
	Insulated Glazing				
	Blinds				
	Screen				
Restroom 2:	Fixtures		X		Fixtures show rust and wear, will need to be replaced. Wood laminate cabinet is showing signs of failure due to exposure to moisture. Walls need repair and paint. Due to the age and condition of the fixtures should be fully remodeled. Tub is a fiberglass insert into the original 1960's cast iron tub, shows wear and should be replace with a new Cast Iron Tub to minimize maintenance.
	Walls		X		
	Floor		X		
	Ceiling		X		
	Cabinet			X	
	Tile		X		
	Bath Tub			X	
Mechanical:	(3) Fancoil Units		X		Code Violation - mixing valve required on bathtub facet
	Bathtub Faucet			X	
Electrical:	Light Fixtures		X		Light Fixtures use a combination of T-8 and compact fluorescent bulbs, significant energy saving can be accomplished by installing either T-5 fixtures or LED. Receptacles are assorted and many have aged. Recommend replacement
	Devices			X	
Other:					

Unit #:	1006	Unit Type: 2 Bd Rm	Occupied: Y	Condition	
			Good	Fair	Poor
	Standard Unit		X		
Living Area:					Comments

DRAFT

Walls:	Surface Condition	X			Gypsum Wall Board and metal lath plaster
	Paint Condition	X			
Ceiling:	Surface Condition	X			Textured underside of Floor Slab
	Paint Condition	X			
Flooring:	12 x 12 VCT Throughout		X		Floor is well maintained but due to age has reached the end of its service life and is showing signs of shrinkage and will begin to fail.
	Wood Base	X			
Doors:	HM Frame / Wd Door		X		Solid Core at Hallways, Hollow Core at interior. Mixture of Hardware, recent ADA hardware is in good condition, non ADA hardware should be replaced
	Hardware		X		
Windows:	(2) Aluminum Sliding Glass Door			X	Doors show signs of wear and are reaching the end of their service life. Rollers are worn and making it difficult to open and close the doors
	Insulated Glazing		X		
	Blinds	X			
	Screen		X		
Kitchen:	Stove			X	Cabinets are in working order, but due to age are reaching the end of their service life and should be replaced. Sink and faucet show significant wear. Due to the age and condition of the fixtures the kitchen should be fully remodeled.
	Oven		X		
	Refrigerator		X		
	Sink			X	
	Cabinets			X	
Balcony:	Slab			X	Railings are original to the 1962 construction and should be refurbished/repainted. Slab shows siginifigant cracking
	Railing		X		
	Exterior stucco Wall	X			
Bedroom 1:					Comments
Walls:	Surface Condition	X			Gypsum Wall Board and metal lath plaster
	Paint Condition	X			
Ceiling:	Surface Condition	X			Textured underside of Floor Slab
	Paint Condition	X			
Flooring:	12 x 12 VCT Throughout		X		Floor is well maintained but due to age has reached the end of its service life and is showing signs of shrinkage and will begin to fail.
	Wood Base	X			
Window:	Window Unit		X		Window show signs of wear and reaching the end of it's service life. Blinds Broken
	Insulated Glazing		X		
	Blinds			X	
	Screen		X		
Restroom 1:	Fixtures		X		Fixtures show rust and wear, will need to be replaced. Wood laminate cabinet is showing signs of failure due to exposure to moisture. Walls need repair and paint. Due to the age and condition of the fixtures should be fully remodeled. Shower surround is in fair condition, as is shower door
	Walls		X		
	Floor		X		
	Ceiling		X		
	Cabinet			X	
	Tile		X		
	Bath Tub			X	
Bedroom 2:					Comments
Walls:	Surface Condition	X			Gypsum Wall Board and metal lath plaster - Needs paint

DRAFT

	Paint Condition		X		
Ceiling:	Surface Condition	X			Textured underside of Floor Slab
	Paint Condition	X			
Flooring:	12 x 12 VCT Throughout		X		Floor is well maintained but due to age has reached the end of its service life and is showing signs of shrinkage and will begin to fail.
	Wood Base	X			
Window:	Window Unit		X		Window show signs of wear and reaching the end of it's service life. Blinds Broken
	Insulated Glazing		X		
	Blinds			X	
	Screen		X		
Restroom 2:	Fixtures		X		Fixtures show rust and wear, will need to be replaced. Wood laminate cabinet is showing signs of failure due to exposure to moisture. Walls need repair and paint. Due to the age and condition of the fixtures should be fully remodeled. Tub is a fiberglass insert into the original 1960's cast iron tub, shows wear and should be replace with a new Cast Iron Tub to minimize maintenance.
	Walls		X		
	Floor		X		
	Ceiling		X		
	Cabinet			X	
	Tile		X		
	Bath Tub			X	
Mechanical:	(3) Fancoil Units		X		Code Violation - mixing valve required on bathtub facet
	Bathtub Faucet			X	
Electrical:	Light Fixtures		X		Light Fixtures use a combination of T-8 and compact fluorescent bulbs, significant energy saving can be accomplished by installing either T-5 fixtures or LED. Receptacles are assorted and many have aged. Recommend replacement
	Devices			X	
Other:					

Unit #:	1106	Unit Type: 2 Bd Rm	Occupied: N	Condition			
				Good	Fair	Poor	
	Standard Unit				X		
Living Area:							Comments
Walls:	Surface Condition			X			Gypsum Wall Board and metal lath plaster. Need some patch and paint
	Paint Condition				X		
Ceiling:	Surface Condition			X			Textured underside of Floor Slab
	Paint Condition			X			
Flooring:	12 x 12 VCT Throughout				X		Floor is well maintained but due to age has reached the end of its service life and is showing signs of shrinkage and will begin to fail.
	Wood Base			X			
Doors:	HM Frame / Wd Door				X		Solid Core at Hallways, Hollow Core at interior. Hardware is aged and should be replaced
	Hardware					X	
Windows:	(2) Aluminum Sliding Glass Door				X		Doors show signs of wear and are reaching the end of their service life.
	Insulated Glazing				X		
	Blinds			X			

DRAFT

	Screen		X		
Kitchen:	Stove			X	Cabinets are in working order, but due to age are reaching the end of their service life and should be replaced. Sink and faucet show significant wear. Due to the age and condition of the fixtures the kitchen should be fully remodeled.
	Oven		X		
	Refrigerator		X		
	Sink			X	
	Cabinets			X	
Balcony:	Slab		X		Railings are original to the 1962 construction and should be refurbished/repainted. Balcony slab show some cracking and appears to slope toward door instead of to the balcony edge, possibly introducing water into the building wall system.
	Railing		X		
	Exterior stucco Wall	X			
Bedroom 1:					Comments
Walls:	Surface Condition		X		Gypsum Wall Board and metal lath plaster. Some vertical cracking on east wall
	Paint Condition	X			
Ceiling:	Surface Condition	X			Textured underside of Floor Slab
	Paint Condition	X			
Flooring:	12 x 12 VCT Throughout		X		Floor is well maintained but due to age has reached the end of its service life and is showing signs of shrinkage and will begin to fail.
	Wood Base	X			
Window:	Window Unit		X		Window show signs of wear and reaching the end of it's service life.
	Insulated Glazing		X		
	Blinds	X			
	Screen		X		
Restroom 1:	Fixtures		X		Fixtures show rust and wear, will need to be replaced. Wood laminate cabinet is showing signs of failure due to exposure to moisture. Walls need repair and paint. Due to the age and condition of the fixtures should be fully remodeled. Shower surround is in fair condition, as is shower door
	Walls		X		
	Floor		X		
	Ceiling		X		
	Cabinet			X	
	Tile		X		
	Bath Tub			X	
Bedroom 2:					Comments
Walls:	Surface Condition		X		Gypsum Wall Board and metal lath plaster. Some vertical cracking on east wall
	Paint Condition	X			
Ceiling:	Surface Condition	X			Textured underside of Floor Slab
	Paint Condition	X			
Flooring:	12 x 12 VCT Throughout		X		Floor is well maintained but due to age has reached the end of its service life and is showing signs of shrinkage and will begin to fail.
	Wood Base	X			
Window:	Window Unit		X		Window show signs of wear and reaching the end of it's service life.
	Insulated Glazing		X		
	Blinds	X			
	Screen		X		
Restroom 2:	Fixtures		X		Fixtures show rust and wear, will need to be replaced. Wood laminate cabinet is showing signs of failure due to exposure to moisture. Walls need repair and paint. Due to the age and condition of the fixtures should be fully remodeled. Tub is a fiberglass
	Walls		X		
	Floor		X		

DRAFT

	Ceiling		X		insert into the original 1960's cast iron tub, shows wear and should be replace with a new Cast Iron Tub to minimize maintenance.
	Cabinet			X	
	Tile		X		
	Bath Tub			X	
Mechanical:	(3) Fancoil Units		X		Code Violation - mixing valve required on bathtub facet
	Bathtub Faucet			X	
Electrical:	Light Fixtures		X		Light Fixtures use a combination of T-8 and compact fluorescent bulbs, significant energy saving can be accomplished by installing either T-5 fixtures or LED. Receptacles are assorted and many have aged. Recommend replacement
	Devices			X	
Other:					

Unit #:	1321	Unit Type:	2 Bd Rm	Occupied: N	Condition			
					Good	Fair	Poor	
	Standard Unit				X			
Living Area:								Comments
Walls:	Surface Condition					X		Gypsum Wall Board and metal lath plaster. Need some patch and paint. Vertical cracks in east wall
	Paint Condition					X		
Ceiling:	Surface Condition				X			Textured underside of Floor Slab
	Paint Condition				X			
Flooring:	12 x 12 VCT Throughout					X		Floor is well maintained but due to age has reached the end of its service life and is showing signs of shrinkage and will begin to fail.
	Wood Base				X			
Doors:	HM Frame / Wd Door					X		Solid Core at Hallways, Hollow Core at interior. Hardware is aged and should be replaced
	Hardware						X	
Windows:	(2) Aluminum Sliding Glass Door						X	Doors show signs of wear and are reaching the end of their service life. Rollers are worn and making it difficult to open and close the doors
	Insulated Glazing					X		
	Blinds				X			
	Screen					X		
Kitchen:	Stove						X	Cabinets are in working order, but due to age are reaching the end of their service life and should be replaced. Sink and faucet show significant wear. Due to the age and condition of the fixtures the kitchen should be fully remodeled.. Pipe insulation damaged under accessible kitchen sink, needs repair.
	Oven					X		
	Refrigerator					X		
	Sink						X	
	Cabinets						X	
Balcony:	Slab					X		Railings are original to the 1962 construction and should be refurbished/repainted. Balcony slab show some cracking.
	Railing					X		
	Exterior stucco Wall				X			
Bedroom 1:								Comments

DRAFT

Walls:	Surface Condition		X		Gypsum Wall Board and metal lath plaster. Some vertical cracking on east wall
	Paint Condition	X			
Ceiling:	Surface Condition	X			Textured underside of Floor Slab
	Paint Condition	X			
Flooring:	12 x 12 VCT Throughout		X		Floor is well maintained but due to age has reached the end of its service life and is showing signs of shrinkage and will begin to fail.
	Wood Base	X			
Window:	Window Unit			X	Window show signs of wear and reaching the end of it's service life. Rollers are worn and making it difficult to open and close the window. Blinds need to be replaced
	Insulated Glazing		X		
	Blinds			X	
	Screen		X		
Restroom 1:	Fixtures		X		Fixtures show rust and wear, will need to be replaced. Wood laminate cabinet is showing signs of failure due to exposure to moisture. Walls need repair and paint. Due to the age and condition of the fixtures should be fully remodeled. Shower surround is in fair condition, as is shower door
	Walls		X		
	Floor		X		
	Ceiling		X		
	Cabinet			X	
	Tile		X		
	Bath Tub			X	
Bedroom 2:					Comments
Walls:	Surface Condition		X		Gypsum Wall Board and metal lath plaster. Some vertical cracking on east wall
	Paint Condition	X			
Ceiling:	Surface Condition	X			Textured underside of Floor Slab
	Paint Condition	X			
Flooring:	12 x 12 VCT Throughout		X		Floor is well maintained but due to age has reached the end of its service life and is showing signs of shrinkage and will begin to fail.
	Wood Base	X			
Window:	Window Unit			X	Window show signs of wear and reaching the end of it's service life. Rollers are worn and making it difficult to open and close the window. Blinds need to be replaced
	Insulated Glazing		X		
	Blinds			X	
	Screen		X		
Restroom 2:	Fixtures		X		Fixtures show rust and wear, will need to be replaced. Wood laminate cabinet is showing signs of failure due to exposure to moisture. Walls need repair and paint. Due to the age and condition of the fixtures should be fully remodeled. Tub is a fiberglass insert into the original 1960's cast iron tub, shows wear and should be replace with a new Cast Iron Tub to minimize maintenance.
	Walls		X		
	Floor		X		
	Ceiling		X		
	Cabinet			X	
	Tile		X		
	Bath Tub			X	
Mechanical:	(3) Fancoil Units		X		Code Violation - mixing valve required on bathtub facet
	Bathtub Faucet			X	
Electrical:	Light Fixtures		X		Light Fixtures use a combination of T-8 and compact fluorescent bulbs, significant energy saving can be accomplished by installing either T-5 fixtures or LED. Receptacles are assorted and many have aged. Recommend replacement
	Devices			X	
Other:					

DRAFT

Unit #:	150	Unit Type:	2 Bd Rm	Occupied: Y	Condition			
					Good	Fair	Poor	
	Standard Unit				X			
Living Area:								Comments
Walls:	Surface Condition					X		Gypsum Wall Board and metal lath plaster. Need some patch and paint. Vertical cracks in east wall
	Paint Condition					X		
Ceiling:	Surface Condition				X			Textured underside of Floor Slab
	Paint Condition				X			
Flooring:	12 x 12 VCT Throughout					X		Floor is well maintained but due to age has reached the end of its service life and is showing signs of shrinkage and will begin to fail.
	Wood Base				X			
Doors:	HM Frame / Wd Door					X		Solid Core at Hallways, Hollow Core at interior. Hardware is aged and should be replaced
	Hardware						X	
Windows:	(2) Aluminum Sliding Glass Door					X		Doors show signs of wear and are reaching the end of their service life.
	Insulated Glazing					X		
	Blinds				X			
	Screen					X		
Kitchen:	Stove						X	Cabinets are in working order, but due to age are reaching the end of their service life and should be replaced. Sink and faucet show significant wear. Due to the age and condition of the fixtures the kitchen should be fully remodeled.
	Oven						X	
	Refrigerator						X	
	Sink						X	
	Cabinets						X	
Balcony:	Slab					X		Railings are original to the 1962 construction and should be refurbished/repainted. Wing walls show some seperation from the building structure and should be addressed
	Railing					X		
	Exterior stucco Wall				X			
Bedroom 1:								Comments
Walls:	Surface Condition							Not accessible
	Paint Condition							
Ceiling:	Surface Condition							
	Paint Condition							
Flooring:	12 x 12 VCT Throughout							
	Wood Base							
Window:	Window Unit							
	Insulated Glazing							
	Blinds							
	Screen							
Restroom 1:	Fixtures					X		Fixtures show rust and wear, will need to be replaced. Wood laminate cabinet is showing signs of failure due to exposure to moisture. Walls need repair and paint. Due
	Walls					X		

DRAFT

	Floor		X		to the age and condition of the fixtures should be fully remodeled. Tub is a fiberglass insert into the original 1960's cast iron tub, shows wear and should be replace with a new Cast Iron Tub to minimize maintenance.
	Ceiling		X		
	Cabinet			X	
	Tile		X		
	Bath Tub			X	
Bedroom 2:					Comments
Walls:	Surface Condition				Not accessible
	Paint Condition				
Ceiling:	Surface Condition				
	Paint Condition				
Flooring:	12 x 12 VCT Throughout				
	Wood Base				
Window:	Window Unit				
	Insulated Glazing				
	Blinds				
	Screen				
Restroom 2:	Fixtures				Not Accessible
	Walls				
	Floor				
	Ceiling				
	Cabinet				
	Tile				
	Bath Tub				
Mechanical:	(3) Fancoil Units		X		Code Violation - mixing valve required on bathtub facet
	Bathtub Faucet			X	
Electrical:	Light Fixtures		X		Light Fixtures use a combination of T-8 and compact fluorescent bulbs, significant energy saving can be accomplished by installing either T-5 fixtures or LED. Receptacles are assorted and many have aged. Recommend replacement
	Devices			X	
Other:	Small Balcony			X	Slab shows signifigant cracking

DRAFT

Room #:	B100	Room Use: LL Lobby	Condition			
			Good	Fair	Poor	
	Overall Condition				X	
Room Condition						Comments
Walls:	Surface Condition				X	Gypsum Wall Board and metal lath plaster - Patch and repair needed
	Paint Condition				X	
Ceiling:	2x4 ACT				X	Ceiling grid and tile is aged and damaged from access to maintain systems above. Code Violation, egress pathway height min 7'6", corridor is 7'-0"
Flooring:	Concrete			X		Concrete is stained and cracking, needs patch and repair, wall base is damaged and is at the end of its service life, needs to be replaced
	Rubber Base				X	
Doors:	HM Frame / Wd Door			X		Doors and Frames are worn from use, hardware is not consistently accessible.
	Hardware				X	
Windows:	Aluminum Storefront					None
	Insulated Glazing					
	Blinds					
Appliances						None
Equipment						None
Mechanical:						See MEP report
Electrical:	Light Fixtures			X		1' x 4' Light Fixtures use T-8 fluorescent bulbs, significant energy saving can be accomplished by installing either T-5 fixtures or LED. Receptacles are assorted and many have aged. Recommend replacement.
	Devices				X	
Other:	Livability				X	Redesign of the corridor spaces with modern aesthetics would contribute to a sense of place and increase the marketability/livability of the facility

DRAFT

Room #:	B101A	Room Use:	LL Coor W	Condition			
				Good	Fair	Poor	
	Overall Condition					X	
Room Condition							Comments
Walls:	Surface Condition					X	Gypsum Wall Board and metal lath plaster - Patch and repair needed
	Paint Condition					X	
Ceiling:	2x4 ACT					X	Ceiling grid and tile is aged and damaged from access to maintain systems above. Code Violation, egress pathway height min 7'6", corridor is 7'-0"
Flooring:	12 x 12 VCT				X		VCT is worn and shows signs of shrinkage, needs to be replaced, wall base is damaged and is at the end of its service life, needs to be replaced
	Rubber Base					X	
Doors:	HM Frame / Wd Door				X		Doors and Frames are worn from use, hardware is not consistently accessible.
	Hardware					X	
Windows:	Aluminum Storefront						None
	Insulated Glazing						
	Blinds						
Appliances							None
Equipment							None
Mechanical:							See MEP report
Electrical:	Light Fixtures				X		1' x 4' Light Fixtures use T-8 fluorescent bulbs, significant energy saving can be accomplished by installing either T-5 fixtures or LED. Receptacles are assorted and many have aged. Recommend replacement.
	Devices					X	
Other:	Livability					X	Redesign of the corridor spaces with modern aesthetics would contribute to a sense of place and increase the marketability/livability of the facility

DRAFT

Room #:	B101B	Room Use:	LL Coor E	Condition			
				Good	Fair	Poor	
	Overall Condition					X	
Room Condition							Comments
Walls:	Surface Condition					X	Gypsum Wall Board and metal lath plaster - Patch and repair needed
	Paint Condition					X	
Ceiling:	2x4 ACT					X	Ceiling grid and tile is aged and damaged from access to maintain systems above. Code Violation, egress pathway height min 7'6", corridor is 7'-0"
Flooring:	Concrete				X		Concrete is stained and cracking, needs patch and repair, wall base is damaged and is at the end of its service life, needs to be replaced
	Rubber Base					X	
Doors:	HM Frame / Wd Door				X		Doors and Frames are worn from use, hardware is not consistently accessible.
	Hardware				X		
Windows:	Aluminum Storefront						None
	Insulated Glazing						
	Blinds						
Appliances							None
Equipment							None
Mechanical:							See MEP report
Electrical:	Light Fixtures				X		1' x 4' & 2' x 4' Light Fixtures use T-8 fluorescent bulbs, significant energy saving can be accomplished by installing either T-5 fixtures or LED. Receptacles are assorted and many have aged. Recommend replacement.
	Devices					X	
Other:	Livability					X	Redesign of the corridor spaces with modern aesthetics would contribute to a sense of place and increase the marketability/livability of the facility

DRAFT

Room #:	B105	Room Use:	Mens RR	Condition			
				Good	Fair	Poor	
	Overall Condition					X	
Room Condition							Comments
Walls:	Surface Condition					X	Tile has multiple patches and repairs, should be replaced and is in over all poor condiiton
	Paint Condition					X	
Ceiling:	Gyp Bd				X		Gyp bd ceiling is in fair condion, needs paint
Flooring:	Concrete				X		Concrete is stained and cracking, needs patch and repair, wall base is damaged and is at the end of its service life, needs to be replaced
	Rubber Base					X	
Doors:	HM Frame / Wd Door					X	Doors and Frames are worn from use, Door is failing
	Hardware					X	
Windows:	Aluminum Storefront						None
	Insulated Glazing						
	Blinds						
Appliances							None
Equipment							None
Mechanical:							Floor drain is depressed in the slab and does not meet code requirements. Fixtures in poor condition
Electrical:	Light Fixtures				X		1' x 4' Light Fixtures use T-8 fluorescent bulbs, significant energy saving can be accomplished by installing either T-5 fixtures or LED. Receptacles are assorted and many have aged. Recommend replacement.
	Devices					X	
Other:							

DRAFT

Room #:	B111	Room Use: Library	Condition			
			Good	Fair	Poor	
	Overall Condition			X		
Room Condition						Comments
Walls:	Surface Condition			X		
	Paint Condition			X		
Ceiling:	2x2 ACT			X		Shows signs of damage from water and access to utilities above
Flooring:	12 x 12 VCT			X		VCT is in fair condition but showing its age, some shrinkage is evident, wall base is damaged and is at the end of its service life, needs to be replaced
	Rubber Base				X	
Doors:	HM Frame / Wd Door			X		Solid Core Doors. Some ADA Hardware, Non ADA hardware needs replacement
	Hardware			X		
Windows:	Aluminum Storefront				X	Windows appear to be the origional single pane aluminum windows. Need to be replaced with thermally broken aluminum storefront with insulated glazing
	Insulated Glazing				X	
	Blinds			X		
Appliances	Computers				X	Computers are very old
Equipment	Library Shelving				X	Library Shelving is worn from use. Tables and chairs are servicable but also show signifigant age from use.
	Tables			X		
	Chairs			X		
Mechanical:				X		Return air vents are dirty, system likely needs to be cleaned
Electrical:	Light Fixtures			X		1' x 4' & 2' x 4' Light Fixtures use T-8 fluorescent bulbs, significant energy saving can be accomplished by installing either T-5 fixtures or LED. Receptacles are assorted and many have aged. Recommend replacement.
	Devices				X	
Other:						The space is overcrowded with materal and is inadequate for a facility this size.

DRAFT

Room #:	B115	Room Use:	Carriage Room	Condition			
				Good	Fair	Poor	
	Overall Condition			X			
Room Condition							Comments
Walls:	Surface Condition				X		Room appears to get consistant use, needs to be remodeled.
	Paint Condition				X		
Ceiling:	2x2 ACT				X		Shows signs of damage from access to utilities above
	1x1 Surface applied ACT				X		
Flooring:	Flooring				X		VCT is in fair condition but showing its age, some shrinkage is evident, wall base is damaged and is at the end of its service life, needs to be replaced
	Rubber Base					X	
Doors:	HM Frame / Wd Door					X	Solid Core Doors at interior, Aluminum Storefront entrances at exterior. Some ADA
	Hardware					X	Hardware, Non ADA hardware needs replacement. Water infiltration evident under
Windows:	Aluminum Storefront				X		Windows do not show signs of failure but are reaching the end of their service life.
	Insulated Glazing				X		
	Blinds				X		
Appliances							
Equipment	Casework					X	Worn from use
	Corner guards				X		
Mechanical:					X		Return air vents are dirty, system likely needs to be cleaned
Electrical:	Light Fixtures				X		1' x 4' Light Fixtures use T-8 fluorescent bulbs, significant energy saving can be
	Devices					X	accomplished by installing either T-5 fixtures or LED. Receptacles are assorted and
							many have aged. Recommend replacement.
Other:							

DRAFT

Room #:	B116	Room Use:	Conference Room	Condition			
				Good	Fair	Poor	
	Overall Condition				X		
Room Condition							Comments
Walls:	Surface Condition				X		Room appears to get consistant use, needs to be remodeled.
	Paint Condition				X		
Ceiling:	2x2 ACT				X		Shows signs of damage from access to utilities above
Flooring:	Flooring				X		VCT is in fair condition but showing its age, some shrinkage is evident, wall base is damaged and is at the end of its service life, needs to be replaced
	Rubber Base					X	
Doors:	HM Frame / Wd Door					X	Solid Core Doors . Non ADA hardware needs replacement.
	Hardware					X	
Windows:	Aluminum Storefront					X	Windows show signs of failure but are reaching the end of their service life. Appears to be water infiltration at the top of the window
	Insulated Glazing				X		
	Blinds				X		
Appliances							
Equipment	Furniture				X		Furniture is in fair condition but is showing signs of wear from use.
Mechanical:					X		Return air vents are dirty, system likely needs to be cleaned
Electrical:	Light Fixtures				X		2' x 4' Light Fixtures use T-8 fluorescent bulbs, significant energy saving can be accomplished by installing either T-5 fixtures or LED. Receptacles are assorted and many have aged. Recommend replacement.
	Devices					X	
Other:							

DRAFT

Room #:	B129	Room Use:	Laundry	Condition			
				Good	Fair	Poor	
	Overall Condition					X	
Room Condition							Comments
Walls:	Surface Condition					X	High use room, does not seem adequate for the building population, due to this shows excessive wear.
	Paint Condition					X	
Ceiling:	2x2 ACT					X	Shows signs of damage from access to utilities above
Flooring:	Flooring					X	VCT is in Poor condition, some shrinkage is evident, and the floor is worn and stianed from use. Wall base is damaged and is at the end of its service life, needs to be replaced
	Rubber Base					X	
Doors:	HM Frame / Wd Door					X	Solid Core Doors worn and damaged. Non ADA hardware needs replacement.
	Hardware					X	
Windows:	Aluminum Storefront				X		Windows do not show signs of failure but are reaching the end of their service life.
	Insulated Glazing				X		
	Blinds				X		
Appliances	Laundry Equipment				X		Laundry equipment is in fair condition, but worn from constant use.
Equipment	Furniture				X		Furniture is in fair condition but is showing signs of wear from use.
Mechanical:					X		Return air vents are dirty, system likely needs to be cleaned
Electrical:	Light Fixtures				X		2' x 4' Light Fixtures use T-8 fluorescent bulbs, significant energy saving can be accomplished by installing either T-5 fixtures or LED. Receptacles are assorted and many have aged. Recommend replacement.
	Devices					X	
Other:							Room has many exposed utilities, ducts and piping. Several wall mounted utilities and pieces of equipment are ADA violations.

DRAFT

Room #:	B132	Room Use:	Craft Room	Condition			
				Good	Fair	Poor	
	Overall Condition					X	
Room Condition							Comments
Walls:	Surface Condition				X		High use room, does not seem adequate for the building population.
	Paint Condition				X		
Ceiling:	2x2 ACT					X	Shows signs of damage from access to utilities above
Flooring:	Flooring				X		VCT is in Fair condition, some shrinkage is evident, and the floor is worn and stianed from use. Wall base is damaged and is at the end of its service life, needs to be replaced
	Rubber Base					X	
Doors:	HM Frame / Wd Door					X	Solid Core Doors worn and damaged. Non ADA hardware needs replacement.
	Hardware					X	
Windows:	Aluminum Storefront				X		Windows do not show signs of failure but are reaching the end of their service life.
	Insulated Glazing				X		
	Blinds				X		
Appliances							
Equipment	Furniture				X		Furniture is in fair condition but is showing signs of wear from use. Shelving is not braced to the wall.
Mechanical:					X		Return air vents are dirty, system likely needs to be cleaned
Electrical:	Light Fixtures				X		2' x 4' Light Fixtures use T-8 fluorescent bulbs, significant energy saving can be accomplished by installing either T-5 fixtures or LED. Receptacles are assorted and many have aged. Recommend replacement.
	Devices					X	
Other:							Room is high use and does not seem adequate for the building population

DRAFT

Room #:	B134	Room Use:	Storage	Condition			
				Good	Fair	Poor	
	Overall Condition				X		
Room Condition							Comments
Walls:	Surface Condition				X		Concrete block &Cast in place Concrete walls
	Paint Condition				X		
Ceiling:	2x2 ACT				X		Exposed Concrete Slab
Flooring:	Flooring				X		Exposed Concrete Slab
	Rubber Base						
Doors:	HM Frame / HM Door					X	Doors worn and damaged.
	Hardware					X	
Windows:	Aluminum Storefront						None
	Insulated Glazing						
	Blinds						
Appliances							
Equipment	Furniture					X	Mixture of shelving and tables,
Mechanical:							
Electrical:	Light Fixtures				X		2' x 4' Light Fixtures use T-8 fluorescent bulbs, there are also some CFL's. Significant energy saving can be accomplished by installing either T-5 fixtures or LED. Receptacles are assorted and many have aged. Recommend replacement.
	Devices					X	
Other:							Room is adequate for use but needs proper storage equipment to maxamize the efficiency

DRAFT

Room #:	B141	Room Use:	Physical Plant	Condition			
				Good	Fair	Poor	
	Overall Condition				X		
Room Condition							Comments
Walls:	Surface Condition				X		Concrete block &Cast in place Concrete walls
	Paint Condition						
Ceiling:					X		Exposed Concrete Slab
Flooring:	Flooring				X		Exposed Concrete Slab - shows cracking and staining in several areas
	Rubber Base						
Doors:	HM Frame / HM Door					X	Doors worn from use.
	Hardware					X	
Windows:	Aluminum Storefront						None
	Insulated Glazing						
	Blinds						
Appliances							
Equipment							See Mechanical and Electrical Report
Mechanical:							See Mechanical and Electrical Report
Electrical:	Light Fixtures				X		2' x 4' Light Fixtures use T-8 fluorescent bulbs, there are also some CFL's. Significant energy saving can be accomplished by installing either T-5 fixtures or LED. Receptacles are assorted and many have aged. Recommend replacement.
	Devices					X	
Other:							Guard rails not OSHA compliant. Handrails are not provided at all locations required. Fire protection on ceiling is not continuous and is damaged in some areas. Not all equipment has proper clearances. Due to the overcroweded nature of the room it is difficult to access and maintain equipment properly.

DRAFT

Room #:	B145	Room Use:	Archive	Condition			
				Good	Fair	Poor	
	Overall Condition				X		
Room Condition							Comments
Walls:	Surface Condition				X		
	Paint Condition				X		
Ceiling:	Surface Condition				X		
	Paint Condition				X		
Flooring:	Flooring				X		VCT is in Fair condition, some shrinkage is evident, and the floor is worn and stianed from use. Wall base is damaged and is at the end of its service life, needs to be replaced
	Rubber Base					X	
Doors:	HM Frame / Wd Door					X	Solid Doors worn. Non ADA hardware needs replacement.
	Hardware					X	
Windows:	Aluminum Storefront				X		Windows do not show signs of failure but are reaching the end of their service life.
	Insulated Glazing				X		
	Blinds				X		
Appliances							
Equipment	Shelving				X		Shelving is in fair condition but is showing signs of wear from use. Shelving is not braced to the wall.
Mechanical:					X		Return air vents are dirty, system likely needs to be cleaned
Electrical:	Light Fixtures				X		1' x 4' Light Fixtures use T-8 fluorescent bulbs, significant energy saving can be accomplished by installing either T-5 fixtures or LED. Receptacles are assorted and many have aged. Recommend replacement.
	Devices					X	
Other:							

DRAFT

Room #:	100	Room Use:	Outer Lobby	Condition			
				Good	Fair	Poor	
	Overall Condition				X		
Room Condition							Comments
Walls:	Surface Condition				X		
	Paint Condition				X		
Ceiling:	Surface Condition				X		Combination of 2x4 ACT and Gypsum board soffits
	Paint Condition				X		
Flooring:	Flooring				X		Ceramic time is dated but in good condition. Wall base is damaged and is at the end of its service life, needs to be replaced
	Rubber Base					X	
Doors:	HM Frame / Wd Door				X		(2) sets of automatic sliding glass doors are in good condition and functional. Integration into the access control system is functional.
	Hardware				X		
Windows:	Aluminum Storefront				X		Windows do not show signs of failure but are reaching the end of their service life.
	Insulated Glazing				X		
	Blinds				n/a		
Appliances							
Equipment	Furniture						
Mechanical:					X		Return air vents are dirty, system likely needs to be cleaned
Electrical:	Light Fixtures				X		2' x 4' Light Fixtures use T-8 fluorescent bulbs, significant energy saving can be accomplished by installing either T-5 fixtures or LED. Receptacles are assorted and many have aged. Recommend replacement.
	Devices					X	
Other:							

DRAFT

Room #:	100b	Room Use:	Inner Lobby	Condition			
				Good	Fair	Poor	
	Overall Condition				X		
Room Condition							Comments
Walls:	Surface Condition					X	Heavy use, clear acrylic wainscot is marred/damaged in some areas
	Paint Condition				X		
Ceiling:	Surface Condition				X		Combination of 2x4 ACT and Gypsum board soffits
	Paint Condition				X		
Flooring:	Flooring				X		Ceramic time is dated but in good condition, carpeting in waiting area is worn. Wall base is damaged and is at the end of its service life, needs to be replaced
	Rubber Base					X	
Doors:	HM Frame / Wd Door				X		(1) set of automatic sliding glass doors are in good condition and functional. Integration into the access control system is functional.
	Hardware				X		
Windows:	Aluminum Storefront				X		Windows do not show signs of failure but are reaching the end of their service life.
	Insulated Glazing				X		
	Blinds				n/a		
Appliances							
Equipment	Furniture				X		Furniture is in fair condition but is showing signs of wear from use.
Mechanical:					X		Return air vents are dirty, system likely needs to be cleaned
Electrical:	Light Fixtures				X		2' x 4' Light Fixtures use T-8 fluorescent bulbs, significant energy saving can be accomplished by installing either T-5 fixtures or LED. Receptacles are assorted and many have aged. Recommend replacement.
	Devices					X	
Other:							

DRAFT

WSM Architects
Studio Dwelling Unit Assessments

Tucson House
Physical Needs Assessment

City of Tucson
HCD

Room #:	100b	Room Use: 1st Floor Elev. Lobby	Condition			
			Good	Fair	Poor	
	Overall Condition			X		
Room Condition						Comments
Walls:	Surface Condition			X		Heavy use. Gyp board surfaces and column covers show wear, marble appears to be origional to the 1962 construction and should be preserved. Some acrylic wall
	Paint Condition			X		
Ceiling:	Surface Condition			X		Combination of 2x4 ACT and Gypsum board soffits
	Paint Condition			X		
Flooring:	Flooring			X		Ceramic time is dated but in good condition. Wall base is damaged and is at the end of its service life, needs to be replaced
	Rubber Base				X	
Doors:	HM Frame / Wd Door			X		(1) set of automatic sliding glass doors are in good condition and functional. Integration into the access control system is functional.
	Hardware			X		
Windows:	Aluminum Storefront				X	East Windows do show signs of failure but are reaching the end of their service life.
	Insulated Glazing			X		
	Blinds			n/a		
Appliances						
Equipment	Furniture					
Mechanical:				X		Return air vents are dirty, system likely needs to be cleaned
Electrical:	Light Fixtures			X		2' x 4' Light Fixtures use T-8 fluorescent bulbs, significant energy saving can be accomplished by installing either T-5 fixtures or LED. Receptacles are assorted and many have aged. Recommend replacement.
	Devices				X	
Other:						Ceiling height is too low per IBC, rework of the ceiling is necessary. Would recommend restoring to its origional 1962 design to preserve the historic integrity of the facility.

DRAFT

Room #:	100c	Room Use:	1st Floor West Corridor	Condition			
				Good	Fair	Poor	
	Overall Condition				X		
Room Condition							Comments
Walls:	Surface Condition				X		Heavy use. Gyp board surfaces show wear,
	Paint Condition				X		
Ceiling:	Surface Condition				X		Combination of 2x4 ACT and Gypsum board soffits
	Paint Condition				X		
Flooring:	Flooring				X		Ceramic time is dated but in good condition. Wall base is damaged and is at the end of its service life, needs to be replaced
	Rubber Base					X	
Doors:	HM Frame / Wd Door				X		Doors to units are in fair condition. Exit doors and Stair doors are worn and damaged from use. Should be replaced
	Hardware				X		
Windows:	Aluminum Storefront						None
	Insulated Glazing						
	Blinds						
Appliances							
Equipment	Furniture						
Mechanical:					X		Return air vents are dirty, system likely needs to be cleaned
Electrical:	Light Fixtures				X		1' x 4' Light Fixtures use T-8 fluorescent bulbs, significant energy saving can be accomplished by installing either T-5 fixtures or LED. Receptacles are assorted and many have aged. Recommend replacement.
	Devices					X	
Other:							Ceiling height is too low per IBC, rework of the ceiling is necessary.

DRAFT

Room #:	100c	Room Use:	1st Floor East Corridor	Condition			
				Good	Fair	Poor	
	Overall Condition				X		
Room Condition							Comments
Walls:	Surface Condition				X		Heavy use. Gyp board surfaces show wear,
	Paint Condition				X		
Ceiling:	Surface Condition				X		Combination of 2x4 ACT and Gypsum board soffits
	Paint Condition				X		
Flooring:	Flooring				X		Ceramic time is dated but in good condition. Wall base is damaged and is at the end of its service life, needs to be replaced
	Rubber Base					X	
Doors:	HM Frame / Wd Door				X		Doors to units are in fair condition. Exit doors and Stair doors are worn and damaged from use. Should be replaced
	Hardware				X		
Windows:	Aluminum Storefront						None
	Insulated Glazing						
	Blinds						
Appliances							
Equipment	Furniture						
Mechanical:					X		Return air vents are dirty, system likely needs to be cleaned
Electrical:	Light Fixtures				X		1' x 4' Light Fixtures use T-8 fluorescent bulbs, significant energy saving can be accomplished by installing either T-5 fixtures or LED. Receptacles are assorted and many have aged. Recommend replacement.
	Devices					X	
Other:							Ceiling height is too low per IBC, rework of the ceiling is necessary.

DRAFT

Room #:	101	Room Use:	Security Room	Condition			
				Good	Fair	Poor	
	Overall Condition				X		
Room Condition							Comments
Walls:	Surface Condition					X	Heavy use.
	Paint Condition					X	
Ceiling:	Surface Condition				X		Combination of 2x4 ACT and Gypsum board soffits
	Paint Condition				X		
Flooring:	Flooring				X		VCT is worn. Wall base is damaged and is at the end of its service life, needs to be replaced
	Rubber Base					X	
Doors:	HM Frame / Wd Door				X		HM Door in HM Frame, fair condition
	Hardware				X		
Windows:	Aluminum Storefront						None
	Insulated Glazing						
	Blinds						
Appliances							
Equipment	Furniture				X		
	Casework				X		
Mechanical:					X		Return air vents are dirty, system likely needs to be cleaned
Electrical:	Light Fixtures				X		2' x 4' Light Fixtures use T-8 fluorescent bulbs, significant energy saving can be accomplished by installing either T-5 fixtures or LED. Receptacles are assorted and many have aged. Recommend replacement.
	Devices					X	
Other:							Special systems including Fire Panel, CCTV, and Access control appear dated. Updated head end hardware would allow for more flexibility in manageing the security of the facility.

DRAFT

Room #:	102	Room Use:	Main Office	Condition			
				Good	Fair	Poor	
	Overall Condition				X		
Room Condition							Comments
Walls:	Surface Condition				X		Heavy use.
	Paint Condition				X		
Ceiling:	Surface Condition				X		2x2 ACT
	Paint Condition				X		
Flooring:	Flooring				X		VCT is worn and shows signs of shrinkage, needs to be replaced, wall base is damaged and is at the end of its service life, needs to be replaced
	Rubber Base					X	
Doors:	HM Frame / Wd Door				X		Mixture of door types, mostly HM Frame with SC wood Doors in fair condition. One pocket door does not meet ADA requirements
	Hardware				X		
Windows:	Aluminum Storefront				X		Windows do not show signs of failure but are reaching the end of their service life.
	Insulated Glazing				X		
	Blinds				X		
Appliances							
Equipment	Furniture				X		Furniture is a mix of systems furniture and other components. In good to fair condition
	Casework				X		
Mechanical:					X		Return air vents are dirty, system likely needs to be cleaned
Electrical:	Light Fixtures				X		2' x 4' Light Fixtures use T-8 fluorescent bulbs, significant energy saving can be accomplished by installing either T-5 fixtures or LED. Receptacles are assorted and many have aged. Recommend replacement.
	Devices					X	
Other:							The overall layout of the office is inefficient, redesign of this space would benefit the staff and provide a more functional layout.

DRAFT

Room #:	103	Room Use:	Office	Condition			
				Good	Fair	Poor	
	Overall Condition				X		
Room Condition							Comments
Walls:	Surface Condition				X		Gypsum Wall Board . Need some patch and paint.
	Paint Condition				X		
Ceiling:	Surface Condition				X		2x2 ACT
	Paint Condition				X		
Flooring:	Flooring				X		VCT is worn and shows signs of shrinkage, needs to be replaced, wall base is damaged and is at the end of its service life, needs to be replaced
	Rubber Base					X	
Doors:	HM Frame / Wd Door				X		HM Frame with SC wood Doors in fair condition.
	Hardware				X		
Windows:	Aluminum Storefront				X		Windows do not show signs of failure but are reaching the end of their service life.
	Insulated Glazing				X		
	Blinds				X		
Appliances							
Equipment	Furniture				X		Furniture is a mix of systems furniture and other components. In good to fair condition
	Casework				X		
Mechanical:					X		Return air vents are dirty, system likely needs to be cleaned
Electrical:	Light Fixtures				X		2' x 4' Light Fixtures use T-8 fluorescent bulbs, significant energy saving can be accomplished by installing either T-5 fixtures or LED. Receptacles are assorted and many have aged. Recommend replacement.
	Devices					X	
Other:							The overall layout of the office is inefficient, this office is used as access from the main office into the breakroom.

DRAFT

Room #:	103C	Room Use:	Office Breakroom	Condition			
				Good	Fair	Poor	
	Overall Condition				X		
Room Condition							Comments
Walls:	Surface Condition				X		Gypsum Wall Board . Need some patch and paint.
	Paint Condition				X		
Ceiling:	Surface Condition					X	2x2 ACT , ceiling tile damaged
	Paint Condition				X		
Flooring:	Flooring				X		VCT is worn and shows signs of shrinkage, needs to be replaced, wall base is damaged and is at the end of its service life, needs to be replaced
	Rubber Base					X	
Doors:	HM Frame / Wd Door					X	Pocket door does not meet ADA requirements, should be replaced
	Hardware					X	
Windows:	Aluminum Storefront				X		Windows do not show signs of failure but are reaching the end of their service life.
	Insulated Glazing				X		
	Blinds				X		
Appliances	Refrigerator				X		
	Stove				X		
Equipment	Furniture				X		Furniture is a mix of systems furniture and other components. In good to fair condition
	Casework				X		
Mechanical:					X		Return air vents are dirty, system likely needs to be cleaned
Electrical:	Light Fixtures				X		2' x 4' Light Fixtures use T-8 fluorescent bulbs, significant energy saving can be accomplished by installing either T-5 fixtures or LED. Receptacles are assorted and many have aged. Recommend replacement.
	Devices					X	
Other:							

DRAFT

Room #:	103D	Room Use:	Office	Condition			
				Good	Fair	Poor	
	Overall Condition				X		
Room Condition							Comments
Walls:	Surface Condition				X		Gypsum Wall Board . Need some patch and paint.
	Paint Condition				X		
Ceiling:	Surface Condition					X	2x2 ACT , ceiling tile damaged
	Paint Condition				X		
Flooring:	Flooring				X		VCT is worn and shows signs of shrinkage, needs to be replaced, wall base is damaged and is at the end of its service life, needs to be replaced
	Rubber Base					X	
Doors:	HM Frame / Wd Door				X		HM Frame with SC wood Doors in fair condition.
	Hardware				X		
Windows:	Aluminum Storefront				X		Windows do not show signs of failure but are reaching the end of their service life.
	Insulated Glazing				X		
	Blinds				X		
Appliances							
Equipment	Furniture				X		Furniture is a mix of systems furniture and other components. In good to fair condition
	Casework				X		
Mechanical:					X		Return air vents are dirty, system likely needs to be cleaned
Electrical:	Light Fixtures				X		2' x 4' Light Fixtures use T-8 fluorescent bulbs, significant energy saving can be accomplished by installing either T-5 fixtures or LED. Receptacles are assorted and many have aged. Recommend replacement.
	Devices					X	
Other:							The overall layout of the office is inefficient, this office is used as access from the main office into the breakroom.

DRAFT

Room #:	103E	Room Use:	Admin Restroom	Condition			
				Good	Fair	Poor	
	Overall Condition				X		
Room Condition							Comments
Walls:	Surface Condition				X		Gypsum Wall Board . Need some patch and paint.
	Paint Condition				X		
Ceiling:	Surface Condition				X		Gypsum Wall Board . Need some patch and paint.
	Paint Condition				X		
Flooring:	Flooring				X		ceramic tile is worn and grout is dirty,
	Rubber Base				N/A		
Doors:	HM Frame / Wd Door				X		HM Frame with SC wood Doors in fair condition.
	Hardware				X		
Windows:	Aluminum Storefront						N/A
	Insulated Glazing						
	Blinds						
Appliances							
Equipment	Furniture				X		Furniture is a mix of systems furniture and other components. In good to fair condition
	Casework				X		
Mechanical:					X		Return air vent located in the shower, need to be relocated. No supply evident
Electrical:	Light Fixtures				X		2' x 4' Light Fixtures use T-8 fluorescent bulbs, significant energy saving can be accomplished by installing either T-5 fixtures or LED. Receptacles are assorted and many have aged. Recommend replacement.
	Devices					X	
Other:							

DRAFT

Room #:	124	Room Use:	Lounge	Condition			
				Good	Fair	Poor	
	Overall Condition				X		
Room Condition							Comments
Walls:	Surface Condition				X		Gypsum Wall Board . Need some patch and paint.
	Paint Condition				X		
Ceiling:	Surface Condition					X	2x2 ACT , ceiling tile damaged from access to utilities
	Paint Condition				X		
Flooring:	Flooring				X		VCT is worn and shows signs of shrinkage, needs to be replaced, wall base is damaged and is at the end of its service life, needs to be replaced
	Rubber Base					X	
Doors:	HM Frame / Wd Door				X		HM Frame with HM wood Doors in fair condition. Aluminum Entrance appears servicable
	Hardware				X		
Windows:	Aluminum Storefront				X		Windows do not show signs of failure but are reaching the end of their service life.
	Insulated Glazing				X		
Appliances							
Equipment	Furniture					X	Furniture is a mix and is worn from use
Mechanical:					X		Return air vents are dirty, system likely needs to be cleaned
Electrical:	Light Fixtures				X		2' x 4' Light Fixtures use T-8 fluorescent bulbs, significant energy saving can be accomplished by installing either T-5 fixtures or LED. Receptacles are assorted and many have aged. Recommend replacement.
	Devices					X	
Other:							

DRAFT

Room #:	300 a	Room Use:	3rd Floor Elev. Lobby	Condition			
				Good	Fair	Poor	
	Overall Condition				X		
Room Condition							Comments
Walls:	Surface Condition				X		Heavy use. Gyp board surfaces and column covers show wear
	Paint Condition				X		
Ceiling:	Surface Condition				X		2x4 ACT - Damaged tile and grid from access to utilities above
	Paint Condition				X		
Flooring:	Flooring				X		Ceramic time is dated but in good condition. Wall base is damaged and is at the end of its service life, needs to be replaced
	Rubber Base					X	
Doors:	HM Frame / Wd Door				X		HM Frame with HM wood Doors in fair condition. Aluminum Entrance appears servicable
	Hardware				X		
Windows:	Aluminum Storefront					X	East Windows do show signs of failure but are reaching the end of their service life.
	Insulated Glazing				X		
	Blinds				n/a		
Appliances							
Equipment	Furniture						
Mechanical:					X		Return air vents are dirty, system likely needs to be cleaned
Electrical:	Light Fixtures				X		2' x 4' Light Fixtures use T-8 fluorescent bulbs, significant energy saving can be accomplished by installing either T-5 fixtures or LED. Receptacles are assorted and many have aged. Recommend replacement.
	Devices					X	
Other:							Ceiling height is too low per IBC, rework of the ceiling is necessary.

DRAFT

Room #:	300b	Room Use:	3rd Floor West Corridor	Condition			
				Good	Fair	Poor	
	Overall Condition				X		
Room Condition							Comments
Walls:	Surface Condition				X		Heavy use. Gyp board surfaces show wear,
	Paint Condition				X		
Ceiling:	Surface Condition				X		2x4 ACT - Damaged tile and grid from access to utilities above
	Paint Condition				X		
Flooring:	Flooring					X	Carpeting is worn from heavy use. Wall base is damaged and is at the end of its service life, needs to be replaced
	Rubber Base					X	
Doors:	HM Frame / Wd Door				X		Doors to units are in fair condition. Exit doors and Stair doors are worn and damaged from use. Should be replaced
	Hardware				X		
Windows:	Aluminum Storefront						None
	Insulated Glazing						
	Blinds						
Appliances							
Equipment	Furniture						
Mechanical:					X		Return air vents are dirty, system likely needs to be cleaned
Electrical:	Light Fixtures				X		1' x 4' Light Fixtures use T-8 fluorescent bulbs, significant energy saving can be accomplished by installing either T-5 fixtures or LED. Recepticles spaces at 30'. Receptacles are assorted and many have aged. Recommend replacement.
	Devices					X	
Other:							Ceiling height is too low per IBC, rework of the ceiling is necessary.

DRAFT

Room #:	300c	Room Use:	3rd Floor East Corridor	Condition			
				Good	Fair	Poor	
	Overall Condition				X		
Room Condition							Comments
Walls:	Surface Condition				X		Heavy use. Gyp board surfaces show wear,
	Paint Condition				X		
Ceiling:	Surface Condition				X		2x4 ACT - Damaged tile and grid from access to utilities above
	Paint Condition				X		
Flooring:	Flooring					X	Carpeting is worn from heavy use. Wall base is damaged and is at the end of its service life, needs to be replaced
	Rubber Base					X	
Doors:	HM Frame / Wd Door				X		Doors to units are in fair condition. Exit doors and Stair doors are worn and damaged from use. Should be replaced
	Hardware				X		
Windows:	Aluminum Storefront						None
	Insulated Glazing						
	Blinds						
Appliances							
Equipment	Furniture						
Mechanical:					X		Return air vents are dirty, system likely needs to be cleaned
Electrical:	Light Fixtures				X		1' x 4' Light Fixtures use T-8 fluorescent bulbs, significant energy saving can be accomplished by installing either T-5 fixtures or LED. Recepticles spaces at 30'. Receptacles are assorted and many have aged. Recommend replacement.
	Devices					X	
Other:							Ceiling height is too low per IBC, rework of the ceiling is necessary.

DRAFT

Room #:	700a	Room Use:	7th Floor Elev. Lobby	Condition			
				Good	Fair	Poor	
	Overall Condition				X		
Room Condition							Comments
Walls:	Surface Condition				X		Heavy use. Gyp board surfaces and column covers show wear
	Paint Condition				X		
Ceiling:	Surface Condition				X		2x4 ACT - Damaged tile and grid from access to utilities above
	Paint Condition				X		
Flooring:	Flooring				X		Ceramic time is dated but in good condition. Wall base is damaged and is at the end of its service life, needs to be replaced
	Rubber Base					X	
Doors:	HM Frame / Wd Door				X		HM Frame with HM wood Doors in fair condition. Aluminum Entrance appears servicable
	Hardware				X		
Windows:	Aluminum Storefront					X	East Windows do show signs of failure but are reaching the end of their service life.
	Insulated Glazing				X		
	Blinds				n/a		
Appliances							
Equipment	Furniture						
Mechanical:					X		Return air vents are dirty, system likely needs to be cleaned
Electrical:	Light Fixtures				X		2' x 4' Light Fixtures use T-8 fluorescent bulbs, significant energy saving can be accomplished by installing either T-5 fixtures or LED. Receptacles are assorted and many have aged. Recommend replacement.
	Devices					X	
Other:							Ceiling height is too low per IBC, rework of the ceiling is necessary.

DRAFT

WSM Architects
Studio Dwelling Unit Assessments

Tucson House
Physical Needs Assessment

City of Tucson
HCD

Room #:	700b	Room Use:	7th Floor West Corridor	Condition			
				Good	Fair	Poor	
	Overall Condition				X		
Room Condition							Comments
Walls:	Surface Condition				X		Heavy use. Gyp board surfaces show wear,
	Paint Condition				X		
Ceiling:	Surface Condition				X		2x4 ACT - Damaged tile and grid from access to utilities above
	Paint Condition				X		
Flooring:	Flooring					X	Carpeting is worn from heavy use. Wall base is damaged and is at the end of its service life, needs to be replaced
	Rubber Base					X	
Doors:	HM Frame / Wd Door				X		Doors to units are in fair condition. Exit doors and Stair doors are worn and damaged from use. Should be replaced
	Hardware				X		
Windows:	Aluminum Storefront						None
	Insulated Glazing						
	Blinds						
Appliances							
Equipment	Furniture						
Mechanical:					X		Return air vents are dirty, system likely needs to be cleaned
Electrical:	Light Fixtures				X		1' x 4' Light Fixtures use T-8 fluorescent bulbs, significant energy saving can be accomplished by installing either T-5 fixtures or LED. Recepticles spaces at 30'. Receptacles are assorted and many have aged. Recommend replacement.
	Devices					X	
Other:							Ceiling height is too low per IBC, rework of the ceiling is necessary.

DRAFT

Room #:	700c	Room Use:	7th Floor East Corridor	Condition			
				Good	Fair	Poor	
	Overall Condition				X		
Room Condition							Comments
Walls:	Surface Condition				X		Heavy use. Gyp board surfaces show wear,
	Paint Condition				X		
Ceiling:	Surface Condition				X		2x4 ACT - Damaged tile and grid from access to utilities above
	Paint Condition				X		
Flooring:	Flooring					X	Carpeting is worn from heavy use. Wall base is damaged and is at the end of its service life, needs to be replaced
	Rubber Base					X	
Doors:	HM Frame / Wd Door				X		Doors to units are in fair condition. Exit doors and Stair doors are worn and damaged from use. Should be replaced
	Hardware				X		
Windows:	Aluminum Storefront						None
	Insulated Glazing						
	Blinds						
Appliances							
Equipment	Furniture						
Mechanical:					X		Return air vents are dirty, system likely needs to be cleaned
Electrical:	Light Fixtures				X		1' x 4' Light Fixtures use T-8 fluorescent bulbs, significant energy saving can be accomplished by installing either T-5 fixtures or LED. Recepticles spaces at 30'. Receptacles are assorted and many have aged. Recommend replacement.
	Devices					X	
Other:							Ceiling height is too low per IBC, rework of the ceiling is necessary.

DRAFT

Room #:	1100a	Room Use: 11th Floor Elev. Lobby	Condition			
			Good	Fair	Poor	
	Overall Condition			X		
Room Condition						Comments
Walls:	Surface Condition			X		Heavy use. Gyp board surfaces and column covers show wear
	Paint Condition			X		
Ceiling:	Surface Condition			X		2x4 ACT - Damaged tile and grid from access to utilities above
	Paint Condition			X		
Flooring:	Flooring			X		Ceramic time is dated but in good condition. Wall base is damaged and is at the end of its service life, needs to be replaced
	Rubber Base				X	
Doors:	HM Frame / Wd Door			X		HM Frame with HM wood Doors in fair condition. Aluminum Entrance appears servicable
	Hardware			X		
Windows:	Aluminum Storefront				X	East Windows do show signs of failure but are reaching the end of their service life.
	Insulated Glazing			X		
	Blinds			n/a		
Appliances						
Equipment	Furniture					
Mechanical:				X		Return air vents are dirty, system likely needs to be cleaned
Electrical:	Light Fixtures			X		2' x 4' Light Fixtures use T-8 fluorescent bulbs, significant energy saving can be accomplished by installing either T-5 fixtures or LED. Receptacles are assorted and many have aged. Recommend replacement.
	Devices				X	
Other:						Ceiling height is too low per IBC, rework of the ceiling is necessary.

DRAFT

Room #:	1100b	Room Use: 11th Floor West Corridor	Condition			
			Good	Fair	Poor	
	Overall Condition			X		
Room Condition						Comments
Walls:	Surface Condition			X		Heavy use. Gyp board surfaces show wear,
	Paint Condition			X		
Ceiling:	Surface Condition			X		2x4 ACT - Damaged tile and grid from access to utilities above
	Paint Condition			X		
Flooring:	Flooring				X	Carpeting is worn from heavy use. Wall base is damaged and is at the end of its service life, needs to be replaced
	Rubber Base				X	
Doors:	HM Frame / Wd Door			X		Doors to units are in fair condition. Exit doors and Stair doors are worn and damaged from use. Should be replaced
	Hardware			X		
Windows:	Aluminum Storefront					None
	Insulated Glazing					
	Blinds					
Appliances						
Equipment	Furniture					
Mechanical:				X		Return air vents are dirty, system likely needs to be cleaned
Electrical:	Light Fixtures			X		1' x 4' Light Fixtures use T-8 fluorescent bulbs, significant energy saving can be accomplished by installing either T-5 fixtures or LED. Recepticles spaces at 30'. Receptacles are assorted and many have aged. Recommend replacement.
	Devices				X	
Other:						Ceiling height is too low per IBC, rework of the ceiling is necessary.

DRAFT

Room #:	1100c	Room Use:	11th Floor East Corridor	Condition			
				Good	Fair	Poor	
	Overall Condition				X		
Room Condition							Comments
Walls:	Surface Condition				X		Heavy use. Gyp board surfaces show wear,
	Paint Condition				X		
Ceiling:	Surface Condition				X		2x4 ACT - Damaged tile and grid from access to utilities above
	Paint Condition				X		
Flooring:	Flooring					X	Carpeting is worn from heavy use. Wall base is damaged and is at the end of its service life, needs to be replaced
	Rubber Base					X	
Doors:	HM Frame / Wd Door				X		Doors to units are in fair condition. Exit doors and Stair doors are worn and damaged from use. Should be replaced
	Hardware				X		
Windows:	Aluminum Storefront						None
	Insulated Glazing						
	Blinds						
Appliances							
Equipment	Furniture						
Mechanical:					X		Return air vents are dirty, system likely needs to be cleaned
Electrical:	Light Fixtures				X		1' x 4' Light Fixtures use T-8 fluorescent bulbs, significant energy saving can be accomplished by installing either T-5 fixtures or LED. Recepticles spaces at 30'. Receptacles are assorted and many have aged. Recommend replacement.
	Devices					X	
Other:							Ceiling height is too low per IBC, rework of the ceiling is necessary.

DRAFT

Room #:	1200a	Room Use: 12th Floor Elev. Lobby	Condition			
			Good	Fair	Poor	
	Overall Condition			X		
Room Condition						Comments
Walls:	Surface Condition			X		Heavy use. Gyp board surfaces and column covers show wear
	Paint Condition			X		
Ceiling:	Surface Condition			X		2x4 ACT - Damaged tile and grid from access to utilities above
	Paint Condition			X		
Flooring:	Flooring			X		Ceramic time is dated but in good condition. Wall base is damaged and is at the end of its service life, needs to be replaced
	Rubber Base				X	
Doors:	HM Frame / Wd Door			X		HM Frame with HM wood Doors in fair condition. Aluminum Entrance appears servicable
	Hardware			X		
Windows:	Aluminum Storefront				X	East Windows do show signs of failure but are reaching the end of their service life.
	Insulated Glazing			X		
	Blinds			n/a		
Appliances						
Equipment	Furniture					
Mechanical:				X		Return air vents are dirty, system likely needs to be cleaned
Electrical:	Light Fixtures			X		2' x 4' Light Fixtures use T-8 fluorescent bulbs, significant energy saving can be accomplished by installing either T-5 fixtures or LED. Receptacles are assorted and many have aged. Recommend replacement.
	Devices				X	
Other:						Ceiling height is too low per IBC, rework of the ceiling is necessary.

DRAFT

WSM Architects
Studio Dwelling Unit Assessments

Tucson House
Physical Needs Assessment

City of Tucson
HCD

Room #:	1200b	Room Use: 12th Floor West Corridor	Condition			
			Good	Fair	Poor	
	Overall Condition			X		
Room Condition						Comments
Walls:	Surface Condition			X		Heavy use. Gyp board surfaces show wear,
	Paint Condition			X		
Ceiling:	Surface Condition			X		2x4 ACT - Damaged tile and grid from access to utilities above
	Paint Condition			X		
Flooring:	Flooring				X	Carpeting is worn from heavy use. Wall base is damaged and is at the end of its service life, needs to be replaced
	Rubber Base				X	
Doors:	HM Frame / Wd Door			X		Doors to units are in fair condition. Exit doors and Stair doors are worn and damaged from use. Should be replaced
	Hardware			X		
Windows:	Aluminum Storefront					None
	Insulated Glazing					
	Blinds					
Appliances						
Equipment	Furniture					
Mechanical:				X		Return air vents are dirty, system likely needs to be cleaned
Electrical:	Light Fixtures			X		1' x 4' Light Fixtures use T-8 fluorescent bulbs, significant energy saving can be accomplished by installing either T-5 fixtures or LED. Recepticles spaces at 30'. Receptacles are assorted and many have aged. Recommend replacement.
	Devices				X	
Other:						Ceiling height is too low per IBC, rework of the ceiling is necessary.

DRAFT

Room #:	1200c	Room Use:	12th Floor East Corridor	Condition			
				Good	Fair	Poor	
	Overall Condition				X		
Room Condition							Comments
Walls:	Surface Condition				X		Heavy use. Gyp board surfaces show wear,
	Paint Condition				X		
Ceiling:	Surface Condition				X		2x4 ACT - Damaged tile and grid from access to utilities above
	Paint Condition				X		
Flooring:	Flooring					X	Carpeting is worn from heavy use. Wall base is damaged and is at the end of its service life, needs to be replaced
	Rubber Base					X	
Doors:	HM Frame / Wd Door				X		Doors to units are in fair condition. Exit doors and Stair doors are worn and damaged from use. Should be replaced
	Hardware				X		
Windows:	Aluminum Storefront						None
	Insulated Glazing						
	Blinds						
Appliances							
Equipment	Furniture						
Mechanical:					X		Return air vents are dirty, system likely needs to be cleaned
Electrical:	Light Fixtures				X		1' x 4' Light Fixtures use T-8 fluorescent bulbs, significant energy saving can be accomplished by installing either T-5 fixtures or LED. Recepticles spaces at 30'. Receptacles are assorted and many have aged. Recommend replacement.
	Devices					X	
Other:							Ceiling height is too low per IBC, rework of the ceiling is necessary.

DRAFT

Room #:	1400a	Room Use: 14th Floor Elev. Lobby	Condition			
			Good	Fair	Poor	
	Overall Condition			X		
Room Condition						Comments
Walls:	Surface Condition			X		Heavy use. Gyp board surfaces and column covers show wear
	Paint Condition			X		
Ceiling:	Surface Condition			X		2x4 ACT - Damaged tile and grid from access to utilities above
	Paint Condition			X		
Flooring:	Flooring			X		Ceramic time is dated but in good condition. Wall base is damaged and is at the end of its service life, needs to be replaced
	Rubber Base				X	
Doors:	HM Frame / Wd Door			X		HM Frame with HM wood Doors in fair condition. Aluminum Entrance appears servicable
	Hardware			X		
Windows:	Aluminum Storefront				X	East Windows do show signs of failure but are reaching the end of their service life.
	Insulated Glazing			X		
	Blinds			n/a		
Appliances						
Equipment	Furniture					
Mechanical:				X		Return air vents are dirty, system likely needs to be cleaned
Electrical:	Light Fixtures			X		2' x 4' Light Fixtures use T-8 fluorescent bulbs, significant energy saving can be accomplished by installing either T-5 fixtures or LED. Receptacles are assorted and many have aged. Recommend replacement.
	Devices				X	
Other:						Ceiling height is too low per IBC, rework of the ceiling is necessary.

DRAFT

Room #:	1400b	Room Use:	14th Floor West Corridor	Condition			
				Good	Fair	Poor	
	Overall Condition				X		
Room Condition							Comments
Walls:	Surface Condition				X		Heavy use. Gyp board surfaces show wear,
	Paint Condition				X		
Ceiling:	Surface Condition				X		2x4 ACT - Damaged tile and grid from access to utilities above
	Paint Condition				X		
Flooring:	Flooring					X	Carpeting is worn from heavy use. Wall base is damaged and is at the end of its service life, needs to be replaced
	Rubber Base					X	
Doors:	HM Frame / Wd Door				X		Doors to units are in fair condition. Exit doors and Stair doors are worn and damaged from use. Should be replaced
	Hardware				X		
Windows:	Aluminum Storefront						None
	Insulated Glazing						
	Blinds						
Appliances							
Equipment	Furniture						
Mechanical:					X		Return air vents are dirty, system likely needs to be cleaned
Electrical:	Light Fixtures				X		1' x 4' Light Fixtures use T-8 fluorescent bulbs, significant energy saving can be accomplished by installing either T-5 fixtures or LED. Recepticles spaces at 30'. Receptacles are assorted and many have aged. Recommend replacement.
	Devices					X	
Other:							Ceiling height is too low per IBC, rework of the ceiling is necessary.

DRAFT

Room #:	1400c	Room Use:	14th Floor East Corridor	Condition			
				Good	Fair	Poor	
	Overall Condition				X		
Room Condition							Comments
Walls:	Surface Condition				X		Heavy use. Gyp board surfaces show wear,
	Paint Condition				X		
Ceiling:	Surface Condition				X		2x4 ACT - Damaged tile and grid from access to utilities above
	Paint Condition				X		
Flooring:	Flooring					X	Carpeting is worn from heavy use. Wall base is damaged and is at the end of its service life, needs to be replaced
	Rubber Base					X	
Doors:	HM Frame / Wd Door				X		Doors to units are in fair condition. Exit doors and Stair doors are worn and damaged from use. Should be replaced
	Hardware				X		
Windows:	Aluminum Storefront						None
	Insulated Glazing						
	Blinds						
Appliances							
Equipment	Furniture						
Mechanical:					X		Return air vents are dirty, system likely needs to be cleaned
Electrical:	Light Fixtures				X		1' x 4' Light Fixtures use T-8 fluorescent bulbs, significant energy saving can be accomplished by installing either T-5 fixtures or LED. Recepticles spaces at 30'. Receptacles are assorted and many have aged. Recommend replacement.
	Devices					X	
Other:							Ceiling height is too low per IBC, rework of the ceiling is necessary.

DRAFT

Room #:	1600a	Room Use: 16th Floor Elev. Lobby	Condition			
			Good	Fair	Poor	
	Overall Condition			X		
Room Condition						Comments
Walls:	Surface Condition			X		Heavy use. Gyp board surfaces and column covers show wear
	Paint Condition			X		
Ceiling:	Surface Condition			X		2x4 ACT - Damaged tile and grid from access to utilities above
	Paint Condition			X		
Flooring:	Flooring			X		Ceramic time is dated but in good condition. Wall base is damaged and is at the end of its service life, needs to be replaced
	Rubber Base				X	
Doors:	HM Frame / Wd Door			X		HM Frame with HM wood Doors in fair condition. Aluminum Entrance appears servicable
	Hardware			X		
Windows:	Aluminum Storefront				X	East Windows do show signs of failure but are reaching the end of their service life.
	Insulated Glazing			X		
	Blinds			n/a		
Appliances						
Equipment	Furniture					
Mechanical:				X		Return air vents are dirty, system likely needs to be cleaned
Electrical:	Light Fixtures			X		2' x 4' Light Fixtures use T-8 fluorescent bulbs, significant energy saving can be accomplished by installing either T-5 fixtures or LED. Receptacles are assorted and many have aged. Recommend replacement.
	Devices				X	
Other:						Ceiling height is too low per IBC, rework of the ceiling is necessary.

DRAFT

Room #:	1600b	Room Use: 16th Floor West Corridor	Condition			
			Good	Fair	Poor	
	Overall Condition			X		
Room Condition						Comments
Walls:	Surface Condition			X		Heavy use. Gyp board surfaces show wear,
	Paint Condition			X		
Ceiling:	Surface Condition			X		2x4 ACT - Damaged tile and grid from access to utilities above
	Paint Condition			X		
Flooring:	Flooring				X	Carpeting is worn from heavy use. Wall base is damaged and is at the end of its service life, needs to be replaced
	Rubber Base				X	
Doors:	HM Frame / Wd Door			X		Doors to units are in fair condition. Exit doors and Stair doors are worn and damaged from use. Should be replaced
	Hardware			X		
Windows:	Aluminum Storefront					None
	Insulated Glazing					
	Blinds					
Appliances						
Equipment	Furniture					
Mechanical:				X		Return air vents are dirty, system likely needs to be cleaned
Electrical:	Light Fixtures			X		1' x 4' Light Fixtures use T-8 fluorescent bulbs, significant energy saving can be accomplished by installing either T-5 fixtures or LED. Recepticles spaces at 30'. Receptacles are assorted and many have aged. Recommend replacement.
	Devices				X	
Other:						Ceiling height is too low per IBC, rework of the ceiling is necessary.

DRAFT

Room #:	1600c	Room Use: 16th Floor East Corridor	Condition			
			Good	Fair	Poor	
	Overall Condition			X		
Room Condition						Comments
Walls:	Surface Condition			X		Heavy use. Gyp board surfaces show wear,
	Paint Condition			X		
Ceiling:	Surface Condition			X		2x4 ACT - Damaged tile and grid from access to utilities above
	Paint Condition			X		
Flooring:	Flooring				X	Carpeting is worn from heavy use. Wall base is damaged and is at the end of its service life, needs to be replaced
	Rubber Base				X	
Doors:	HM Frame / Wd Door			X		Doors to units are in fair condition. Exit doors and Stair doors are worn and damaged from use. Should be replaced
	Hardware			X		
Windows:	Aluminum Storefront					None
	Insulated Glazing					
	Blinds					
Appliances						
Equipment	Furniture					
Mechanical:				X		Return air vents are dirty, system likely needs to be cleaned
Electrical:	Light Fixtures			X		1' x 4' Light Fixtures use T-8 fluorescent bulbs, significant energy saving can be accomplished by installing either T-5 fixtures or LED. Recepticles spaces at 30'. Receptacles are assorted and many have aged. Recommend replacement.
	Devices				X	
Other:						Ceiling height is too low per IBC, rework of the ceiling is necessary.

DRAFT

Room #:		Room Use:	Stair #1	Condition			
				Good	Fair	Poor	
	Overall Condition					X	
Room Condition							Comments
Walls:	Surface Condition					X	Cracks in Masonry, needs patch and paint throughout
	Paint Condition					X	
Ceiling:	Surface Condition				X		Exposed Concrete
	Paint Condition				X		
Flooring:	Flooring					X	Exposed painted concrete - some cracking and damage in some areas, need patch and repair.
	Rubber Base					X	
Doors:	HM Frame / Wd Door					X	Doors are in high abuse areas and show signs of deteroriation, need replacment or doors, frames and hardwars
	Hardware					X	
Windows:	Aluminum Storefront						None
	Insulated Glazing						
	Blinds						
Electrical:	Light Fixtures				X		1' x 4' Light Fixtures use T-8 fluorescent bulbs, significant energy saving can be accomplished by installing either T-5 fixtures or LED. Recepticles spaces at 30'. Receptacles are assorted and many have aged. Recommend replacement. Phones are located on the 16,13,10,7,4,1, B levels
	Devices					X	
Other:							All hand rails and guard rails are code violations and need to be replaced with IBC compliant construction. Hand rails are needed on both sides of the stair

DRAFT

Room #:		Room Use:	Stair #2	Condition			
				Good	Fair	Poor	
	Overall Condition					X	
Room Condition							Comments
Walls:	Surface Condition				X		High use area, needs paint
	Paint Condition					X	
Ceiling:	Surface Condition				X		Exposed Concrete
	Paint Condition				X		
Flooring:	Flooring					X	Exposed painted concrete - some cracking and damage in some areas, need patch and repair.
	Rubber Base					X	
Doors:	HM Frame / Wd Door					X	Doors are in high abuse areas and show signs of deteroriation, need replacment or doors, frames and hardwars
	Hardware					X	
Windows:	Aluminum Storefront						None
	Insulated Glazing						
	Blinds						
Electrical:	Light Fixtures				X		1' x 4' Light Fixtures use T-8 fluorescent bulbs, significant energy saving can be accomplished by installing either T-5 fixtures or LED. Recepticles spaces at 30'. Receptacles are assorted and many have aged. Recommend replacement. Phones are located on the 16,13,10,7,4,1, B levels
	Devices					X	
Other:							All hand rails and guard rails are code violations and need to be replaced with IBC compliant construction. Hand rails are needed on both sides of the stair

DRAFT

Room #:		Room Use:	Stair #3	Condition			
				Good	Fair	Poor	
	Overall Condition					X	
Room Condition							Comments
Walls:	Surface Condition				X		High use area, needs paint
	Paint Condition					X	
Ceiling:	Surface Condition				X		Exposed Concrete
	Paint Condition				X		
Flooring:	Flooring					X	Exposed painted concrete - some cracking and damage in some areas, need patch and repair.
	Rubber Base					X	
Doors:	HM Frame / Wd Door					X	Doors are in high abuse areas and show signs of deteroriation, need replacment or doors, frames and hardwars
	Hardware					X	
Windows:	Aluminum Storefront						None
	Insulated Glazing						
	Blinds						
Electrical:	Light Fixtures				X		1' x 4' Light Fixtures use T-8 fluorescent bulbs, significant energy saving can be accomplished by installing either T-5 fixtures or LED. Recepticles spaces at 30'. Receptacles are assorted and many have aged. Recommend replacement. Phones are located on the 16,13,10,7,4,1, B levels
	Devices					X	
Other:							All hand rails and guard rails are code violations and need to be replaced with IBC compliant construction. Hand rails are needed on both sides of the stair

DRAFT

Room #:		Room Use:	Stair #4	Condition			
				Good	Fair	Poor	
	Overall Condition					X	
Room Condition							Comments
Walls:	Surface Condition				X		High use area, needs paint
	Paint Condition					X	
Ceiling:	Surface Condition				X		Exposed Concrete
	Paint Condition				X		
Flooring:	Flooring					X	Exposed painted concrete - some cracking and damage in some areas, need patch and repair.
	Rubber Base					X	
Doors:	HM Frame / Wd Door					X	Doors are in high abuse areas and show signs of deteroriation, need replacment or doors, frames and hardwars
	Hardware					X	
Windows:	Aluminum Storefront						None
	Insulated Glazing						
	Blinds						
Electrical:	Light Fixtures				X		1' x 4' Light Fixtures use T-8 fluorescent bulbs, significant energy saving can be accomplished by installing either T-5 fixtures or LED. Recepticles spaces at 30'. Receptacles are assorted and many have aged. Recommend replacement. Phones are located on the 16,13,10,7,4,1, B levels
	Devices					X	
Other:							All hand rails and guard rails are code violations and need to be replaced with IBC compliant construction. Hand rails are needed on both sides of the stair

DRAFT

Energy Data

1 Executive Summary

2 Facility History

3 Assessment Process

4 Component Conditions

5 Aggregate Capital Needs

6 Elevator Assessment

7 Component Assessment Forms

8

DRAFT

City of Tucson

Air System Sizing Summary for B-EAST

Project Name: 16004 TUCSON HOUSE 01/22/2016
Prepared by: PH Mechanical 02:43PM

Air System Information

Air System Name	**B-EAST**		Number of zones	**1**	
Equipment Class	**SPLT AHU**		Floor Area	**6902.0**	ft²
Air System Type	**SZCAV**		Location	**Tucson, Arizona**	

Sizing Calculation Information

Calculation Months	**Jan to Dec**		Zone CFM Sizing	**Sum of space airflow rates**
Sizing Data	**Calculated**		Space CFM Sizing	**Individual peak space loads**

Central Cooling Coil Sizing Data

Total coil load	**9.5**	Tons	Load occurs at	**Aug 1500**	
Total coil load	**113.5**	MBH	OA DB / WB	**110.0 / 67.0**	°F
Sensible coil load	**113.5**	MBH	Entering DB / WB	**91.9 / 62.7**	°F
Coil CFM at Aug 1500	**3025**	CFM	Leaving DB / WB	**53.7 / 48.4**	°F
Max block CFM	**3025**	CFM	Coil ADP	**49.5**	°F
Sum of peak zone CFM	**3025**	CFM	Bypass Factor	**0.100**	
Sensible heat ratio	**1.000**		Resulting RH	**38**	%
ft²/Ton	**729.7**		Design supply temp.	**55.0**	°F
BTU/(hr-ft²)	**16.4**		Zone T-stat Check	**1 of 1**	OK
Water flow @ 10.0 °F rise	**N/A**		Max zone temperature deviation	**0.0**	°F

Central Heating Coil Sizing Data

Max coil load	**74.2**	MBH	Load occurs at	**Des Htg**	
Coil CFM at Des Htg	**3025**	CFM	BTU/(hr-ft²)	**10.8**	
Max coil CFM	**3025**	CFM	Ent. DB / Lvg DB	**50.4 / 75.4**	°F
Water flow @ 20.0 °F drop	**N/A**				

Supply Fan Sizing Data

Actual max CFM	**3025**	CFM	Fan motor BHP	**0.41**	BHP
Standard CFM	**2756**	CFM	Fan motor kW	**0.33**	kW
Actual max CFM/ft²	**0.44**	CFM/ft²	Fan static	**0.50**	in wg

Outdoor Ventilation Air Data

Design airflow CFM	**1531**	CFM	CFM/person	**28.89**	CFM/person
CFM/ft²	**0.22**	CFM/ft²			

DRAFT

Zone Sizing Summary for B-EAST

Project Name: 16004 TUCSON HOUSE 01/22/2016
Prepared by: PH Mechanical 02:43PM

Air System Information

Air System Name ..... **B-EAST**
Equipment Class ..... **SPLT AHU**
Air System Type ..... **SZCAV**

Number of zones **1**
Floor Area ..... **6902.0** ft²
Location ..... **Tucson, Arizona**

Sizing Calculation Information

Calculation Months ..... **Jan to Dec**
Sizing Data ..... **Calculated**

Zone CFM Sizing ..... **Sum of space airflow rates**
Space CFM Sizing ..... **Individual peak space loads**

Zone Sizing Data

Zone Name	Maximum Cooling Sensible (MBH)	Design Airflow (CFM)	Minimum Airflow (CFM)	Time of Peak Load	Maximum Heating Load (MBH)	Zone Floor Area (ft²)	Zone CFM/ft²
Zone 1	50.1	2723	2723	Sep 1600	15.5	6902.0	0.39

Zone Terminal Sizing Data

No Zone Terminal Sizing Data required for this system.

Space Loads and Airflows

Zone Name / Space Name	Mult.	Cooling Sensible (MBH)	Time of Load	Air Flow (CFM)	Heating Load (MBH)	Floor Area (ft²)	Space CFM/ft²
Zone 1							
0-E-B101B COORIDOR	1	2.9	Jan 1600	156	0.0	908.0	0.17
0-E-B12 AGENT	1	0.8	Jan 1600	45	0.0	124.0	0.36
0-E-B124 AGENT	1	1.5	Sep 1600	82	0.8	141.0	0.58
0-E-B125 AGENT	1	1.3	Oct 1500	70	0.5	143.0	0.49
0-E-B126 ZONE MANAGER	1	1.9	Sep 1600	101	0.7	192.0	0.53
0-E-B128 WAITING	1	3.9	Jan 1600	207	0.0	293.0	0.71
0-E-B129 LAUNDRY	1	7.5	Sep 1600	400	1.6	733.0	0.55
0-E-B130 STG	1	0.8	Oct 1500	45	0.4	182.0	0.25
0-E-B131 CONFERENCE	1	6.3	Sep 1600	360	0.8	329.0	1.09
0-E-B132 COUNCIL	1	2.6	Sep 1600	141	0.8	346.0	0.41
0-E-B132 STG	1	1.3	Oct 1500	69	0.8	205.0	0.34
0-E-B134 STG	1	4.4	Sep 1600	238	2.7	904.0	0.26
0-E-B135 STG	1	5.9	Jul 1600	316	4.2	1219.0	0.26
0-E-B136-STG	1	1.0	Jul 1600	52	0.6	230.0	0.23
0-E-B1367 WORK ROOM	1	6.7	Jul 1600	360	1.5	629.0	0.57
0-E-B139-RR	1	0.5	Jan 1600	27	0.0	94.0	0.29
0-E-B140 STG	1	0.5	Oct 1500	28	0.2	80.0	0.35
0-E-B142 STG	1	0.5	Jan 1600	26	0.0	150.0	0.17

DRAFT

Air System Design Load Summary for B-EAST

Project Name: 16004 TUCSON HOUSE 01/22/2016
Prepared by: PH Mechanical 02:43PM

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Aug 1500 COOLING OA DB / WB 110.0 °F / 67.0 °F			HEATING DATA AT DES HTG HEATING OA DB / WB 31.0 °F / 25.9 °F		
ZONE LOADS	**Details**	**Sensible (BTU/hr)**	**Latent (BTU/hr)**	**Details**	**Sensible (BTU/hr)**	**Latent (BTU/hr)**
Window & Skylight Solar Loads	0 ft²	0	-	0 ft²	-	-
Wall Transmission	3381 ft²	7312	-	3381 ft²	6096	-
Roof Transmission	0 ft²	0	-	0 ft²	0	-
Window Transmission	0 ft²	0	-	0 ft²	0	-
Skylight Transmission	0 ft²	0	-	0 ft²	0	-
Door Loads	0 ft²	0	-	0 ft²	0	-
Floor Transmission	6547 ft²	0	-	6547 ft²	5846	-
Partitions	0 ft²	0	-	0 ft²	0	-
Ceiling	0 ft²	0	-	0 ft²	0	-
Overhead Lighting	7990 W	21893	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	1369 W	4261	-	0	0	-
People	53	9361	10865	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	15% / 15%	6424	1630	30%	3582	0
>> Total Zone Loads	**-**	**49251**	**12495**	**-**	**15524**	**0**
Zone Conditioning	-	52122	12495	-	14590	0
Plenum Wall Load	0%	0	-	0	0	-
Plenum Roof Load	0%	0	-	0	0	-
Plenum Lighting Load	0%	0	-	0	0	-
Return Fan Load	3025 CFM	0	-	3025 CFM	0	-
Ventilation Load	1531 CFM	55343	-12491	1531 CFM	59223	0
Supply Fan Load	3025 CFM	1121	-	3025 CFM	-1121	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	10%	4925	-	10%	1552	-
>> Total System Loads	**-**	**113511**	**3**	**-**	**74244**	**0**
Central Cooling Coil	-	113511	0	-	0	0
Central Heating Coil	-	0	-	-	74244	-
>> Total Conditioning	**-**	**113511**	**0**	**-**	**74244**	**0**
Key:	**Positive values are clg loads Negative values are htg loads**			**Positive values are htg loads Negative values are clg loads**		

DRAFT

August DESIGN COOLING DAY, 1500

TABLE 1: SYSTEM DATA

Component	Location	Dry-Bulb Temp (°F)	Specific Humidity (lb/lb)	Airflow (CFM)	CO2 Level (ppm)	Sensible Heat (BTU/hr)	Latent Heat (BTU/hr)
Ventilation Air	Inlet	110.0	0.00572	1531	400	55343	-12491
Vent - Return Mixing	Outlet	91.9	0.00665	3025	611	-	-
Central Cooling Coil	Outlet	53.7	0.00665	3025	611	113511	0
Central Heating Coil	Outlet	53.7	0.00665	3025	611	0	-
Supply Fan	Outlet	54.1	0.00665	3025	611	1121	-
Cold Supply Duct	Outlet	55.9	0.00665	2723	611	-	-
Zone Air	-	75.4	0.00771	2723	850	52122	12495
Return Plenum	Outlet	75.4	0.00771	2723	850	0	-
Duct Leakage Air	Outlet	54.1	0.00665	303	611	-	-
Return Duct	Outlet	73.3	0.00761	3025	827	-	-

Air Density x Heat Capacity x Conversion Factor: At sea level = 1.080; At site altitude = 0.984 BTU/(hr-CFM-F)
Air Density x Heat of Vaporization x Conversion Factor: At sea level = 4746.6; At site altitude = 4324.3 BTU/(hr-CFM)
Site Altitude = 2556.0 ft

TABLE 2: ZONE DATA

Zone Name	Zone Sensible Load (BTU/hr)	T-stat Mode	Zone Cond (BTU/hr)	Zone Temp (°F)	Zone Airflow (CFM)	CO2 Level (ppm)	Terminal Heating Coil (BTU/hr)	Zone Heating Unit (BTU/hr)
Zone 1	49251	Cooling	52122	75.4	2723	850	0	0

DRAFT

WINTER DESIGN HEATING

TABLE 1: SYSTEM DATA

Component	Location	Dry-Bulb Temp (°F)	Specific Humidity (lb/lb)	Airflow (CFM)	CO2 Level (ppm)	Sensible Heat (BTU/hr)	Latent Heat (BTU/hr)
Ventilation Air	Inlet	31.0	0.00198	1531	400	-59223	0
Vent - Return Mixing	Outlet	50.4	0.00198	3025	406	-	-
Central Cooling Coil	Outlet	50.4	0.00198	3025	406	0	0
Central Heating Coil	Outlet	75.4	0.00198	3025	406	74244	-
Supply Fan	Outlet	75.7	0.00198	3025	406	1121	-
Cold Supply Duct	Outlet	75.2	0.00198	2723	406	-	-
Zone Air	-	69.7	0.00198	2723	412	-14590	0
Return Plenum	Outlet	69.7	0.00198	2723	412	0	-
Duct Leakage Air	Outlet	75.7	0.00198	303	406	-	-
Return Duct	Outlet	70.3	0.00198	3025	412	-	-

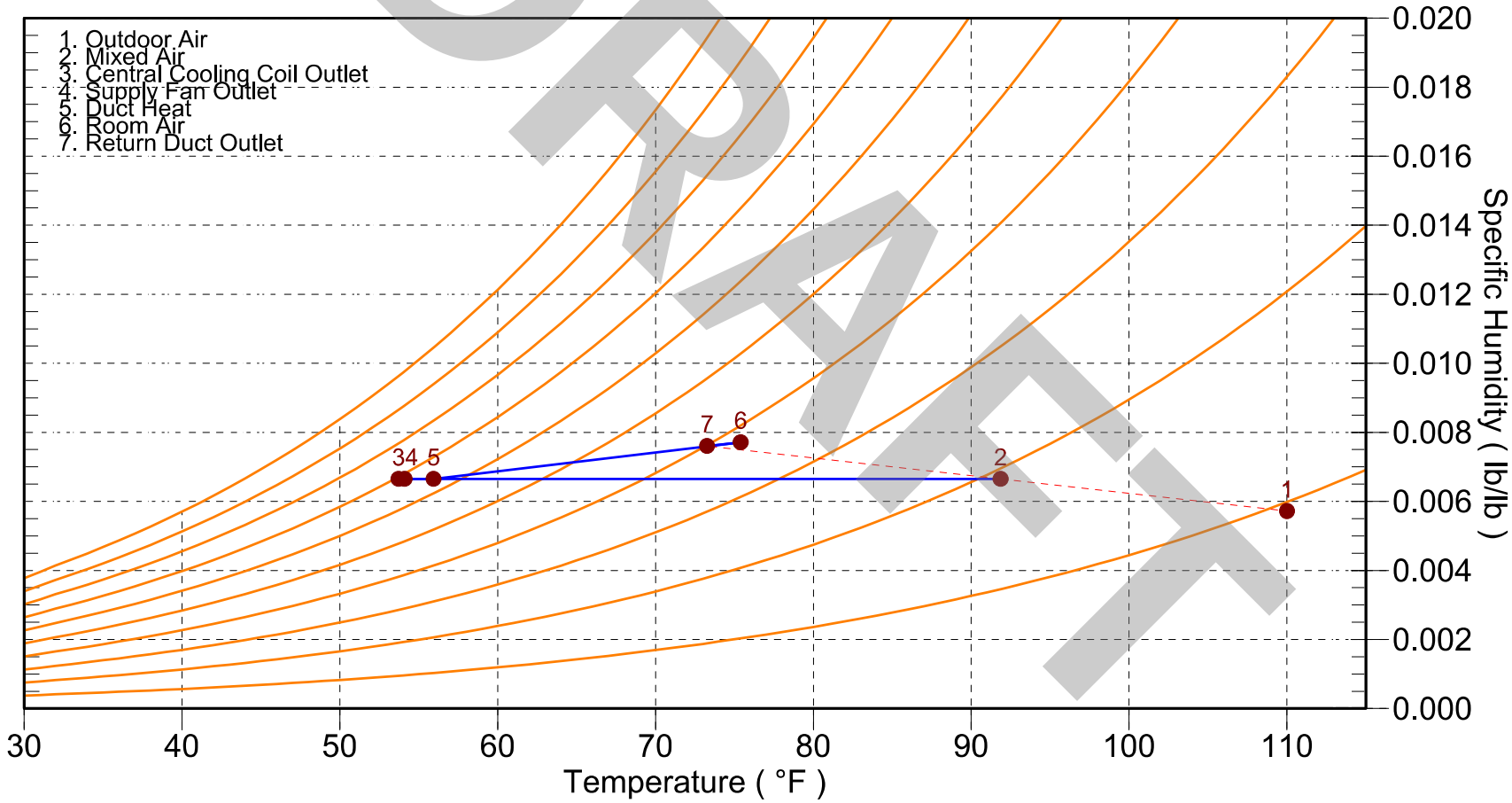
Air Density x Heat Capacity x Conversion Factor: At sea level = 1.080; At site altitude = 0.984 BTU/(hr-CFM-F)
Air Density x Heat of Vaporization x Conversion Factor: At sea level = 4746.6; At site altitude = 4324.3 BTU/(hr-CFM)
Site Altitude = 2556.0 ft

TABLE 2: ZONE DATA

Zone Name	Zone Sensible Load (BTU/hr)	T-stat Mode	Zone Cond (BTU/hr)	Zone Temp (°F)	Zone Airflow (CFM)	CO2 Level (ppm)	Terminal Heating Coil (BTU/hr)	Zone Heating Unit (BTU/hr)
Zone 1	-15524	Heating	-14590	69.7	2723	412	0	0

DRAFT

Location: Tucson, Arizona
Altitude: 2556.0 ft.
Data for: August DESIGN COOLING DAY, 1500



DRAFT

Air System Sizing Summary for B-WEST

Project Name: 16004 TUCSON HOUSE — 01/22/2016
Prepared by: PH Mechanical — 02:43PM

Air System Information

Air System Name	**B-WEST**		Number of zones	**1**	
Equipment Class	**SPLT AHU**		Floor Area	**9195.0**	ft²
Air System Type	**SZCAV**		Location	**Tucson, Arizona**	

Sizing Calculation Information

Calculation Months	**Jan to Dec**		Zone CFM Sizing	**Sum of space airflow rates**
Sizing Data	**Calculated**		Space CFM Sizing	**Individual peak space loads**

Central Cooling Coil Sizing Data

Total coil load	**31.7**	Tons	Load occurs at	**Aug 1500**	
Total coil load	**380.1**	MBH	OA DB / WB	**110.0 / 67.0**	°F
Sensible coil load	**374.0**	MBH	Entering DB / WB	**80.1 / 63.2**	°F
Coil CFM at Aug 1500	**15933**	CFM	Leaving DB / WB	**56.2 / 54.6**	°F
Max block CFM	**15933**	CFM	Coil ADP	**53.6**	°F
Sum of peak zone CFM	**15933**	CFM	Bypass Factor	**0.100**	
Sensible heat ratio	**0.984**		Resulting RH	**53**	%
ft²/Ton	**290.3**		Design supply temp.	**55.0**	°F
BTU/(hr-ft²)	**41.3**		Zone T-stat Check	**1 of 1**	OK
Water flow @ 10.0 °F rise	**N/A**		Max zone temperature deviation	**0.0**	°F

Central Heating Coil Sizing Data

Max coil load	**184.9**	MBH	Load occurs at	**Des Htg**	
Coil CFM at Des Htg	**15933**	CFM	BTU/(hr-ft²)	**20.1**	
Max coil CFM	**15933**	CFM	Ent. DB / Lvg DB	**63.2 / 75.0**	°F
Water flow @ 20.0 °F drop	**N/A**				

Supply Fan Sizing Data

Actual max CFM	**15933**	CFM	Fan motor BHP	**2.18**	BHP
Standard CFM	**14515**	CFM	Fan motor kW	**1.73**	kW
Actual max CFM/ft²	**1.73**	CFM/ft²	Fan static	**0.50**	in wg

Outdoor Ventilation Air Data

Design airflow CFM	**2974**	CFM	CFM/person	**10.12**	CFM/person
CFM/ft²	**0.32**	CFM/ft²			

DRAFT

Zone Sizing Summary for B-WEST

Project Name: 16004 TUCSON HOUSE — 01/22/2016
Prepared by: PH Mechanical — 02:43PM

Air System Information

Air System Name ..... **B-WEST**
Equipment Class ..... **SPLT AHU**
Air System Type ..... **SZCAV**

Number of zones **1**
Floor Area ..... **9195.0** ft²
Location ..... **Tucson, Arizona**

Sizing Calculation Information

Calculation Months ..... **Jan to Dec**
Sizing Data ..... **Calculated**

Zone CFM Sizing ..... **Sum of space airflow rates**
Space CFM Sizing ..... **Individual peak space loads**

Zone Sizing Data

Zone Name	Maximum Cooling Sensible (MBH)	Design Airflow (CFM)	Minimum Airflow (CFM)	Time of Peak Load	Maximum Heating Load (MBH)	Zone Floor Area (ft²)	Zone CFM/ft²
Zone 1	250.2	14340	14340	Nov 1400	67.8	9195.0	1.56

Zone Terminal Sizing Data

No Zone Terminal Sizing Data required for this system.

Space Loads and Airflows

Zone Name / Space Name	Mult.	Cooling Sensible (MBH)	Time of Load	Air Flow (CFM)	Heating Load (MBH)	Floor Area (ft²)	Space CFM/ft²
Zone 1							
0-W-B103 CUBBY	1	6.1	Jul 1600	326	1.8	487.0	0.67
0-W-B105 MEN	1	0.5	Jan 1600	27	0.0	94.0	0.29
0-W-B107 TENANT	1	1.9	Jul 1600	101	0.6	185.0	0.55
0-W-B108 WOMEN	1	0.6	Jan 1600	31	0.0	115.0	0.27
0-W-B110 COMPUTER	1	7.4	Jul 1600	396	0.9	236.0	1.68
0-W-B1101A COORIDOR	1	11.0	Nov 1400	588	1.8	1294.0	0.45
0-W-B111 LIBRARY	1	8.0	Jul 1600	428	1.6	863.0	0.50
0-W-B112 KITCHEN	1	10.3	Jun 1800	549	3.9	205.0	2.68
0-W-B113 STG	1	0.1	Jan 1600	6	0.0	34.0	0.17
0-W-B114 STG	1	0.3	Jan 1600	17	0.0	98.0	0.17
0-W-B115 MULTI	1	88.5	Nov 1500	4732	14.7	1730.0	2.74
0-W-B116 STORE	1	13.0	Jun 1600	695	7.0	443.0	1.57
0-W-B117 STG	1	4.1	Jun 1700	218	3.0	138.0	1.58
0-W-B118 COORIDOR	1	0.3	Jan 1600	18	0.0	105.0	0.17
0-W-B120 COORIDOR	1	0.6	Jan 1600	34	0.0	197.0	0.17
0-W-B120 COORIDOR2	1	1.4	Jun 1600	77	0.9	80.0	0.96
0-W-B145 ARTS	1	26.9	Nov 1400	1439	6.9	411.0	3.50
0-W-B146 TENANT	1	40.5	Nov 1400	2166	9.1	652.0	3.32
0-W-B206 BED 1	1	4.4	Jun 1600	234	2.0	240.0	0.97
0-W-B206 BED 2	1	3.4	Jun 1600	181	1.7	140.0	1.29
0-W-B206 LIV	1	11.3	Oct 1500	607	4.9	547.0	1.11
0-W-B206 RR	1	0.3	Jan 1600	17	0.0	37.0	0.47
0-W-B206 RR2	1	0.3	Jan 1600	17	0.0	37.0	0.47
0-W-B207 BED	1	7.9	Nov 1400	424	2.0	181.0	2.34
0-W-B207 LIV	1	10.9	Nov 1400	582	2.9	444.0	1.31
0-W-B208 BED	1	8.0	Nov 1400	430	2.0	202.0	2.13

DRAFT

Air System Design Load Summary for B-WEST

Project Name: 16004 TUCSON HOUSE 01/22/2016
Prepared by: PH Mechanical 02:43PM

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Aug 1500 COOLING OA DB / WB 110.0 °F / 67.0 °F			HEATING DATA AT DES HTG HEATING OA DB / WB 31.0 °F / 25.9 °F		
ZONE LOADS	**Details**	**Sensible (BTU/hr)**	**Latent (BTU/hr)**	**Details**	**Sensible (BTU/hr)**	**Latent (BTU/hr)**
Window & Skylight Solar Loads	1431 ft²	40630	-	1431 ft²	-	-
Wall Transmission	2549 ft²	5055	-	2549 ft²	4596	-
Roof Transmission	205 ft²	287	-	205 ft²	197	-
Window Transmission	1431 ft²	27909	-	1431 ft²	35416	-
Skylight Transmission	0 ft²	0	-	0 ft²	0	-
Door Loads	251 ft²	13474	-	251 ft²	6639	-
Floor Transmission	6178 ft²	0	-	6178 ft²	5306	-
Partitions	0 ft²	0	-	0 ft²	0	-
Ceiling	0 ft²	0	-	0 ft²	0	-
Overhead Lighting	13981 W	38342	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	3742 W	11723	-	0	0	-
People	292	52120	59840	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	15% / 15%	28431	8976	30%	15646	0
>> Total Zone Loads	**-**	**217970**	**68815**	**-**	**67801**	**0**
Zone Conditioning	-	238704	68815	-	68132	0
Plenum Wall Load	0%	0	-	0	0	-
Plenum Roof Load	0%	0	-	0	0	-
Plenum Lighting Load	0%	0	-	0	0	-
Return Fan Load	15933 CFM	0	-	15933 CFM	0	-
Ventilation Load	2974 CFM	107586	-62697	2974 CFM	115881	0
Supply Fan Load	15933 CFM	5906	-	15933 CFM	-5906	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	10%	21797	-	10%	6780	-
>> Total System Loads	**-**	**373993**	**6118**	**-**	**184888**	**0**
Central Cooling Coil	-	373993	6130	-	0	0
Central Heating Coil	-	0	-	-	184887	-
>> Total Conditioning	**-**	**373993**	**6130**	**-**	**184887**	**0**
Key:	**Positive values are clg loads Negative values are htg loads**			**Positive values are htg loads Negative values are clg loads**		

DRAFT

August DESIGN COOLING DAY, 1500

TABLE 1: SYSTEM DATA

Component	Location	Dry-Bulb Temp (°F)	Specific Humidity (lb/lb)	Airflow (CFM)	CO2 Level (ppm)	Sensible Heat (BTU/hr)	Latent Heat (BTU/hr)
Ventilation Air	Inlet	110.0	0.00572	2974	400	107586	-62697
Vent - Return Mixing	Outlet	80.1	0.00968	15933	1320	-	-
Central Cooling Coil	Outlet	56.2	0.00960	15933	1320	373993	6130
Central Heating Coil	Outlet	56.2	0.00960	15933	1320	0	-
Supply Fan	Outlet	56.6	0.00960	15933	1320	5906	-
Cold Supply Duct	Outlet	58.2	0.00960	14340	1320	-	-
Zone Air	-	75.1	0.01070	14340	1555	238704	68815
Return Plenum	Outlet	75.1	0.01070	14340	1555	0	-
Duct Leakage Air	Outlet	56.6	0.00960	1593	1320	-	-
Return Duct	Outlet	73.2	0.01059	15933	1531	-	-

Air Density x Heat Capacity x Conversion Factor: At sea level = 1.080; At site altitude = 0.984 BTU/(hr-CFM-F)
Air Density x Heat of Vaporization x Conversion Factor: At sea level = 4746.6; At site altitude = 4324.3 BTU/(hr-CFM)
Site Altitude = 2556.0 ft

TABLE 2: ZONE DATA

Zone Name	Zone Sensible Load (BTU/hr)	T-stat Mode	Zone Cond (BTU/hr)	Zone Temp (°F)	Zone Airflow (CFM)	CO2 Level (ppm)	Terminal Heating Coil (BTU/hr)	Zone Heating Unit (BTU/hr)
Zone 1	217970	Cooling	238704	75.1	14340	1555	0	0

DRAFT

WINTER DESIGN HEATING

TABLE 1: SYSTEM DATA

Component	Location	Dry-Bulb Temp (°F)	Specific Humidity (lb/lb)	Airflow (CFM)	CO2 Level (ppm)	Sensible Heat (BTU/hr)	Latent Heat (BTU/hr)
Ventilation Air	Inlet	31.0	0.00198	2974	400	-115881	0
Vent - Return Mixing	Outlet	63.2	0.00198	15933	441	-	-
Central Cooling Coil	Outlet	63.2	0.00198	15933	441	0	0
Central Heating Coil	Outlet	75.0	0.00198	15933	441	184887	-
Supply Fan	Outlet	75.4	0.00198	15933	441	5906	-
Cold Supply Duct	Outlet	74.9	0.00198	14340	441	-	-
Zone Air	-	70.1	0.00198	14340	451	-68132	0
Return Plenum	Outlet	70.1	0.00198	14340	451	0	-
Duct Leakage Air	Outlet	75.4	0.00198	1593	441	-	-
Return Duct	Outlet	70.6	0.00198	15933	451	-	-

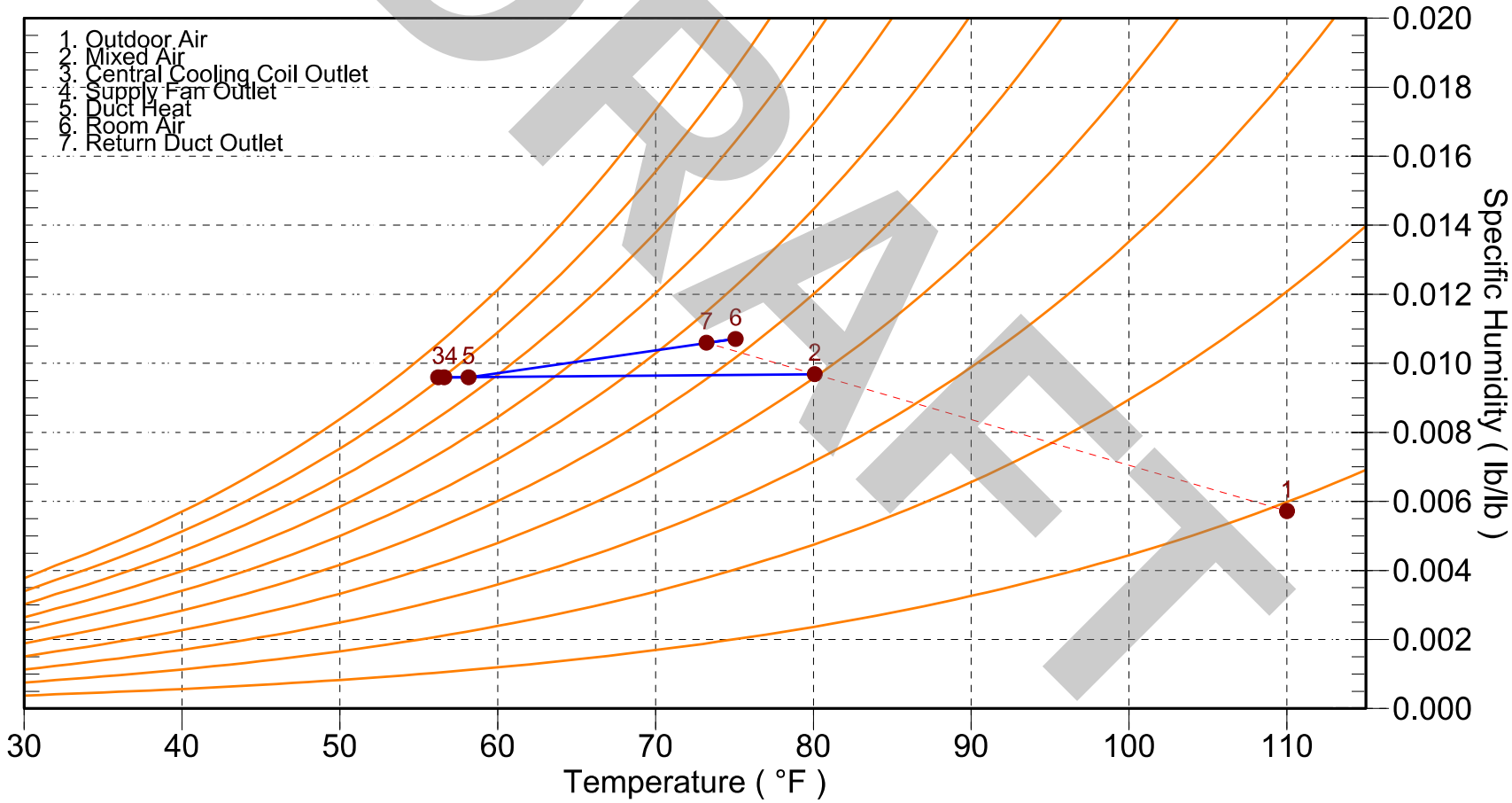
Air Density x Heat Capacity x Conversion Factor: At sea level = 1.080; At site altitude = 0.984 BTU/(hr-CFM-F)
Air Density x Heat of Vaporization x Conversion Factor: At sea level = 4746.6; At site altitude = 4324.3 BTU/(hr-CFM)
Site Altitude = 2556.0 ft

TABLE 2: ZONE DATA

Zone Name	Zone Sensible Load (BTU/hr)	T-stat Mode	Zone Cond (BTU/hr)	Zone Temp (°F)	Zone Airflow (CFM)	CO2 Level (ppm)	Terminal Heating Coil (BTU/hr)	Zone Heating Unit (BTU/hr)
Zone 1	-67801	Deadband	-68132	70.1	14340	451	0	0

DRAFT

Location: Tucson, Arizona
Altitude: 2556.0 ft.
Data for: August DESIGN COOLING DAY, 1500



DRAFT

Air System Sizing Summary for 01ST FLOOR-EAST

Project Name: 16004 TUCSON HOUSE 01/22/2016
Prepared by: PH Mechanical 02:41PM

Air System Information

Air System Name	**01ST FLOOR-EAST**		Number of zones	**1**	
Equipment Class	**SPLT AHU**		Floor Area	**10532.0**	ft²
Air System Type	**SZCAV**		Location	**Tucson, Arizona**	

Sizing Calculation Information

Calculation Months	**Jan to Dec**		Zone CFM Sizing	**Sum of space airflow rates**	
Sizing Data	**Calculated**		Space CFM Sizing	**Individual peak space loads**	

Central Cooling Coil Sizing Data

Total coil load	**21.8**	Tons	Load occurs at	**Sep 1500**	
Total coil load	**261.1**	MBH	OA DB / WB	**106.2 / 65.0**	°F
Sensible coil load	**261.1**	MBH	Entering DB / WB	**76.1 / 57.0**	°F
Coil CFM at Sep 1500	**12619**	CFM	Leaving DB / WB	**55.1 / 48.6**	°F
Max block CFM	**12619**	CFM	Coil ADP	**52.7**	°F
Sum of peak zone CFM	**12619**	CFM	Bypass Factor	**0.100**	
Sensible heat ratio	**1.000**		Resulting RH	**33**	%
ft²/Ton	**484.1**		Design supply temp.	**55.0**	°F
BTU/(hr-ft²)	**24.8**		Zone T-stat Check	**1 of 1**	OK
Water flow @ 10.0 °F rise	**N/A**		Max zone temperature deviation	**0.0**	°F

Central Heating Coil Sizing Data

Max coil load	**106.3**	MBH	Load occurs at	**Des Htg**	
Coil CFM at Des Htg	**12619**	CFM	BTU/(hr-ft²)	**10.1**	
Max coil CFM	**12619**	CFM	Ent. DB / Lvg DB	**66.8 / 75.3**	°F
Water flow @ 20.0 °F drop	**N/A**				

Supply Fan Sizing Data

Actual max CFM	**12619**	CFM	Fan motor BHP	**1.73**	BHP
Standard CFM	**11496**	CFM	Fan motor kW	**1.37**	kW
Actual max CFM/ft²	**1.20**	CFM/ft²	Fan static	**0.50**	in wg

Outdoor Ventilation Air Data

Design airflow CFM	**1086**	CFM	CFM/person	**16.80**	CFM/person
CFM/ft²	**0.10**	CFM/ft²			

DRAFT

Zone Sizing Summary for 01ST FLOOR-EAST

Project Name: 16004 TUCSON HOUSE 01/22/2016
Prepared by: PH Mechanical 02:41PM

Air System Information

Air System Name ..... **01ST FLOOR-EAST**
Equipment Class ..... **SPLT AHU**
Air System Type ..... **SZCAV**

Number of zones **1**
Floor Area ..... **10532.0** ft²
Location ..... **Tucson, Arizona**

Sizing Calculation Information

Calculation Months ..... **Jan to Dec**
Sizing Data ..... **Calculated**

Zone CFM Sizing ..... **Sum of space airflow rates**
Space CFM Sizing ..... **Individual peak space loads**

Zone Sizing Data

Zone Name	Maximum Cooling Sensible (MBH)	Design Airflow (CFM)	Minimum Airflow (CFM)	Time of Peak Load	Maximum Heating Load (MBH)	Zone Floor Area (ft²)	Zone CFM/ft²
Zone 1	187.6	11357	11357	Oct 1400	67.9	10532.0	1.08

Zone Terminal Sizing Data

No Zone Terminal Sizing Data required for this system.

Space Loads and Airflows

Zone Name / Space Name	Mult.	Cooling Sensible (MBH)	Time of Load	Air Flow (CFM)	Heating Load (MBH)	Floor Area (ft²)	Space CFM/ft²
Zone 1							
1 ELEVATOR	1	2.4	Jan 1600	129	0.0	756.0	0.17
1-E COORIDOR	1	3.5	Jan 1600	189	0.7	1101.0	0.17
1-E-111 BED 1	1	4.3	Jun 1600	230	2.0	220.0	1.05
1-E-111 BED 2	1	3.8	Jun 1600	201	2.0	131.0	1.53
1-E-111 BED/LIV	1	10.5	Nov 1400	561	2.6	400.0	1.40
1-E-114 BED	1	7.5	Nov 1400	399	1.9	189.0	2.11
1-E-114 LIV	1	10.8	Nov 1400	577	3.0	419.0	1.38
1-E-114 RR	1	0.4	Jan 1600	20	0.0	50.0	0.39
1-E-115 BED	1	7.8	Nov 1400	420	2.0	168.0	2.50
1-E-115 LIV	1	10.7	Nov 1400	571	2.6	446.0	1.28
1-E-115 RR	1	0.4	Jan 1600	21	0.0	58.0	0.36
1-E-116 BED/LIV	1	10.6	Nov 1400	565	2.6	410.0	1.38
1-E-116 RR	1	0.4	Jan 1600	22	0.0	63.0	0.35
1-E-117 BED/LIV	1	10.5	Nov 1400	563	2.6	410.0	1.37
1-E-117 RR	1	0.4	Jan 1600	21	0.0	58.0	0.36
1-E-118 BED/LIV	1	10.6	Nov 1400	565	2.6	410.0	1.38
1-E-118 RR	1	0.4	Jan 1600	20	0.0	54.0	0.38
1-E-119 BED	1	7.4	Nov 1400	395	1.9	177.0	2.23
1-E-119 LIV	1	10.7	Nov 1400	570	2.6	443.0	1.29
1-E-119 RR	1	0.4	Jan 1600	19	0.0	47.0	0.41
1-E-120 BED	1	7.6	Nov 1400	407	1.9	176.0	2.31
1-E-120 LIV	1	16.0	Nov 1400	854	4.2	438.0	1.95
1-E-120 RR	1	0.3	Jan 1600	19	0.0	43.0	0.43
1-E-121 BED 1	1	4.1	Jun 1600	220	2.0	192.0	1.14
1-E-121 BED 2	1	3.4	Jun 1600	179	1.7	136.0	1.32
1-E-121 LIV	1	13.3	Sep 1400	713	6.3	613.0	1.16
1-E-121 RR	1	0.3	Jan 1600	17	0.0	36.0	0.48
1-E-121 RR2	1	0.4	Jan 1600	21	0.0	59.0	0.36
1-E-122 BED 1	1	4.3	Jun 1600	230	2.0	220.0	1.05
1-E-122 BED 2	1	3.8	Jun 1600	201	2.0	131.0	1.53
1-E-122 LIV	1	8.5	Jun 1600	455	3.8	481.0	0.95
1-E-122 RR 1	1	0.3	Jan 1600	17	0.0	36.0	0.48
1-E-122 RR 2	1	0.4	Jan 1600	21	0.0	56.0	0.37
1-E-123 BED 1	1	4.7	Jun 1600	253	2.0	305.0	0.83

DRAFT

Zone Sizing Summary for 01ST FLOOR-EAST

Project Name: 16004 TUCSON HOUSE 01/22/2016
Prepared by: PH Mechanical 02:41PM

Zone Name / Space Name	Mult.	Cooling Sensible (MBH)	Time of Load	Air Flow (CFM)	Heating Load (MBH)	Floor Area (ft²)	Space CFM/ft²
1-E-123 BED 2	1	3.7	Jun 1600	198	2.0	131.0	1.51
1-E-123 LIV	1	8.1	Jun 1600	434	3.9	411.0	1.06
1-E-123 RR 1	1	0.4	Jan 1600	20	0.0	52.0	0.39
1-E-123 RR 2	1	0.4	Jan 1600	22	0.0	61.0	0.35
1-E-124 DAYROOM	1	19.0	Jun 1600	1014	6.8	945.0	1.07

DRAFT

Air System Design Load Summary for 01ST FLOOR-EAST

Project Name: 16004 TUCSON HOUSE 01/22/2016
Prepared by: PH Mechanical 02:41PM

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Sep 1500 COOLING OA DB / WB 106.2 °F / 65.0 °F			HEATING DATA AT DES HTG HEATING OA DB / WB 31.0 °F / 25.9 °F		
ZONE LOADS	**Details**	**Sensible (BTU/hr)**	**Latent (BTU/hr)**	**Details**	**Sensible (BTU/hr)**	**Latent (BTU/hr)**
Window & Skylight Solar Loads	1396 ft²	36154	-	1396 ft²	-	-
Wall Transmission	2671 ft²	5815	-	2671 ft²	4816	-
Roof Transmission	0 ft²	0	-	0 ft²	0	-
Window Transmission	1396 ft²	23884	-	1396 ft²	34584	-
Skylight Transmission	0 ft²	0	-	0 ft²	0	-
Door Loads	396 ft²	35864	-	396 ft²	12312	-
Floor Transmission	256 ft²	0	-	256 ft²	501	-
Partitions	0 ft²	0	-	0 ft²	0	-
Ceiling	0 ft²	0	-	0 ft²	0	-
Overhead Lighting	10532 W	28858	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	6002 W	18678	-	0	0	-
People	32	9019	6601	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	15% / 15%	23741	990	30%	15664	0
>> Total Zone Loads	**-**	**182014**	**7591**	**-**	**67877**	**0**
Zone Conditioning	-	203009	7591	-	62372	0
Plenum Wall Load	0%	0	-	0	0	-
Plenum Roof Load	0%	0	-	0	0	-
Plenum Lighting Load	0%	0	-	0	0	-
Return Fan Load	12619 CFM	0	-	12619 CFM	0	-
Ventilation Load	1086 CFM	35202	-7273	1086 CFM	41812	0
Supply Fan Load	12619 CFM	4677	-	12619 CFM	-4677	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	10%	18201	-	10%	6788	-
>> Total System Loads	**-**	**261090**	**318**	**-**	**106295**	**0**
Central Cooling Coil	-	261090	0	-	0	0
Central Heating Coil	-	0	-	-	106294	-
>> Total Conditioning	**-**	**261090**	**0**	**-**	**106294**	**0**
Key:	**Positive values are clg loads Negative values are htg loads**			**Positive values are htg loads Negative values are clg loads**		

DRAFT

September DESIGN COOLING DAY, 1500

TABLE 1: SYSTEM DATA

Component	Location	Dry-Bulb Temp (°F)	Specific Humidity (lb/lb)	Airflow (CFM)	CO2 Level (ppm)	Sensible Heat (BTU/hr)	Latent Heat (BTU/hr)
Ventilation Air	Inlet	106.2	0.00508	1086	400	35202	-7273
Vent - Return Mixing	Outlet	76.1	0.00650	12619	794	-	-
Central Cooling Coil	Outlet	55.1	0.00650	12619	794	261090	0
Central Heating Coil	Outlet	55.1	0.00650	12619	794	0	-
Supply Fan	Outlet	55.4	0.00650	12619	794	4677	-
Cold Supply Duct	Outlet	57.1	0.00650	11357	794	-	-
Zone Air	-	75.2	0.00665	11357	834	203009	7591
Return Plenum	Outlet	75.2	0.00665	11357	834	0	-
Duct Leakage Air	Outlet	55.4	0.00649	1262	794	-	-
Return Duct	Outlet	73.2	0.00663	12619	831	-	-

Air Density x Heat Capacity x Conversion Factor: At sea level = 1.080; At site altitude = 0.984 BTU/(hr-CFM-F)
Air Density x Heat of Vaporization x Conversion Factor: At sea level = 4746.6; At site altitude = 4324.3 BTU/(hr-CFM)
Site Altitude = 2556.0 ft

TABLE 2: ZONE DATA

Zone Name	Zone Sensible Load (BTU/hr)	T-stat Mode	Zone Cond (BTU/hr)	Zone Temp (°F)	Zone Airflow (CFM)	CO2 Level (ppm)	Terminal Heating Coil (BTU/hr)	Zone Heating Unit (BTU/hr)
Zone 1	182014	Cooling	203009	75.2	11357	834	0	0

DRAFT

WINTER DESIGN HEATING

TABLE 1: SYSTEM DATA

Component	Location	Dry-Bulb Temp (°F)	Specific Humidity (lb/lb)	Airflow (CFM)	CO2 Level (ppm)	Sensible Heat (BTU/hr)	Latent Heat (BTU/hr)
Ventilation Air	Inlet	31.0	0.00198	1086	400	-41812	0
Vent - Return Mixing	Outlet	66.8	0.00198	12619	504	-	-
Central Cooling Coil	Outlet	66.8	0.00198	12619	504	0	0
Central Heating Coil	Outlet	75.3	0.00198	12619	504	106294	-
Supply Fan	Outlet	75.7	0.00198	12619	504	4677	-
Cold Supply Duct	Outlet	75.1	0.00198	11357	504	-	-
Zone Air	-	69.5	0.00198	11357	513	-62372	0
Return Plenum	Outlet	69.5	0.00198	11357	513	0	-
Duct Leakage Air	Outlet	75.7	0.00198	1262	504	-	-
Return Duct	Outlet	70.1	0.00198	12619	513	-	-

Air Density x Heat Capacity x Conversion Factor: At sea level = 1.080; At site altitude = 0.984 BTU/(hr-CFM-F)
Air Density x Heat of Vaporization x Conversion Factor: At sea level = 4746.6; At site altitude = 4324.3 BTU/(hr-CFM)
Site Altitude = 2556.0 ft

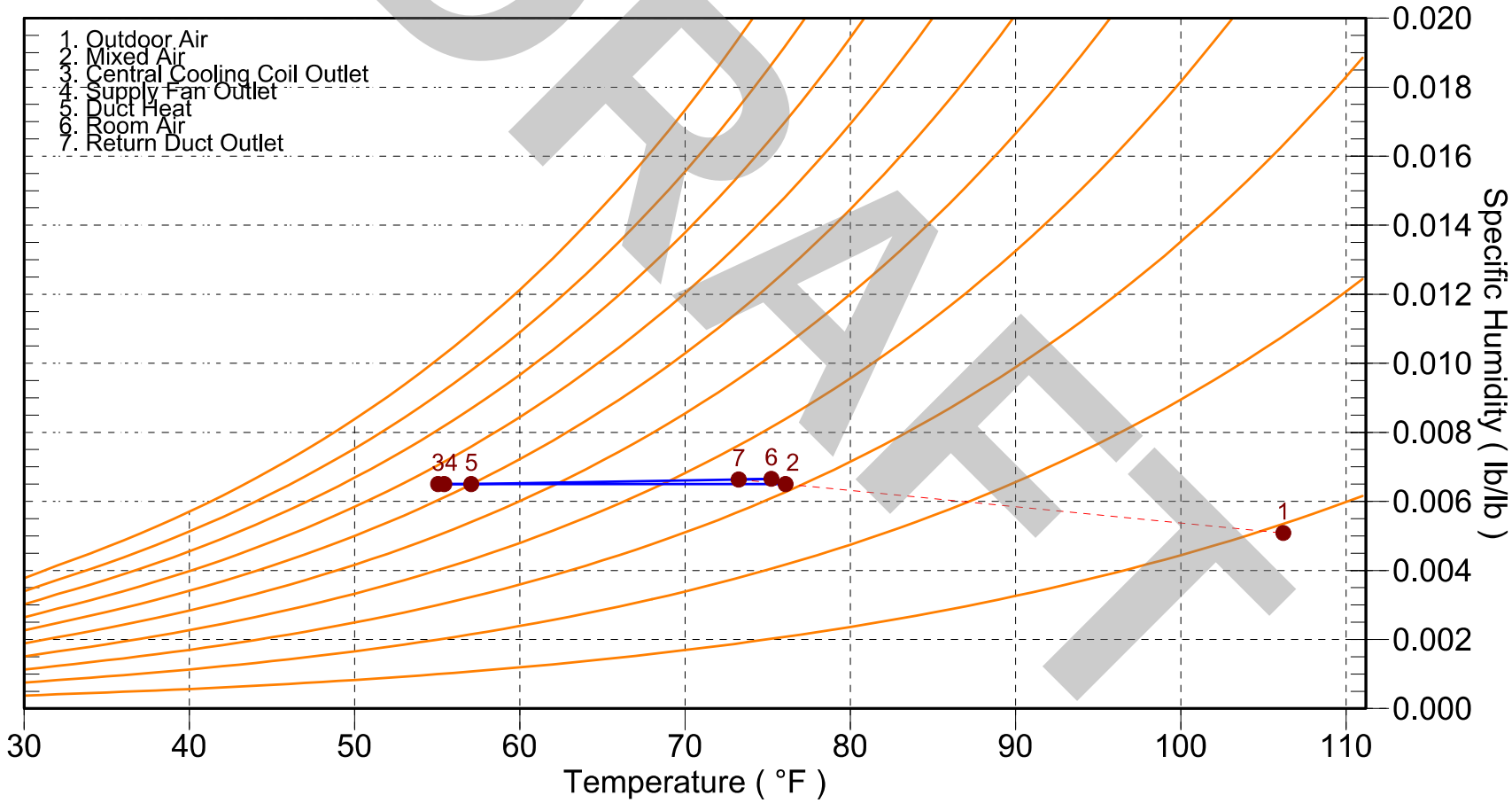
TABLE 2: ZONE DATA

Zone Name	Zone Sensible Load (BTU/hr)	T-stat Mode	Zone Cond (BTU/hr)	Zone Temp (°F)	Zone Airflow (CFM)	CO2 Level (ppm)	Terminal Heating Coil (BTU/hr)	Zone Heating Unit (BTU/hr)
Zone 1	-67877	Heating	-62372	69.5	11357	513	0	0

DRAFT

Psychrometric Analysis for 01ST FLOOR-EAST

Location: Tucson, Arizona
Altitude: 2556.0 ft.
Data for: September DESIGN COOLING DAY, 1500



DRAFT

Air System Sizing Summary for 01ST FLOOR-WEST

Project Name: 16004 TUCSON HOUSE 01/22/2016
Prepared by: PH Mechanical 02:42PM

Air System Information

Air System Name	**01ST FLOOR-WEST**		Number of zones	**1**	
Equipment Class	**SPLT AHU**		Floor Area	**9252.0**	ft²
Air System Type	**SZCAV**		Location	**Tucson, Arizona**	

Sizing Calculation Information

Calculation Months	**Jan to Dec**		Zone CFM Sizing	**Sum of space airflow rates**	
Sizing Data	**Calculated**		Space CFM Sizing	**Individual peak space loads**	

Central Cooling Coil Sizing Data

Total coil load	**19.1**	Tons	Load occurs at	**Sep 1400**	
Total coil load	**229.2**	MBH	OA DB / WB	**105.3 / 64.7**	°F
Sensible coil load	**229.2**	MBH	Entering DB / WB	**77.4 / 58.3**	°F
Coil CFM at Sep 1400	**10283**	CFM	Leaving DB / WB	**54.8 / 49.5**	°F
Max block CFM	**10283**	CFM	Coil ADP	**52.3**	°F
Sum of peak zone CFM	**10283**	CFM	Bypass Factor	**0.100**	
Sensible heat ratio	**1.000**		Resulting RH	**36**	%
ft²/Ton	**484.4**		Design supply temp.	**55.0**	°F
BTU/(hr-ft²)	**24.8**		Zone T-stat Check	**1 of 1**	OK
Water flow @ 10.0 °F rise	**N/A**		Max zone temperature deviation	**0.0**	°F

Central Heating Coil Sizing Data

Max coil load	**101.4**	MBH	Load occurs at	**Des Htg**	
Coil CFM at Des Htg	**10283**	CFM	BTU/(hr-ft²)	**11.0**	
Max coil CFM	**10283**	CFM	Ent. DB / Lvg DB	**65.1 / 75.2**	°F
Water flow @ 20.0 °F drop	**N/A**				

Supply Fan Sizing Data

Actual max CFM	**10283**	CFM	Fan motor BHP	**1.41**	BHP
Standard CFM	**9368**	CFM	Fan motor kW	**1.12**	kW
Actual max CFM/ft²	**1.11**	CFM/ft²	Fan static	**0.50**	in wg

Outdoor Ventilation Air Data

Design airflow CFM	**1320**	CFM	CFM/person	**18.99**	CFM/person
CFM/ft²	**0.14**	CFM/ft²			

DRAFT

Zone Sizing Summary for 01ST FLOOR-WEST

Project Name: 16004 TUCSON HOUSE 01/22/2016
Prepared by: PH Mechanical 02:42PM

Air System Information

Air System Name ..... **01ST FLOOR-WEST**
Equipment Class ..... **SPLT AHU**
Air System Type ..... **SZCAV**

Number of zones **1**
Floor Area ..... **9252.0** ft²
Location ..... **Tucson, Arizona**

Sizing Calculation Information

Calculation Months ..... **Jan to Dec**
Sizing Data ..... **Calculated**

Zone CFM Sizing ..... **Sum of space airflow rates**
Space CFM Sizing ..... **Individual peak space loads**

Zone Sizing Data

Zone Name	Maximum Cooling Sensible (MBH)	Design Airflow (CFM)	Minimum Airflow (CFM)	Time of Peak Load	Maximum Heating Load (MBH)	Zone Floor Area (ft²)	Zone CFM/ft²
Zone 1	151.5	9255	9255	Oct 1400	53.4	9252.0	1.00

Zone Terminal Sizing Data

No Zone Terminal Sizing Data required for this system.

Space Loads and Airflows

Zone Name / Space Name	Mult.	Cooling Sensible (MBH)	Time of Load	Air Flow (CFM)	Heating Load (MBH)	Floor Area (ft²)	Space CFM/ft²
Zone 1							
1-W COORIDOR	1	3.8	Jan 1600	205	0.0	1198.0	0.17
1-W MISC	1	9.1	Nov 1400	488	2.6	380.0	1.28
1-W-100 LOBBY	1	11.8	Jul 1600	632	2.9	614.0	1.03
1-W-101 RECEPTIONIST	1	1.2	Jan 1600	64	0.0	193.0	0.33
1-W-102 DAYROOM	1	17.6	Jul 1600	940	5.9	954.0	0.99
1-W-103 RR	1	0.4	Jan 1600	22	0.0	63.0	0.35
1-W-103B COUNSELING	1	0.8	Jan 1600	41	0.0	69.0	0.60
1-W-103C WAITING	1	10.4	Jun 1600	558	4.8	259.0	2.15
1-W-103D MEDICAL CLINIC	1	4.6	Jul 1600	244	2.0	156.0	1.56
1-W-104 BED	1	3.7	Jun 1600	199	1.9	161.0	1.24
1-W-104 LIV	1	7.1	Jun 1600	379	2.6	579.0	0.65
1-W-104 RR	1	0.4	Jan 1600	21	0.0	55.0	0.37
1-W-105 BED 1	1	3.7	Jun 1600	199	1.9	161.0	1.24
1-W-105 LIV	1	7.1	Jun 1600	379	2.6	579.0	0.65
1-W-105 RR	1	0.4	Jan 1600	21	0.0	55.0	0.37
1-W-106 BED 1	1	4.0	Jun 1600	213	2.0	175.0	1.22
1-W-106 BED 2	1	3.3	Jun 1600	178	1.7	131.0	1.36
1-W-106 LIV	1	11.5	Oct 1500	617	4.9	579.0	1.07
1-W-106 RR 1	1	0.3	Jan 1600	17	0.0	37.0	0.47
1-W-106 RR 2	1	0.4	Jan 1600	24	0.0	75.0	0.32
1-W-107 BED	1	7.9	Nov 1400	423	2.0	178.0	2.37
1-W-107 LIV	1	10.9	Nov 1400	582	3.0	437.0	1.33
1-W-107 RR	1	0.3	Jan 1600	19	0.0	44.0	0.42
1-W-108 BED	1	8.0	Nov 1400	428	2.0	194.0	2.20
1-W-108 LIV	1	10.4	Nov 1400	558	2.6	407.0	1.37
1-W-108 RR	1	0.4	Jan 1600	20	0.0	53.0	0.38
1-W-109 BED/LIV	1	10.5	Nov 1400	561	2.6	400.0	1.40
1-W-109 RR	1	0.4	Jan 1600	20	0.0	54.0	0.38
1-W-110 BED/LIV	1	10.5	Nov 1400	561	2.6	400.0	1.40
1-W-110 RR	1	0.4	Jan 1600	20	0.0	54.0	0.38
1-W-111 RR	1	0.4	Jan 1600	20	0.0	54.0	0.38
1-W-112 BED/LIV	1	10.5	Nov 1400	561	2.6	400.0	1.40
1-W-112 RR	1	0.4	Jan 1600	20	0.0	54.0	0.38
1-W-126 RR	1	0.4	Jan 1600	20	0.0	50.0	0.39

DRAFT

Air System Design Load Summary for 01ST FLOOR-WEST

Project Name: 16004 TUCSON HOUSE 01/22/2016
Prepared by: PH Mechanical 02:42PM

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Sep 1400 COOLING OA DB / WB 105.3 °F / 64.7 °F			HEATING DATA AT DES HTG HEATING OA DB / WB 31.0 °F / 25.9 °F		
ZONE LOADS	**Details**	**Sensible (BTU/hr)**	**Latent (BTU/hr)**	**Details**	**Sensible (BTU/hr)**	**Latent (BTU/hr)**
Window & Skylight Solar Loads	732 ft²	17948	-	732 ft²	-	-
Wall Transmission	2989 ft²	5608	-	2989 ft²	5389	-
Roof Transmission	0 ft²	0	-	0 ft²	0	-
Window Transmission	732 ft²	12090	-	732 ft²	18148	-
Skylight Transmission	0 ft²	0	-	0 ft²	0	-
Door Loads	583 ft²	40257	-	583 ft²	17505	-
Floor Transmission	0 ft²	0	-	0 ft²	0	-
Partitions	0 ft²	0	-	0 ft²	0	-
Ceiling	0 ft²	0	-	0 ft²	0	-
Overhead Lighting	9187 W	24737	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	5636 W	17422	-	0	0	-
People	54	12532	11111	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	15% / 15%	19589	1667	30%	12313	0
>> Total Zone Loads	**-**	**150184**	**12778**	**-**	**53354**	**0**
Zone Conditioning	-	168854	12778	-	49065	0
Plenum Wall Load	0%	0	-	0	0	-
Plenum Roof Load	0%	0	-	0	0	-
Plenum Lighting Load	0%	0	-	0	0	-
Return Fan Load	10283 CFM	0	-	10283 CFM	0	-
Ventilation Load	1320 CFM	41535	-12532	1320 CFM	50833	0
Supply Fan Load	10283 CFM	3811	-	10283 CFM	-3811	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	10%	15018	-	10%	5335	-
>> Total System Loads	**-**	**229219**	**246**	**-**	**101421**	**0**
Central Cooling Coil	-	229219	0	-	0	0
Central Heating Coil	-	0	-	-	101421	-
>> Total Conditioning	**-**	**229219**	**0**	**-**	**101421**	**0**
Key:	**Positive values are clg loads Negative values are htg loads**			**Positive values are htg loads Negative values are clg loads**		

DRAFT

September DESIGN COOLING DAY, 1400

TABLE 1: SYSTEM DATA

Component	Location	Dry-Bulb Temp (°F)	Specific Humidity (lb/lb)	Airflow (CFM)	CO2 Level (ppm)	Sensible Heat (BTU/hr)	Latent Heat (BTU/hr)
Ventilation Air	Inlet	105.3	0.00508	1320	400	41535	-12532
Vent - Return Mixing	Outlet	77.4	0.00700	10283	804	-	-
Central Cooling Coil	Outlet	54.8	0.00700	10283	804	229219	0
Central Heating Coil	Outlet	54.8	0.00700	10283	804	0	-
Supply Fan	Outlet	55.2	0.00700	10283	804	3811	-
Cold Supply Duct	Outlet	56.8	0.00700	9255	804	-	-
Zone Air	-	75.3	0.00732	9255	870	168854	12778
Return Plenum	Outlet	75.3	0.00732	9255	870	0	-
Duct Leakage Air	Outlet	55.2	0.00699	1028	804	-	-
Return Duct	Outlet	73.3	0.00728	10283	863	-	-

Air Density x Heat Capacity x Conversion Factor: At sea level = 1.080; At site altitude = 0.984 BTU/(hr-CFM-F)
Air Density x Heat of Vaporization x Conversion Factor: At sea level = 4746.6; At site altitude = 4324.3 BTU/(hr-CFM)
Site Altitude = 2556.0 ft

TABLE 2: ZONE DATA

Zone Name	Zone Sensible Load (BTU/hr)	T-stat Mode	Zone Cond (BTU/hr)	Zone Temp (°F)	Zone Airflow (CFM)	CO2 Level (ppm)	Terminal Heating Coil (BTU/hr)	Zone Heating Unit (BTU/hr)
Zone 1	150184	Cooling	168854	75.3	9255	870	0	0

DRAFT

WINTER DESIGN HEATING

TABLE 1: SYSTEM DATA

Component	Location	Dry-Bulb Temp (°F)	Specific Humidity (lb/lb)	Airflow (CFM)	CO2 Level (ppm)	Sensible Heat (BTU/hr)	Latent Heat (BTU/hr)
Ventilation Air	Inlet	31.0	0.00198	1320	400	-50833	0
Vent - Return Mixing	Outlet	65.1	0.00198	10283	467	-	-
Central Cooling Coil	Outlet	65.1	0.00198	10283	467	0	0
Central Heating Coil	Outlet	75.2	0.00198	10283	467	101421	-
Supply Fan	Outlet	75.5	0.00198	10283	467	3811	-
Cold Supply Duct	Outlet	74.9	0.00198	9255	467	-	-
Zone Air	-	69.6	0.00198	9255	477	-49065	0
Return Plenum	Outlet	69.6	0.00198	9255	477	0	-
Duct Leakage Air	Outlet	75.5	0.00198	1028	467	-	-
Return Duct	Outlet	70.2	0.00198	10283	477	-	-

Air Density x Heat Capacity x Conversion Factor: At sea level = 1.080; At site altitude = 0.984 BTU/(hr-CFM-F)
Air Density x Heat of Vaporization x Conversion Factor: At sea level = 4746.6; At site altitude = 4324.3 BTU/(hr-CFM)
Site Altitude = 2556.0 ft

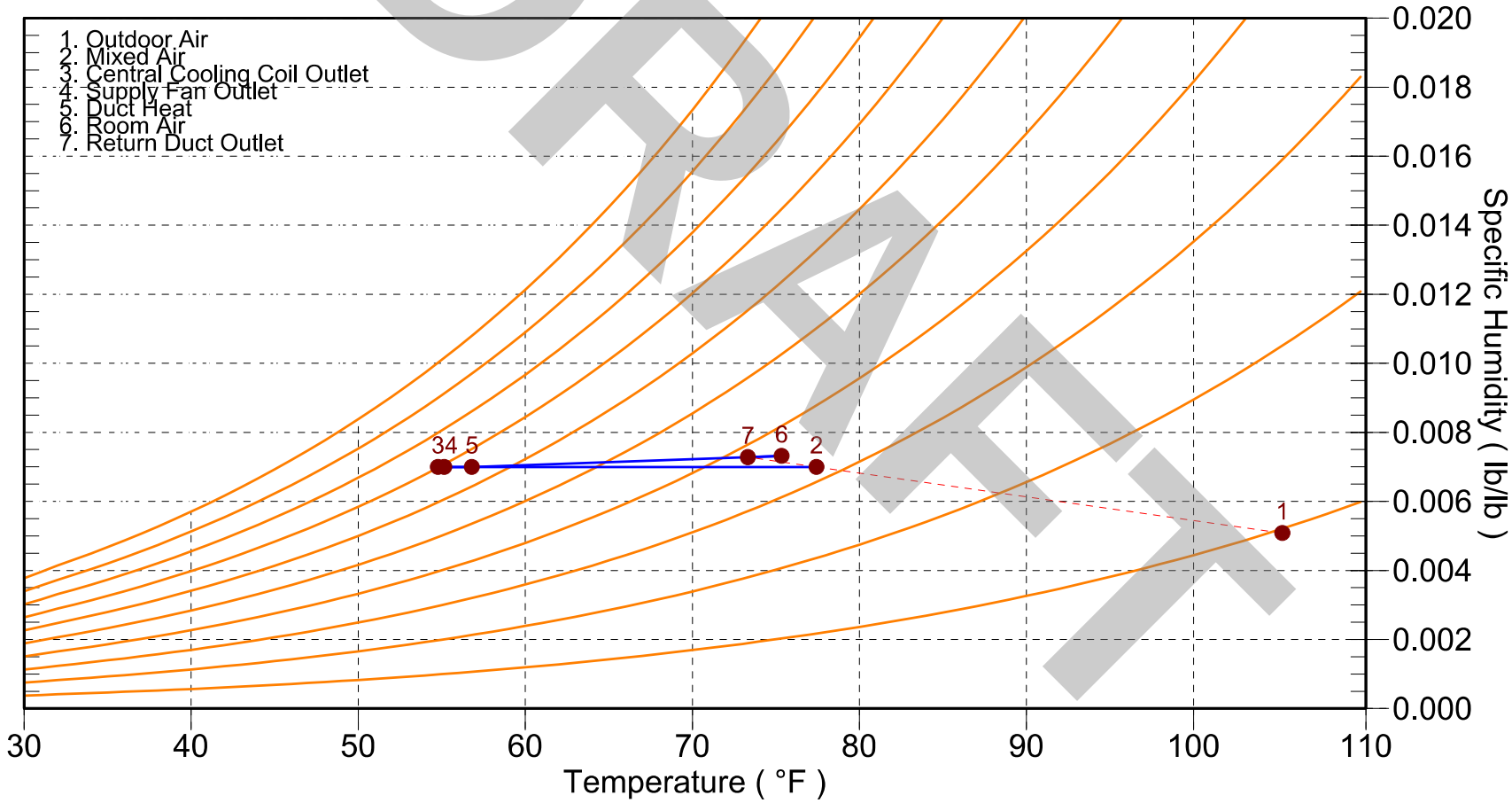
TABLE 2: ZONE DATA

Zone Name	Zone Sensible Load (BTU/hr)	T-stat Mode	Zone Cond (BTU/hr)	Zone Temp (°F)	Zone Airflow (CFM)	CO2 Level (ppm)	Terminal Heating Coil (BTU/hr)	Zone Heating Unit (BTU/hr)
Zone 1	-53354	Heating	-49065	69.6	9255	477	0	0

DRAFT

Psychrometric Analysis for 01ST FLOOR-WEST

Location: Tucson, Arizona
Altitude: 2556.0 ft.
Data for: September DESIGN COOLING DAY, 1400



DRAFT

Air System Sizing Summary for 02ND-16TH FLOOR-EAST

Project Name: 16004 TUCSON HOUSE 01/22/2016
Prepared by: PH Mechanical 02:42PM

Air System Information

Air System Name	**02ND-16TH FLOOR-EAST**		Number of zones	**1**	
Equipment Class	**SPLT AHU**		Floor Area	**9320.0**	ft²
Air System Type	**SZCAV**		Location	**Tucson, Arizona**	

Sizing Calculation Information

Calculation Months	**Jan to Dec**		Zone CFM Sizing	**Sum of space airflow rates**	
Sizing Data	**Calculated**		Space CFM Sizing	**Individual peak space loads**	

Central Cooling Coil Sizing Data

Total coil load	**18.4**	Tons	Load occurs at	**Sep 1400**	
Total coil load	**221.1**	MBH	OA DB / WB	**105.3 / 64.7**	°F
Sensible coil load	**221.1**	MBH	Entering DB / WB	**75.4 / 56.4**	°F
Coil CFM at Sep 1400	**10708**	CFM	Leaving DB / WB	**54.4 / 48.0**	°F
Max block CFM	**10708**	CFM	Coil ADP	**52.1**	°F
Sum of peak zone CFM	**10708**	CFM	Bypass Factor	**0.100**	
Sensible heat ratio	**1.000**		Resulting RH	**32**	%
ft²/Ton	**505.9**		Design supply temp.	**55.0**	°F
BTU/(hr-ft²)	**23.7**		Zone T-stat Check	**1 of 1**	OK
Water flow @ 10.0 °F rise	**N/A**		Max zone temperature deviation	**0.0**	°F

Central Heating Coil Sizing Data

Max coil load	**88.3**	MBH	Load occurs at	**Des Htg**	
Coil CFM at Des Htg	**10708**	CFM	BTU/(hr-ft²)	**9.5**	
Max coil CFM	**10708**	CFM	Ent. DB / Lvg DB	**67.7 / 76.1**	°F
Water flow @ 20.0 °F drop	**N/A**				

Supply Fan Sizing Data

Actual max CFM	**10708**	CFM	Fan motor BHP	**1.47**	BHP
Standard CFM	**9756**	CFM	Fan motor kW	**1.16**	kW
Actual max CFM/ft²	**1.15**	CFM/ft²	Fan static	**0.50**	in wg

Outdoor Ventilation Air Data

Design airflow CFM	**756**	CFM	CFM/person	**21.22**	CFM/person
CFM/ft²	**0.08**	CFM/ft²			

DRAFT

Zone Sizing Summary for 02ND-16TH FLOOR-EAST

Project Name: 16004 TUCSON HOUSE 01/22/2016
Prepared by: PH Mechanical 02:42PM

Air System Information

Air System Name ..... **02ND-16TH FLOOR-EAST**
Equipment Class ..... **SPLT AHU**
Air System Type ..... **SZCAV**

Number of zones **1**
Floor Area ..... **9320.0** ft²
Location ..... **Tucson, Arizona**

Sizing Calculation Information

Calculation Months ..... **Jan to Dec**
Sizing Data ..... **Calculated**

Zone CFM Sizing ..... **Sum of space airflow rates**
Space CFM Sizing ..... **Individual peak space loads**

Zone Sizing Data

Zone Name	Maximum Cooling Sensible (MBH)	Design Airflow (CFM)	Minimum Airflow (CFM)	Time of Peak Load	Maximum Heating Load (MBH)	Zone Floor Area (ft²)	Zone CFM/ft²
Zone 1	162.7	9638	9638	Oct 1400	56.6	9320.0	1.03

Zone Terminal Sizing Data

No Zone Terminal Sizing Data required for this system.

Space Loads and Airflows

Zone Name / Space Name	Mult.	Cooling Sensible (MBH)	Time of Load	Air Flow (CFM)	Heating Load (MBH)	Floor Area (ft²)	Space CFM/ft²
Zone 1							
2-200 ELEVATOR	1	2.0	Jul 1100	108	0.6	455.0	0.24
2-E COORIDOR	1	3.5	Jan 1600	189	0.7	1101.0	0.17
2-E-214 BED	1	7.4	Nov 1400	395	1.9	176.0	2.25
2-E-214 LIV	1	10.9	Nov 1400	583	3.0	437.0	1.33
2-E-214 RR	1	0.3	Jan 1600	17	0.0	36.0	0.48
2-E-215 BED	1	7.4	Nov 1400	396	1.9	179.0	2.21
2-E-215 LIV	1	10.9	Nov 1400	585	3.0	446.0	1.31
2-E-215 RR	1	0.4	Jan 1600	21	0.0	57.0	0.37
2-E-216 BED/LIV	1	10.7	Nov 1400	570	2.6	427.0	1.34
2-E-216 RR	1	0.3	Jan 1600	18	0.0	42.0	0.44
2-E-217 BED/LIV	1	10.5	Nov 1400	563	2.6	410.0	1.37
2-E-217 RR	1	0.3	Jan 1600	17	0.0	36.0	0.48
2-E-218 BED/LIV	1	10.6	Nov 1400	565	2.6	410.0	1.38
2-E-218 RR	1	0.3	Jan 1600	17	0.0	37.0	0.47
2-E-219 BED	1	7.4	Nov 1400	398	1.9	184.0	2.16
2-E-219 LIV	1	10.7	Nov 1400	570	2.6	443.0	1.29
2-E-220 BED	1	7.7	Nov 1400	410	1.9	184.0	2.23
2-E-220 LIV	1	16.0	Nov 1400	854	4.2	438.0	1.95
2-E-221 BED1	1	4.2	Jun 1600	225	2.0	208.0	1.08
2-E-221 BED2	1	3.5	Jun 1600	185	1.7	154.0	1.20
2-E-221 LIV	1	13.3	Sep 1400	713	6.3	613.0	1.16
2-E-221 RR	1	0.4	Jan 1600	21	0.0	59.0	0.36
2-E-221 RR2	1	0.3	Jan 1600	17	0.0	36.0	0.48
2-E-222 LIV	1	6.1	Jun 1600	327	2.6	411.0	0.80
2-E-222 RR	1	0.3	Jan 1600	17	0.0	36.0	0.48
2-E-223 LIV	1	6.1	Jun 1600	327	2.6	405.0	0.81
2-E-223 RR	1	0.3	Jan 1600	17	0.0	36.0	0.48
2-E-224 BED	1	4.0	Jun 1600	214	2.0	181.0	1.18
2-E-224 LIV	1	6.4	Jun 1600	342	2.6	459.0	0.75
2-E-224 RR	1	0.3	Jan 1600	17	0.0	37.0	0.47
2-E-225 BED	1	4.0	Jun 1600	214	2.0	180.0	1.19
2-E-225 LIV	1	6.6	Jun 1600	352	2.6	489.0	0.72
2-E-225 RR	1	0.4	Jan 1600	21	0.0	59.0	0.36
2-E-226 LIV/BED	1	6.2	Jun 1600	331	2.6	423.0	0.78

DRAFT

Zone Sizing Summary for 02ND-16TH FLOOR-EAST

Project Name: 16004 TUCSON HOUSE 01/22/2016
Prepared by: PH Mechanical 02:42PM

Zone Name / Space Name	Mult.	Cooling Sensible (MBH)	Time of Load	Air Flow (CFM)	Heating Load (MBH)	Floor Area (ft^2)	Space CFM/ft^2
2-E-226 RR	1	0.3	Jan 1600	17	0.0	36.0	0.48

DRAFT

Air System Design Load Summary for 02ND-16TH FLOOR-EAST

Project Name: 16004 TUCSON HOUSE 01/22/2016
Prepared by: PH Mechanical 02:42PM

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Sep 1400 COOLING OA DB / WB 105.3 °F / 64.7 °F			HEATING DATA AT DES HTG HEATING OA DB / WB 31.0 °F / 25.9 °F		
ZONE LOADS	**Details**	**Sensible (BTU/hr)**	**Latent (BTU/hr)**	**Details**	**Sensible (BTU/hr)**	**Latent (BTU/hr)**
Window & Skylight Solar Loads	720 ft²	28470	-	720 ft²	-	-
Wall Transmission	3229 ft²	6321	-	3229 ft²	5822	-
Roof Transmission	0 ft²	0	-	0 ft²	0	-
Window Transmission	720 ft²	11881	-	720 ft²	17834	-
Skylight Transmission	0 ft²	0	-	0 ft²	0	-
Door Loads	622 ft²	42097	-	622 ft²	19348	-
Floor Transmission	256 ft²	0	-	256 ft²	501	-
Partitions	0 ft²	0	-	0 ft²	0	-
Ceiling	0 ft²	0	-	0 ft²	0	-
Overhead Lighting	9320 W	25097	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	5443 W	16824	-	0	0	-
People	19	5474	3895	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	15% / 15%	20425	584	30%	13051	0
>> Total Zone Loads	**-**	**156589**	**4479**	**-**	**56556**	**0**
Zone Conditioning	-	177518	4479	-	57220	0
Plenum Wall Load	0%	0	-	0	0	-
Plenum Roof Load	0%	0	-	0	0	-
Plenum Lighting Load	0%	0	-	0	0	-
Return Fan Load	10708 CFM	0	-	10708 CFM	0	-
Ventilation Load	756 CFM	23924	-4246	756 CFM	29357	0
Supply Fan Load	10708 CFM	3969	-	10708 CFM	-3969	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	10%	15659	-	10%	5656	-
>> Total System Loads	**-**	**221070**	**233**	**-**	**88263**	**0**
Central Cooling Coil	-	221070	0	-	0	0
Central Heating Coil	-	0	-	-	88263	-
>> Total Conditioning	**-**	**221070**	**0**	**-**	**88263**	**0**
Key:	**Positive values are clg loads Negative values are htg loads**			**Positive values are htg loads Negative values are clg loads**		

DRAFT

September DESIGN COOLING DAY, 1400

TABLE 1: SYSTEM DATA

Component	Location	Dry-Bulb Temp (°F)	Specific Humidity (lb/lb)	Airflow (CFM)	CO2 Level (ppm)	Sensible Heat (BTU/hr)	Latent Heat (BTU/hr)
Ventilation Air	Inlet	105.3	0.00508	756	400	23924	-4246
Vent - Return Mixing	Outlet	75.4	0.00629	10708	792	-	-
Central Cooling Coil	Outlet	54.4	0.00629	10708	792	221070	0
Central Heating Coil	Outlet	54.4	0.00629	10708	792	0	-
Supply Fan	Outlet	54.8	0.00629	10708	792	3969	-
Cold Supply Duct	Outlet	56.5	0.00629	9638	792	-	-
Zone Air	-	75.2	0.00640	9638	824	177518	4479
Return Plenum	Outlet	75.2	0.00640	9638	824	0	-
Duct Leakage Air	Outlet	54.8	0.00629	1071	792	-	-
Return Duct	Outlet	73.1	0.00638	10708	821	-	-

Air Density x Heat Capacity x Conversion Factor: At sea level = 1.080; At site altitude = 0.984 BTU/(hr-CFM-F)
Air Density x Heat of Vaporization x Conversion Factor: At sea level = 4746.6; At site altitude = 4324.3 BTU/(hr-CFM)
Site Altitude = 2556.0 ft

TABLE 2: ZONE DATA

Zone Name	Zone Sensible Load (BTU/hr)	T-stat Mode	Zone Cond (BTU/hr)	Zone Temp (°F)	Zone Airflow (CFM)	CO2 Level (ppm)	Terminal Heating Coil (BTU/hr)	Zone Heating Unit (BTU/hr)
Zone 1	156590	Cooling	177518	75.2	9638	824	0	0

DRAFT

WINTER DESIGN HEATING

TABLE 1: SYSTEM DATA

Component	Location	Dry-Bulb Temp (°F)	Specific Humidity (lb/lb)	Airflow (CFM)	CO2 Level (ppm)	Sensible Heat (BTU/hr)	Latent Heat (BTU/hr)
Ventilation Air	Inlet	31.0	0.00198	756	400	-29357	0
Vent - Return Mixing	Outlet	67.7	0.00198	10708	524	-	-
Central Cooling Coil	Outlet	67.7	0.00198	10708	524	0	0
Central Heating Coil	Outlet	76.1	0.00198	10708	524	88263	-
Supply Fan	Outlet	76.5	0.00198	10708	524	3969	-
Cold Supply Duct	Outlet	75.9	0.00198	9638	524	-	-
Zone Air	-	69.8	0.00198	9638	533	-57220	0
Return Plenum	Outlet	69.8	0.00198	9638	533	0	-
Duct Leakage Air	Outlet	76.5	0.00198	1071	524	-	-
Return Duct	Outlet	70.5	0.00198	10708	533	-	-

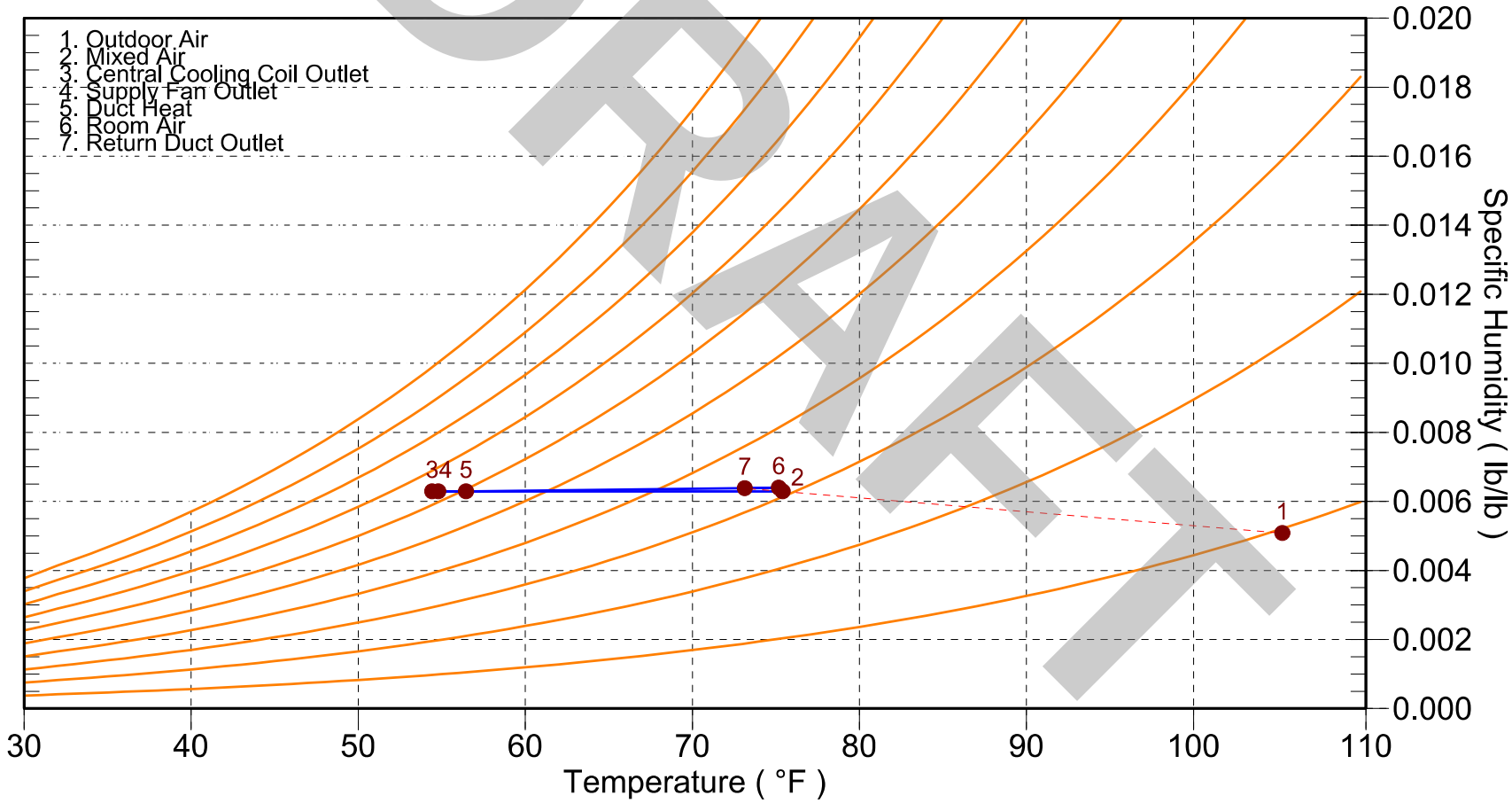
Air Density x Heat Capacity x Conversion Factor: At sea level = 1.080; At site altitude = 0.984 BTU/(hr-CFM-F)
Air Density x Heat of Vaporization x Conversion Factor: At sea level = 4746.6; At site altitude = 4324.3 BTU/(hr-CFM)
Site Altitude = 2556.0 ft

TABLE 2: ZONE DATA

Zone Name	Zone Sensible Load (BTU/hr)	T-stat Mode	Zone Cond (BTU/hr)	Zone Temp (°F)	Zone Airflow (CFM)	CO2 Level (ppm)	Terminal Heating Coil (BTU/hr)	Zone Heating Unit (BTU/hr)
Zone 1	-56556	Heating	-57220	69.8	9638	533	0	0

DRAFT

Location: Tucson, Arizona
Altitude: 2556.0 ft.
Data for: September DESIGN COOLING DAY, 1400



DRAFT

Air System Sizing Summary for 02ND-16TH FLOOR-WEST

Project Name: 16004 TUCSON HOUSE 01/22/2016
Prepared by: PH Mechanical 02:43PM

Air System Information

Air System Name	**02ND-16TH FLOOR-WEST**		Number of zones	**1**	
Equipment Class	**SPLT AHU**		Floor Area	**9292.0**	ft²
Air System Type	**SZCAV**		Location	**Tucson, Arizona**	

Sizing Calculation Information

Calculation Months	**Jan to Dec**		Zone CFM Sizing	**Sum of space airflow rates**	
Sizing Data	**Calculated**		Space CFM Sizing	**Individual peak space loads**	

Central Cooling Coil Sizing Data

Total coil load	**17.6**	Tons	Load occurs at	**Sep 1400**	
Total coil load	**211.8**	MBH	OA DB / WB	**105.3 / 64.7**	°F
Sensible coil load	**211.8**	MBH	Entering DB / WB	**75.2 / 57.3**	°F
Coil CFM at Sep 1400	**10556**	CFM	Leaving DB / WB	**54.8 / 49.2**	°F
Max block CFM	**10556**	CFM	Coil ADP	**52.5**	°F
Sum of peak zone CFM	**10556**	CFM	Bypass Factor	**0.100**	
Sensible heat ratio	**1.000**		Resulting RH	**34**	%
ft²/Ton	**526.5**		Design supply temp.	**55.0**	°F
BTU/(hr-ft²)	**22.8**		Zone T-stat Check	**1 of 1**	OK
Water flow @ 10.0 °F rise	**N/A**		Max zone temperature deviation	**0.0**	°F

Central Heating Coil Sizing Data

Max coil load	**79.7**	MBH	Load occurs at	**Des Htg**	
Coil CFM at Des Htg	**10556**	CFM	BTU/(hr-ft²)	**8.6**	
Max coil CFM	**10556**	CFM	Ent. DB / Lvg DB	**67.9 / 75.6**	°F
Water flow @ 20.0 °F drop	**N/A**				

Supply Fan Sizing Data

Actual max CFM	**10556**	CFM	Fan motor BHP	**1.45**	BHP
Standard CFM	**9617**	CFM	Fan motor kW	**1.15**	kW
Actual max CFM/ft²	**1.14**	CFM/ft²	Fan static	**0.50**	in wg

Outdoor Ventilation Air Data

Design airflow CFM	**619**	CFM	CFM/person	**15.96**	CFM/person
CFM/ft²	**0.07**	CFM/ft²			

DRAFT

Zone Sizing Summary for 02ND-16TH FLOOR-WEST

Project Name: 16004 TUCSON HOUSE 01/22/2016
Prepared by: PH Mechanical 02:43PM

Air System Information

Air System Name ..... **02ND-16TH FLOOR-WEST**
Equipment Class ..... **SPLT AHU**
Air System Type ..... **SZCAV**

Number of zones **1**
Floor Area ..... **9292.0** ft²
Location ..... **Tucson, Arizona**

Sizing Calculation Information

Calculation Months ..... **Jan to Dec**
Sizing Data ..... **Calculated**

Zone CFM Sizing ..... **Sum of space airflow rates**
Space CFM Sizing ..... **Individual peak space loads**

Zone Sizing Data

Zone Name	Maximum Cooling Sensible (MBH)	Design Airflow (CFM)	Minimum Airflow (CFM)	Time of Peak Load	Maximum Heating Load (MBH)	Zone Floor Area (ft²)	Zone CFM/ft²
Zone 1	158.0	9501	9501	Oct 1400	58.9	9292.0	1.02

Zone Terminal Sizing Data

No Zone Terminal Sizing Data required for this system.

Space Loads and Airflows

Zone Name / Space Name	Mult.	Cooling Sensible (MBH)	Time of Load	Air Flow (CFM)	Heating Load (MBH)	Floor Area (ft²)	Space CFM/ft²
Zone 1							
2-W 200 COORIDOR	1	3.5	Jan 1600	186	0.7	1086.0	0.17
2-W-201 BED 1	1	3.3	Jun 1600	177	1.7	130.0	1.37
2-W-201 BED 2	1	4.4	Jun 1600	233	2.0	233.0	1.00
2-W-201 LIV	1	11.3	Oct 1400	604	5.0	558.0	1.08
2-W-201 RR	1	0.3	Jan 1600	18	0.0	39.0	0.46
2-W-201 RR-1	1	0.3	Jan 1600	17	0.0	37.0	0.47
2-W-202 BED	1	4.1	Jun 1600	220	2.0	175.0	1.26
2-W-202 LIV	1	6.2	Jun 1600	332	2.6	431.0	0.77
2-W-202 RR	1	0.3	Jan 1600	17	0.0	37.0	0.47
2-W-203 BED	1	4.1	Jun 1600	220	2.0	175.0	1.26
2-W-203 LIV	1	6.3	Jun 1600	338	2.6	445.0	0.76
2-W-203 RR	1	0.3	Jan 1600	17	0.0	37.0	0.47
2-W-204 BED	1	3.8	Jun 1600	201	1.9	174.0	1.16
2-W-204 LIV	1	6.2	Jun 1600	333	2.6	430.0	0.77
2-W-204 RR	1	0.3	Jan 1600	17	0.0	37.0	0.47
2-W-205 BED	1	3.8	Jun 1600	203	1.9	174.0	1.17
2-W-205 LIV	1	6.2	Jun 1600	333	2.6	433.0	0.77
2-W-205 RR	1	0.3	Jan 1600	17	0.0	37.0	0.47
2-W-206 BED 1	1	4.4	Jun 1600	234	2.0	240.0	0.97
2-W-206 BED 2	1	3.4	Jun 1600	181	1.7	140.0	1.29
2-W-206 LIV	1	11.3	Oct 1500	607	4.9	547.0	1.11
2-W-206 RR	1	0.3	Jan 1600	17	0.0	37.0	0.47
2-W-206 RR2	1	0.3	Jan 1600	17	0.0	37.0	0.47
2-W-207 BED	1	7.9	Nov 1400	424	2.0	181.0	2.34
2-W-207 LIV	1	10.9	Nov 1400	582	2.9	444.0	1.31
2-W-207 RR	1	0.3	Jan 1600	19	0.0	44.0	0.42
2-W-208 BED	1	8.0	Nov 1400	430	2.0	202.0	2.13
2-W-208 LIV	1	10.4	Nov 1400	558	2.6	407.0	1.37
2-W-208 RR	1	0.4	Jan 1600	20	0.0	53.0	0.38
2-W-209 LIV	1	10.6	Nov 1400	569	2.6	426.0	1.34
2-W-209 RR	1	0.3	Jan 1600	17	0.0	37.0	0.47
2-W-210 LIV	1	10.6	Nov 1400	567	2.6	418.0	1.36
2-W-210 RR	1	0.3	Jan 1600	17	0.0	37.0	0.47
2-W-211 LIV/BED	1	10.6	Nov 1400	567	2.6	417.0	1.36

DRAFT

Zone Sizing Summary for 02ND-16TH FLOOR-WEST

Project Name: 16004 TUCSON HOUSE 01/22/2016
Prepared by: PH Mechanical 02:43PM

Zone Name / Space Name	Mult.	Cooling Sensible (MBH)	Time of Load	Air Flow (CFM)	Heating Load (MBH)	Floor Area (ft²)	Space CFM/ft²
2-W-211 RR	1	0.3	Jan 1600	17	0.0	37.0	0.47
2-W-212 LIV/BED	1	10.6	Nov 1400	567	2.6	419.0	1.35
2-W-212 RR	1	0.3	Jan 1600	17	0.0	37.0	0.47
2-W-213 LIV/BED	1	10.6	Nov 1400	568	2.6	427.0	1.33
2-W-213 RR	1	0.3	Jan 1600	17	0.0	37.0	0.47

DRAFT

Air System Design Load Summary for 02ND-16TH FLOOR-WEST

Project Name: 16004 TUCSON HOUSE 01/22/2016
Prepared by: PH Mechanical 02:43PM

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Sep 1400 COOLING OA DB / WB 105.3 °F / 64.7 °F			HEATING DATA AT DES HTG HEATING OA DB / WB 31.0 °F / 25.9 °F		
ZONE LOADS	**Details**	**Sensible (BTU/hr)**	**Latent (BTU/hr)**	**Details**	**Sensible (BTU/hr)**	**Latent (BTU/hr)**
Window & Skylight Solar Loads	655 ft²	19373	-	655 ft²	-	-
Wall Transmission	3161 ft²	6092	-	3161 ft²	5699	-
Roof Transmission	0 ft²	0	-	0 ft²	0	-
Window Transmission	655 ft²	10835	-	655 ft²	16264	-
Skylight Transmission	0 ft²	0	-	0 ft²	0	-
Door Loads	735 ft²	49455	-	735 ft²	22866	-
Floor Transmission	256 ft²	0	-	256 ft²	501	-
Partitions	0 ft²	0	-	0 ft²	0	-
Ceiling	0 ft²	0	-	0 ft²	0	-
Overhead Lighting	9292 W	25021	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	5720 W	17680	-	0	0	-
People	23	6282	4633	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	15% / 15%	20211	695	30%	13599	0
>> Total Zone Loads	**-**	**154950**	**5328**	**-**	**58928**	**0**
Zone Conditioning	-	172904	5328	-	53822	0
Plenum Wall Load	0%	0	-	0	0	-
Plenum Roof Load	0%	0	-	0	0	-
Plenum Lighting Load	0%	0	-	0	0	-
Return Fan Load	10556 CFM	0	-	10556 CFM	0	-
Ventilation Load	619 CFM	19469	-5050	619 CFM	23857	0
Supply Fan Load	10556 CFM	3913	-	10556 CFM	-3913	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	10%	15495	-	10%	5893	-
>> Total System Loads	**-**	**211780**	**278**	**-**	**79659**	**0**
Central Cooling Coil	-	211780	0	-	0	0
Central Heating Coil	-	0	-	-	79659	-
>> Total Conditioning	**-**	**211780**	**0**	**-**	**79659**	**0**
Key:	**Positive values are clg loads Negative values are htg loads**			**Positive values are htg loads Negative values are clg loads**		

DRAFT

September DESIGN COOLING DAY, 1400

TABLE 1: SYSTEM DATA

Component	Location	Dry-Bulb Temp (°F)	Specific Humidity (lb/lb)	Airflow (CFM)	CO2 Level (ppm)	Sensible Heat (BTU/hr)	Latent Heat (BTU/hr)
Ventilation Air	Inlet	105.3	0.00508	619	400	19469	-5050
Vent - Return Mixing	Outlet	75.2	0.00686	10556	801	-	-
Central Cooling Coil	Outlet	54.8	0.00686	10556	801	211780	0
Central Heating Coil	Outlet	54.8	0.00686	10556	801	0	-
Supply Fan	Outlet	55.2	0.00686	10556	801	3913	-
Cold Supply Duct	Outlet	56.8	0.00686	9501	801	-	-
Zone Air	-	75.3	0.00699	9501	829	172904	5328
Return Plenum	Outlet	75.3	0.00699	9501	829	0	-
Duct Leakage Air	Outlet	55.2	0.00685	1056	801	-	-
Return Duct	Outlet	73.3	0.00697	10556	826	-	-

Air Density x Heat Capacity x Conversion Factor: At sea level = 1.080; At site altitude = 0.984 BTU/(hr-CFM-F)
Air Density x Heat of Vaporization x Conversion Factor: At sea level = 4746.6; At site altitude = 4324.3 BTU/(hr-CFM)
Site Altitude = 2556.0 ft

TABLE 2: ZONE DATA

Zone Name	Zone Sensible Load (BTU/hr)	T-stat Mode	Zone Cond (BTU/hr)	Zone Temp (°F)	Zone Airflow (CFM)	CO2 Level (ppm)	Terminal Heating Coil (BTU/hr)	Zone Heating Unit (BTU/hr)
Zone 1	154950	Cooling	172904	75.3	9501	829	0	0

DRAFT

WINTER DESIGN HEATING

TABLE 1: SYSTEM DATA

Component	Location	Dry-Bulb Temp (°F)	Specific Humidity (lb/lb)	Airflow (CFM)	CO2 Level (ppm)	Sensible Heat (BTU/hr)	Latent Heat (BTU/hr)
Ventilation Air	Inlet	31.0	0.00198	619	400	-23857	0
Vent - Return Mixing	Outlet	67.9	0.00198	10556	552	-	-
Central Cooling Coil	Outlet	67.9	0.00198	10556	552	0	0
Central Heating Coil	Outlet	75.6	0.00198	10556	552	79659	-
Supply Fan	Outlet	75.9	0.00198	10556	552	3913	-
Cold Supply Duct	Outlet	75.3	0.00198	9501	552	-	-
Zone Air	-	69.6	0.00198	9501	562	-53822	0
Return Plenum	Outlet	69.6	0.00198	9501	562	0	-
Duct Leakage Air	Outlet	75.9	0.00198	1056	552	-	-
Return Duct	Outlet	70.2	0.00198	10556	562	-	-

Air Density x Heat Capacity x Conversion Factor: At sea level = 1.080; At site altitude = 0.984 BTU/(hr-CFM-F)
Air Density x Heat of Vaporization x Conversion Factor: At sea level = 4746.6; At site altitude = 4324.3 BTU/(hr-CFM)
Site Altitude = 2556.0 ft

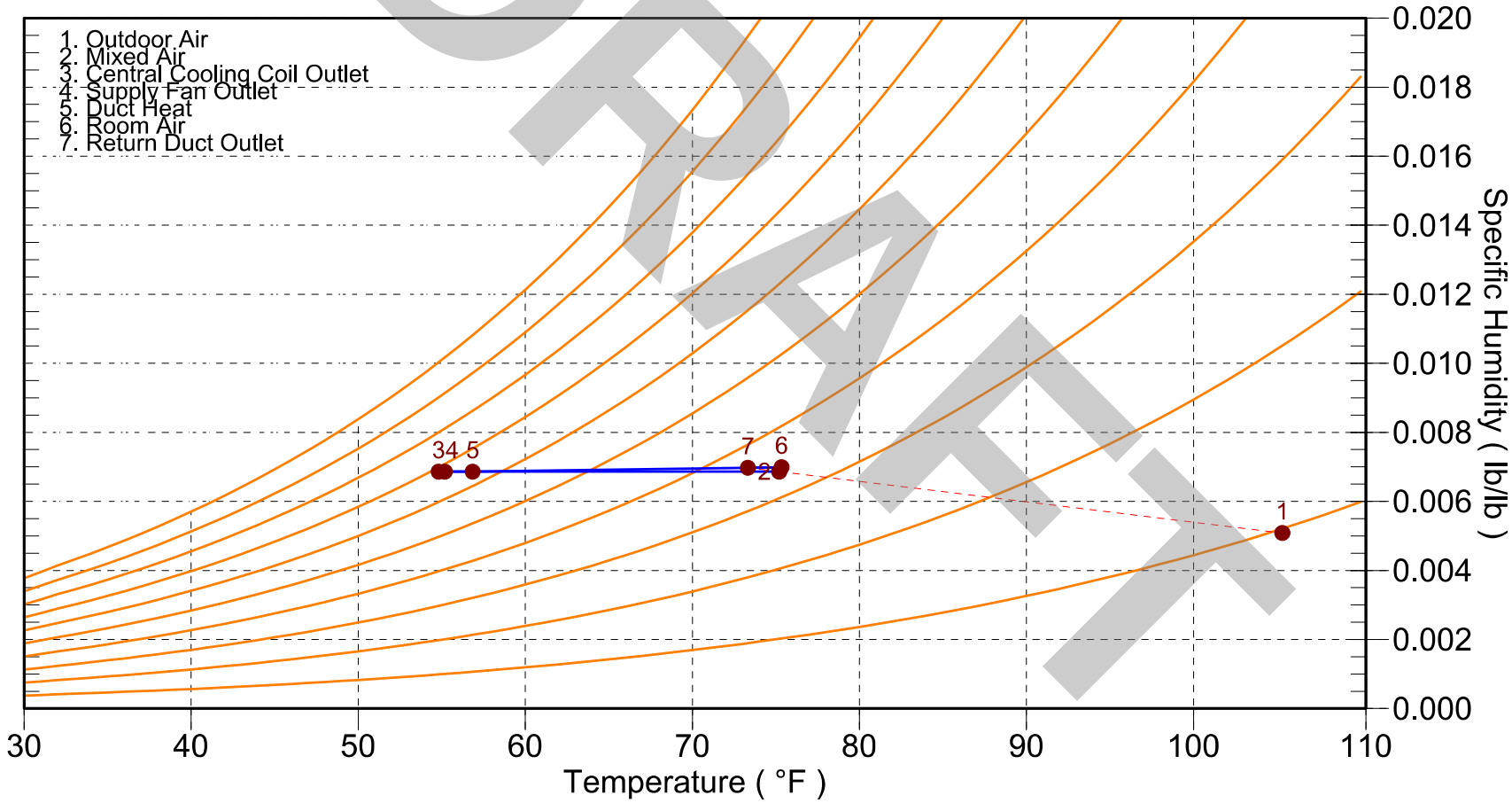
TABLE 2: ZONE DATA

Zone Name	Zone Sensible Load (BTU/hr)	T-stat Mode	Zone Cond (BTU/hr)	Zone Temp (°F)	Zone Airflow (CFM)	CO2 Level (ppm)	Terminal Heating Coil (BTU/hr)	Zone Heating Unit (BTU/hr)
Zone 1	-58928	Heating	-53822	69.6	9501	562	0	0

DRAFT

Psychrometric Analysis for 02ND-16TH FLOOR-WEST

Location: Tucson, Arizona
Altitude: 2556.0 ft.
Data for: September DESIGN COOLING DAY, 1400



DRAFT

Air System Sizing Summary for 17TH FLOOR-EAST

Project Name: 16004 TUCSON HOUSE 01/22/2016
Prepared by: PH Mechanical 02:43PM

Air System Information

Air System Name	**17TH FLOOR-EAST**		Number of zones	**1**	
Equipment Class	**SPLT AHU**		Floor Area	**9320.0**	ft²
Air System Type	**SZCAV**		Location	**Tucson, Arizona**	

Sizing Calculation Information

Calculation Months	**Jan to Dec**		Zone CFM Sizing	**Sum of space airflow rates**
Sizing Data	**Calculated**		Space CFM Sizing	**Individual peak space loads**

Central Cooling Coil Sizing Data

Total coil load	**19.6**	Tons	Load occurs at	**Sep 1400**	
Total coil load	**235.2**	MBH	OA DB / WB	**105.3 / 64.7**	°F
Sensible coil load	**235.2**	MBH	Entering DB / WB	**75.3 / 56.4**	°F
Coil CFM at Sep 1400	**11377**	CFM	Leaving DB / WB	**54.3 / 47.9**	°F
Max block CFM	**11377**	CFM	Coil ADP	**51.9**	°F
Sum of peak zone CFM	**11377**	CFM	Bypass Factor	**0.100**	
Sensible heat ratio	**1.000**		Resulting RH	**31**	%
ft²/Ton	**475.4**		Design supply temp.	**55.0**	°F
BTU/(hr-ft²)	**25.2**		Zone T-stat Check	**1 of 1**	OK
Water flow @ 10.0 °F rise	**N/A**		Max zone temperature deviation	**0.0**	°F

Central Heating Coil Sizing Data

Max coil load	**96.2**	MBH	Load occurs at	**Des Htg**	
Coil CFM at Des Htg	**11377**	CFM	BTU/(hr-ft²)	**10.3**	
Max coil CFM	**11377**	CFM	Ent. DB / Lvg DB	**67.7 / 76.3**	°F
Water flow @ 20.0 °F drop	**N/A**				

Supply Fan Sizing Data

Actual max CFM	**11377**	CFM	Fan motor BHP	**1.56**	BHP
Standard CFM	**10365**	CFM	Fan motor kW	**1.24**	kW
Actual max CFM/ft²	**1.22**	CFM/ft²	Fan static	**0.50**	in wg

Outdoor Ventilation Air Data

Design airflow CFM	**756**	CFM	CFM/person	**21.22**	CFM/person
CFM/ft²	**0.08**	CFM/ft²			

DRAFT

Zone Sizing Summary for 17TH FLOOR-EAST

Project Name: 16004 TUCSON HOUSE 01/22/2016
Prepared by: PH Mechanical 02:43PM

Air System Information

Air System Name ..... **17TH FLOOR-EAST**
Equipment Class ..... **SPLT AHU**
Air System Type ..... **SZCAV**

Number of zones **1**
Floor Area ..... **9320.0** ft²
Location ..... **Tucson, Arizona**

Sizing Calculation Information

Calculation Months ..... **Jan to Dec**
Sizing Data ..... **Calculated**

Zone CFM Sizing ..... **Sum of space airflow rates**
Space CFM Sizing ..... **Individual peak space loads**

Zone Sizing Data

Zone Name	Maximum Cooling Sensible (MBH)	Design Airflow (CFM)	Minimum Airflow (CFM)	Time of Peak Load	Maximum Heating Load (MBH)	Zone Floor Area (ft²)	Zone CFM/ft²
Zone 1	172.5	10240	10240	Oct 1400	68.2	9320.0	1.10

Zone Terminal Sizing Data

No Zone Terminal Sizing Data required for this system.

Space Loads and Airflows

Zone Name / Space Name	Mult.	Cooling Sensible (MBH)	Time of Load	Air Flow (CFM)	Heating Load (MBH)	Floor Area (ft²)	Space CFM/ft²
Zone 1							
17-E COORIDOR	1	5.3	Jul 1600	284	2.0	1101.0	0.26
17-E-214 BED	1	7.5	Nov 1400	402	2.1	176.0	2.28
17-E-214 LIV	1	11.2	Nov 1400	598	3.6	437.0	1.37
17-E-214 RR	1	0.4	Jul 1600	20	0.0	36.0	0.57
17-E-215 BED	1	7.5	Nov 1400	403	2.1	179.0	2.25
17-E-215 LIV	1	11.2	Nov 1400	602	3.6	446.0	1.35
17-E-215 RR	1	0.5	Jul 1600	26	0.1	57.0	0.45
17-E-216 BED/LIV	1	11.0	Nov 1400	586	3.2	427.0	1.37
17-E-216 RR	1	0.4	Jul 1600	22	0.1	42.0	0.52
17-E-217 BED/LIV	1	10.8	Nov 1400	578	3.1	410.0	1.41
17-E-217 RR	1	0.4	Jul 1600	20	0.0	36.0	0.57
17-E-218 BED/LIV	1	10.8	Nov 1400	580	3.2	410.0	1.42
17-E-218 RR	1	0.4	Jul 1600	21	0.0	37.0	0.56
17-E-219 BED	1	7.6	Nov 1400	404	2.1	184.0	2.20
17-E-219 LIV	1	11.0	Nov 1400	586	3.1	443.0	1.32
17-E-220 BED	1	7.8	Nov 1400	417	2.1	184.0	2.26
17-E-220 LIV	1	16.3	Nov 1400	870	4.7	438.0	1.99
17-E-221 BED1	1	4.5	Jun 1600	242	2.3	208.0	1.16
17-E-221 BED2	1	3.7	Jun 1600	198	1.9	154.0	1.28
17-E-221 LIV	1	14.2	Sep 1400	759	7.0	613.0	1.24
17-E-221 RR	1	0.5	Jul 1600	26	0.1	59.0	0.45
17-E-221 RR2	1	0.4	Jul 1600	20	0.0	36.0	0.57
17-E-222 LIV	1	6.8	Jul 1600	361	3.1	411.0	0.88
17-E-222 RR	1	0.4	Jul 1600	20	0.0	36.0	0.57
17-E-223 LIV	1	6.8	Jul 1600	361	3.2	405.0	0.89
17-E-223 RR	1	0.4	Jul 1600	20	0.0	36.0	0.57
17-E-224 BED	1	4.3	Jun 1600	229	2.2	181.0	1.27
17-E-224 LIV	1	7.1	Jul 1600	381	3.2	459.0	0.83
17-E-224 RR	1	0.4	Jul 1600	21	0.0	37.0	0.56
17-E-225 BED	1	4.3	Jun 1600	229	2.2	180.0	1.27
17-E-225 LIV	1	7.3	Jul 1600	393	3.2	489.0	0.80
17-E-225 RR	1	0.5	Jul 1600	26	0.1	59.0	0.45
17-E-226 LIV/BED	1	6.8	Jul 1600	366	3.1	423.0	0.87
17-E-226 RR	1	0.4	Jul 1600	20	0.0	36.0	0.57

DRAFT

Zone Sizing Summary for 17TH FLOOR-EAST

Project Name: 16004 TUCSON HOUSE 01/22/2016
Prepared by: PH Mechanical 02:43PM

Zone Name / Space Name	Mult.	Cooling Sensible (MBH)	Time of Load	Air Flow (CFM)	Heating Load (MBH)	Floor Area (ft²)	Space CFM/ft²
17-ELEVATOR	1	2.7	Jul 1600	146	1.1	455.0	0.32

DRAFT

Air System Design Load Summary for 17TH FLOOR-EAST

Project Name: 16004 TUCSON HOUSE 01/22/2016
Prepared by: PH Mechanical 02:43PM

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Sep 1400 COOLING OA DB / WB 105.3 °F / 64.7 °F			HEATING DATA AT DES HTG HEATING OA DB / WB 31.0 °F / 25.9 °F		
ZONE LOADS	**Details**	**Sensible (BTU/hr)**	**Latent (BTU/hr)**	**Details**	**Sensible (BTU/hr)**	**Latent (BTU/hr)**
Window & Skylight Solar Loads	720 ft²	28470	-	720 ft²	-	-
Wall Transmission	3229 ft²	6321	-	3229 ft²	5822	-
Roof Transmission	9320 ft²	11165	-	9320 ft²	8955	-
Window Transmission	720 ft²	11881	-	720 ft²	17834	-
Skylight Transmission	0 ft²	0	-	0 ft²	0	-
Door Loads	622 ft²	42097	-	622 ft²	19348	-
Floor Transmission	256 ft²	0	-	256 ft²	501	-
Partitions	0 ft²	0	-	0 ft²	0	-
Ceiling	0 ft²	0	-	0 ft²	0	-
Overhead Lighting	9320 W	25097	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	5443 W	16824	-	0	0	-
People	19	5474	3895	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	15% / 15%	22099	584	30%	15738	0
>> Total Zone Loads	**-**	**169429**	**4479**	**-**	**68198**	**0**
Zone Conditioning	-	190150	4479	-	64377	0
Plenum Wall Load	0%	0	-	0	0	-
Plenum Roof Load	0%	0	-	0	0	-
Plenum Lighting Load	0%	0	-	0	0	-
Return Fan Load	11377 CFM	0	-	11377 CFM	0	-
Ventilation Load	756 CFM	23930	-4226	756 CFM	29206	0
Supply Fan Load	11377 CFM	4217	-	11377 CFM	-4217	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	10%	16943	-	10%	6820	-
>> Total System Loads	**-**	**235240**	**253**	**-**	**96187**	**0**
Central Cooling Coil	-	235240	0	-	0	0
Central Heating Coil	-	0	-	-	96186	-
>> Total Conditioning	**-**	**235240**	**0**	**-**	**96186**	**0**
Key:	**Positive values are clg loads Negative values are htg loads**			**Positive values are htg loads Negative values are clg loads**		

DRAFT

September DESIGN COOLING DAY, 1400

TABLE 1: SYSTEM DATA

Component	Location	Dry-Bulb Temp (°F)	Specific Humidity (lb/lb)	Airflow (CFM)	CO2 Level (ppm)	Sensible Heat (BTU/hr)	Latent Heat (BTU/hr)
Ventilation Air	Inlet	105.3	0.00508	756	400	23930	-4226
Vent - Return Mixing	Outlet	75.3	0.00629	11377	792	-	-
Central Cooling Coil	Outlet	54.3	0.00629	11377	792	235240	0
Central Heating Coil	Outlet	54.3	0.00629	11377	792	0	-
Supply Fan	Outlet	54.6	0.00629	11377	792	4217	-
Cold Supply Duct	Outlet	56.3	0.00629	10240	792	-	-
Zone Air	-	75.2	0.00639	10240	822	190150	4479
Return Plenum	Outlet	75.2	0.00639	10240	822	0	-
Duct Leakage Air	Outlet	54.6	0.00628	1138	792	-	-
Return Duct	Outlet	73.1	0.00638	11377	820	-	-

Air Density x Heat Capacity x Conversion Factor: At sea level = 1.080; At site altitude = 0.984 BTU/(hr-CFM-F)
Air Density x Heat of Vaporization x Conversion Factor: At sea level = 4746.6; At site altitude = 4324.3 BTU/(hr-CFM)
Site Altitude = 2556.0 ft

TABLE 2: ZONE DATA

Zone Name	Zone Sensible Load (BTU/hr)	T-stat Mode	Zone Cond (BTU/hr)	Zone Temp (°F)	Zone Airflow (CFM)	CO2 Level (ppm)	Terminal Heating Coil (BTU/hr)	Zone Heating Unit (BTU/hr)
Zone 1	169429	Cooling	190150	75.2	10240	822	0	0

DRAFT

WINTER DESIGN HEATING

TABLE 1: SYSTEM DATA

Component	Location	Dry-Bulb Temp (°F)	Specific Humidity (lb/lb)	Airflow (CFM)	CO2 Level (ppm)	Sensible Heat (BTU/hr)	Latent Heat (BTU/hr)
Ventilation Air	Inlet	31.0	0.00198	756	400	-29206	0
Vent - Return Mixing	Outlet	67.7	0.00198	11377	533	-	-
Central Cooling Coil	Outlet	67.7	0.00198	11377	533	0	0
Central Heating Coil	Outlet	76.3	0.00198	11377	533	96186	-
Supply Fan	Outlet	76.6	0.00198	11377	533	4217	-
Cold Supply Duct	Outlet	76.0	0.00198	10240	533	-	-
Zone Air	-	69.6	0.00198	10240	543	-64377	0
Return Plenum	Outlet	69.6	0.00198	10240	543	0	-
Duct Leakage Air	Outlet	76.6	0.00198	1138	533	-	-
Return Duct	Outlet	70.3	0.00198	11377	543	-	-

Air Density x Heat Capacity x Conversion Factor: At sea level = 1.080; At site altitude = 0.984 BTU/(hr-CFM-F)
Air Density x Heat of Vaporization x Conversion Factor: At sea level = 4746.6; At site altitude = 4324.3 BTU/(hr-CFM)
Site Altitude = 2556.0 ft

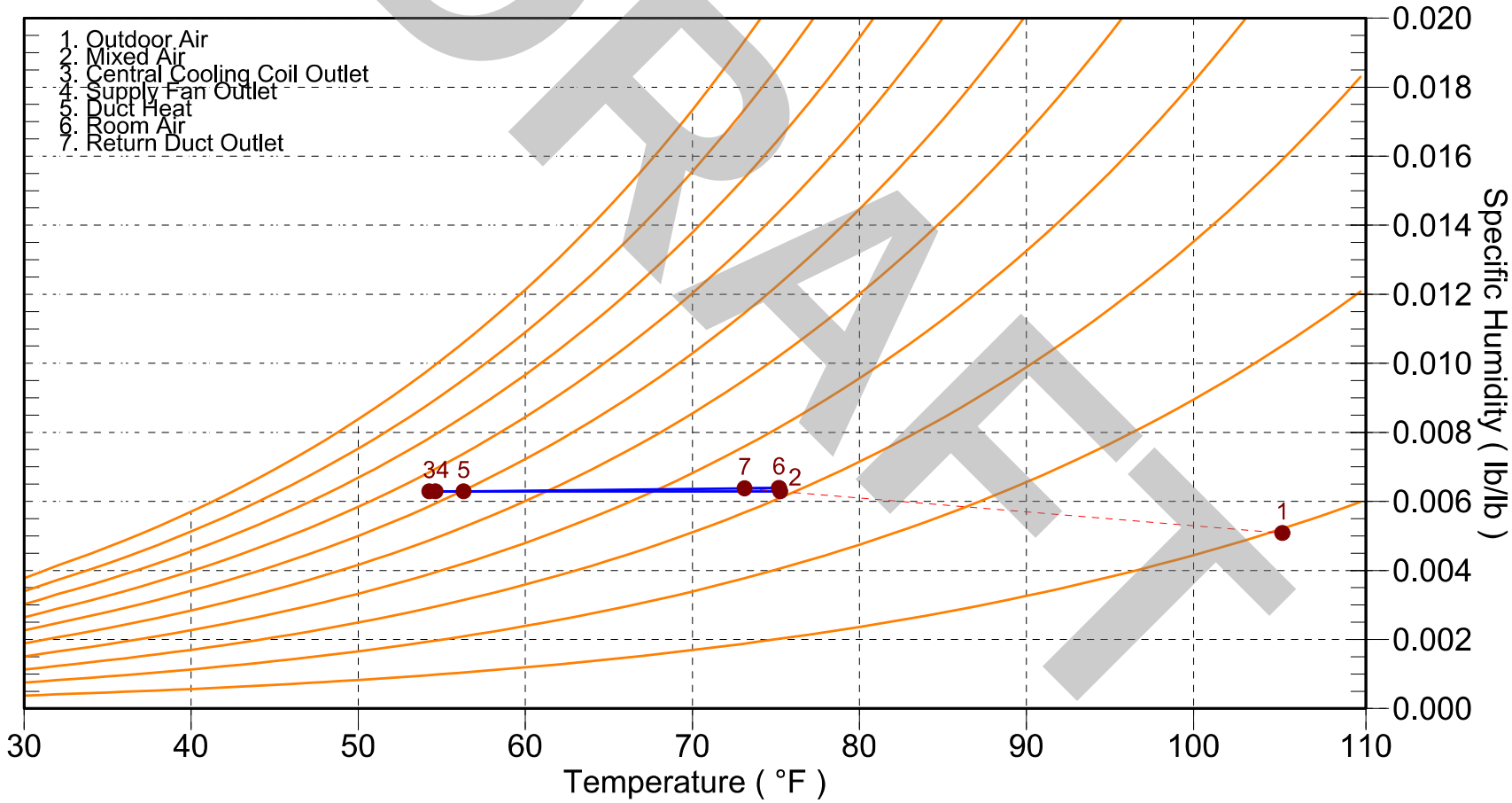
TABLE 2: ZONE DATA

Zone Name	Zone Sensible Load (BTU/hr)	T-stat Mode	Zone Cond (BTU/hr)	Zone Temp (°F)	Zone Airflow (CFM)	CO2 Level (ppm)	Terminal Heating Coil (BTU/hr)	Zone Heating Unit (BTU/hr)
Zone 1	-68198	Heating	-64377	69.6	10240	543	0	0

DRAFT

Psychrometric Analysis for 17TH FLOOR-EAST

Location: Tucson, Arizona
Altitude: 2556.0 ft.
Data for: September DESIGN COOLING DAY, 1400



DRAFT

Air System Sizing Summary for 17TH TH FLOOR-WEST

Project Name: 16004 TUCSON HOUSE 01/22/2016
Prepared by: PH Mechanical 02:43PM

Air System Information

Air System Name	**17TH TH FLOOR-WEST**		Number of zones	**1**	
Equipment Class	**SPLT AHU**		Floor Area	**9292.0**	ft²
Air System Type	**SZCAV**		Location	**Tucson, Arizona**	

Sizing Calculation Information

Calculation Months	**Jan to Dec**		Zone CFM Sizing	**Sum of space airflow rates**	
Sizing Data	**Calculated**		Space CFM Sizing	**Individual peak space loads**	

Central Cooling Coil Sizing Data

Total coil load	**18.9**	Tons	Load occurs at	**Sep 1500**	
Total coil load	**226.7**	MBH	OA DB / WB	**106.2 / 65.0**	°F
Sensible coil load	**226.7**	MBH	Entering DB / WB	**75.0 / 57.7**	°F
Coil CFM at Sep 1500	**11170**	CFM	Leaving DB / WB	**54.4 / 49.6**	°F
Max block CFM	**11170**	CFM	Coil ADP	**52.1**	°F
Sum of peak zone CFM	**11170**	CFM	Bypass Factor	**0.100**	
Sensible heat ratio	**1.000**		Resulting RH	**36**	%
ft²/Ton	**491.9**		Design supply temp.	**55.0**	°F
BTU/(hr-ft²)	**24.4**		Zone T-stat Check	**1 of 1**	OK
Water flow @ 10.0 °F rise	**N/A**		Max zone temperature deviation	**0.0**	°F

Central Heating Coil Sizing Data

Max coil load	**95.0**	MBH	Load occurs at	**Des Htg**	
Coil CFM at Des Htg	**11170**	CFM	BTU/(hr-ft²)	**10.2**	
Max coil CFM	**11170**	CFM	Ent. DB / Lvg DB	**68.3 / 76.9**	°F
Water flow @ 20.0 °F drop	**N/A**				

Supply Fan Sizing Data

Actual max CFM	**11170**	CFM	Fan motor BHP	**1.53**	BHP
Standard CFM	**10176**	CFM	Fan motor kW	**1.21**	kW
Actual max CFM/ft²	**1.20**	CFM/ft²	Fan static	**0.50**	in wg

Outdoor Ventilation Air Data

Design airflow CFM	**619**	CFM	CFM/person	**15.96**	CFM/person
CFM/ft²	**0.07**	CFM/ft²			

DRAFT

Zone Sizing Summary for 17TH TH FLOOR-WEST

Project Name: 16004 TUCSON HOUSE 01/22/2016
Prepared by: PH Mechanical 02:43PM

Air System Information

Air System Name ..... **17TH TH FLOOR-WEST**
Equipment Class ..... **SPLT AHU**
Air System Type ..... **SZCAV**

Number of zones **1**
Floor Area ..... **9292.0** ft²
Location ..... **Tucson, Arizona**

Sizing Calculation Information

Calculation Months ..... **Jan to Dec**
Sizing Data ..... **Calculated**

Zone CFM Sizing ..... **Sum of space airflow rates**
Space CFM Sizing ..... **Individual peak space loads**

Zone Sizing Data

Zone Name	Maximum Cooling Sensible (MBH)	Design Airflow (CFM)	Minimum Airflow (CFM)	Time of Peak Load	Maximum Heating Load (MBH)	Zone Floor Area (ft²)	Zone CFM/ft²
Zone 1	167.1	10053	10053	Oct 1400	69.7	9292.0	1.08

Zone Terminal Sizing Data

No Zone Terminal Sizing Data required for this system.

Space Loads and Airflows

Zone Name / Space Name	Mult.	Cooling Sensible (MBH)	Time of Load	Air Flow (CFM)	Heating Load (MBH)	Floor Area (ft²)	Space CFM/ft²
Zone 1							
17-W COORIDOR	1	5.2	Jul 1600	280	2.0	1086.0	0.26
17-W-201 BED 1	1	3.5	Jun 1600	188	1.9	130.0	1.45
17-W-201 BED 2	1	4.7	Jun 1600	252	2.3	233.0	1.08
17-W-201 LIV	1	12.0	Sep 1400	642	5.7	558.0	1.15
17-W-201 RR	1	0.4	Jul 1600	21	0.0	39.0	0.54
17-W-201 RR-1	1	0.4	Jul 1600	21	0.0	37.0	0.56
17-W-202 BED	1	4.1	Jun 1600	220	2.0	175.0	1.26
17-W-202 LIV	1	6.2	Jun 1600	332	2.6	431.0	0.77
17-W-202 RR	1	0.3	Jan 1600	17	0.0	37.0	0.47
17-W-203 BED	1	4.4	Jun 1600	235	2.2	175.0	1.34
17-W-203 LIV	1	7.0	Jul 1600	375	3.2	445.0	0.84
17-W-203 RR	1	0.4	Jul 1600	21	0.0	37.0	0.56
17-W-204 BED	1	4.0	Jun 1600	216	2.1	174.0	1.24
17-W-204 LIV	1	6.9	Jul 1600	369	3.1	430.0	0.86
17-W-204 RR	1	0.4	Jul 1600	21	0.0	37.0	0.56
17-W-205 BED	1	4.1	Jun 1600	218	2.1	174.0	1.25
17-W-205 LIV	1	6.9	Jul 1600	369	3.1	433.0	0.85
17-W-205 RR	1	0.4	Jul 1600	21	0.0	37.0	0.56
17-W-206 BED 1	1	4.7	Jun 1600	253	2.3	240.0	1.06
17-W-206 BED 2	1	3.6	Jun 1600	192	1.9	140.0	1.37
17-W-206 LIV	1	12.0	Sep 1500	644	5.6	547.0	1.18
17-W-206 RR	1	0.4	Jul 1600	21	0.0	37.0	0.56
17-W-206 RR2	1	0.4	Jul 1600	21	0.0	37.0	0.56
17-W-207 BED	1	8.0	Nov 1400	430	2.2	181.0	2.38
17-W-207 LIV	1	11.2	Nov 1400	599	3.5	444.0	1.35
17-W-207 RR	1	0.4	Jul 1600	22	0.1	44.0	0.51
17-W-208 BED	1	8.2	Nov 1400	437	2.3	202.0	2.17
17-W-208 LIV	1	10.7	Nov 1400	573	3.1	407.0	1.41
17-W-208 RR	1	0.5	Jul 1600	25	0.1	53.0	0.47
17-W-209 LIV	1	10.9	Nov 1400	585	3.2	426.0	1.37
17-W-209 RR	1	0.4	Jul 1600	21	0.0	37.0	0.56
17-W-210 LIV	1	10.9	Nov 1400	582	3.2	418.0	1.39
17-W-210 RR	1	0.4	Jul 1600	21	0.0	37.0	0.56
17-W-211 LIV/BED	1	10.9	Nov 1400	582	3.2	417.0	1.40

DRAFT

Zone Sizing Summary for 17TH TH FLOOR-WEST

Project Name: 16004 TUCSON HOUSE 01/22/2016
Prepared by: PH Mechanical 02:43PM

Zone Name / Space Name	Mult.	Cooling Sensible (MBH)	Time of Load	Air Flow (CFM)	Heating Load (MBH)	Floor Area (ft²)	Space CFM/ft²
17-W-211 RR	1	0.4	Jul 1600	21	0.0	37.0	0.56
17-W-212 LIV/BED	1	10.9	Nov 1400	582	3.2	419.0	1.39
17-W-212 RR	1	0.4	Jul 1600	21	0.0	37.0	0.56
17-W-213 LIV/BED	1	10.9	Nov 1400	584	3.1	427.0	1.37
17-W-213 RR	1	0.4	Jul 1600	21	0.0	37.0	0.56

DRAFT

Air System Design Load Summary for 17TH TH FLOOR-WEST

Project Name: 16004 TUCSON HOUSE 01/22/2016
Prepared by: PH Mechanical 02:43PM

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Sep 1500 COOLING OA DB / WB 106.2 °F / 65.0 °F			HEATING DATA AT DES HTG HEATING OA DB / WB 31.0 °F / 25.9 °F		
ZONE LOADS	**Details**	**Sensible (BTU/hr)**	**Latent (BTU/hr)**	**Details**	**Sensible (BTU/hr)**	**Latent (BTU/hr)**
Window & Skylight Solar Loads	655 ft²	18534	-	655 ft²	-	-
Wall Transmission	3161 ft²	6503	-	3161 ft²	5699	-
Roof Transmission	8649 ft²	10452	-	8649 ft²	8310	-
Window Transmission	655 ft²	11232	-	655 ft²	16264	-
Skylight Transmission	0 ft²	0	-	0 ft²	0	-
Door Loads	735 ft²	48339	-	735 ft²	22866	-
Floor Transmission	256 ft²	0	-	256 ft²	501	-
Partitions	0 ft²	0	-	0 ft²	0	-
Ceiling	0 ft²	0	-	0 ft²	0	-
Overhead Lighting	9292 W	25461	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	5720 W	17800	-	0	0	-
People	26	6641	5412	0	0	0
Infiltration	-	0	0	-	0	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	15% / 15%	21744	812	30%	16092	0
>> Total Zone Loads	**-**	**166705**	**6224**	**-**	**69731**	**0**
Zone Conditioning	-	185766	6224	-	68112	0
Plenum Wall Load	0%	0	-	0	0	-
Plenum Roof Load	0%	0	-	0	0	-
Plenum Lighting Load	0%	0	-	0	0	-
Return Fan Load	11170 CFM	0	-	11170 CFM	0	-
Ventilation Load	619 CFM	20103	-5889	619 CFM	24032	0
Supply Fan Load	11170 CFM	4140	-	11170 CFM	-4140	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	10%	16671	-	10%	6973	-
>> Total System Loads	**-**	**226680**	**334**	**-**	**94977**	**0**
Central Cooling Coil	-	226680	0	-	0	0
Central Heating Coil	-	0	-	-	94977	-
>> Total Conditioning	**-**	**226680**	**0**	**-**	**94977**	**0**
Key:	**Positive values are clg loads Negative values are htg loads**			**Positive values are htg loads Negative values are clg loads**		

DRAFT

September DESIGN COOLING DAY, 1500

TABLE 1: SYSTEM DATA

Component	Location	Dry-Bulb Temp (°F)	Specific Humidity (lb/lb)	Airflow (CFM)	CO2 Level (ppm)	Sensible Heat (BTU/hr)	Latent Heat (BTU/hr)
Ventilation Air	Inlet	106.2	0.00508	619	400	20103	-5889
Vent - Return Mixing	Outlet	75.0	0.00716	11170	805	-	-
Central Cooling Coil	Outlet	54.4	0.00716	11170	805	226680	0
Central Heating Coil	Outlet	54.4	0.00716	11170	805	0	-
Supply Fan	Outlet	54.8	0.00716	11170	805	4140	-
Cold Supply Duct	Outlet	56.4	0.00716	10053	805	-	-
Zone Air	-	75.2	0.00731	10053	832	185766	6224
Return Plenum	Outlet	75.2	0.00731	10053	832	0	-
Duct Leakage Air	Outlet	54.8	0.00716	1117	805	-	-
Return Duct	Outlet	73.2	0.00728	11170	828	-	-

Air Density x Heat Capacity x Conversion Factor: At sea level = 1.080; At site altitude = 0.984 BTU/(hr-CFM-F)
Air Density x Heat of Vaporization x Conversion Factor: At sea level = 4746.6; At site altitude = 4324.3 BTU/(hr-CFM)
Site Altitude = 2556.0 ft

TABLE 2: ZONE DATA

Zone Name	Zone Sensible Load (BTU/hr)	T-stat Mode	Zone Cond (BTU/hr)	Zone Temp (°F)	Zone Airflow (CFM)	CO2 Level (ppm)	Terminal Heating Coil (BTU/hr)	Zone Heating Unit (BTU/hr)
Zone 1	166705	Cooling	185766	75.2	10053	832	0	0

DRAFT

WINTER DESIGN HEATING

TABLE 1: SYSTEM DATA

Component	Location	Dry-Bulb Temp (°F)	Specific Humidity (lb/lb)	Airflow (CFM)	CO2 Level (ppm)	Sensible Heat (BTU/hr)	Latent Heat (BTU/hr)
Ventilation Air	Inlet	31.0	0.00198	619	400	-24032	0
Vent - Return Mixing	Outlet	68.3	0.00198	11170	570	-	-
Central Cooling Coil	Outlet	68.3	0.00198	11170	570	0	0
Central Heating Coil	Outlet	76.9	0.00198	11170	570	94977	-
Supply Fan	Outlet	77.3	0.00198	11170	570	4140	-
Cold Supply Duct	Outlet	76.6	0.00198	10053	570	-	-
Zone Air	-	69.7	0.00198	10053	580	-68112	0
Return Plenum	Outlet	69.7	0.00198	10053	580	0	-
Duct Leakage Air	Outlet	77.3	0.00198	1117	570	-	-
Return Duct	Outlet	70.5	0.00198	11170	580	-	-

Air Density x Heat Capacity x Conversion Factor: At sea level = 1.080; At site altitude = 0.984 BTU/(hr-CFM-F)
Air Density x Heat of Vaporization x Conversion Factor: At sea level = 4746.6; At site altitude = 4324.3 BTU/(hr-CFM)
Site Altitude = 2556.0 ft

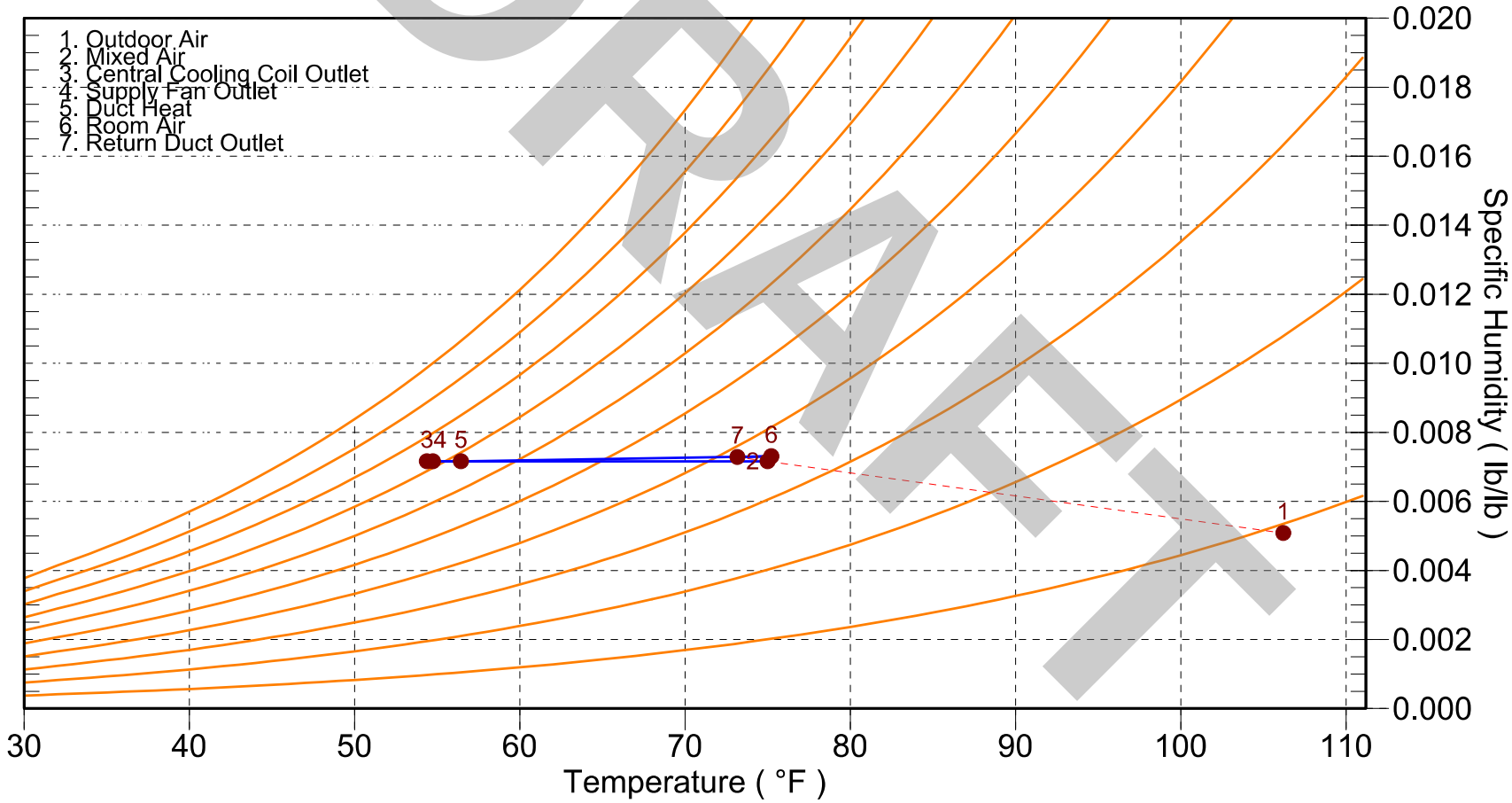
TABLE 2: ZONE DATA

Zone Name	Zone Sensible Load (BTU/hr)	T-stat Mode	Zone Cond (BTU/hr)	Zone Temp (°F)	Zone Airflow (CFM)	CO2 Level (ppm)	Terminal Heating Coil (BTU/hr)	Zone Heating Unit (BTU/hr)
Zone 1	-69731	Heating	-68112	69.7	10053	580	0	0

DRAFT

Psychrometric Analysis for 17TH TH FLOOR-WEST

Location: Tucson, Arizona
Altitude: 2556.0 ft.
Data for: September DESIGN COOLING DAY, 1500



DRAFT

VARITEC™

CHILLER EVALUATION					
Chiller Tonnage	**Features**	**Equipment Cost**	**IPLV kW/Ton**	**Annual Operating Cost[1]**	**Total Cost of Ownership[2]**
500	Conventional Centrifugal w/VFD + 150-Ton Pony chiller	$200,000	0.422	$133,082	$3,527,048
500	(2) Daikin 250-Ton Magnetic Bearing Centrifugal Chillers	$300,000	0.319	$100,600	$2,814,996

ECONOMIC CRITERIA		
Energy Cost:	$0.12	Per kWH
Evaluation Basis*	2,628,000	Ton-Hrs/Yr
Evaluation Period:	25.0	Years

EVALUATION BASIS		
System Capacity	500	Tons
Annual Hours	8760	Hrs/Year
Utilization	60%	Of Design
Evaluation Basis	**2,628,000**	**Ton-Hrs/Yr**

[1]Annual Operating Cost = IPLV (kW/ton) x Evaluation Basis x Energy Cost

[2]Total Cost of Ownership = Initial Equipment Cost + (Annual Operating Cost x Evaluation Period)

Notes:
1. Maintenance cost not considered, but should be less on the Magnetic Bearing compressors due to oil-free design
2. IPLV based on AHRI Std 550-590

DRAFT

JOB NAME	EFZSM8	**REP. OFFICE**	Varitec Solutions (Phoenix)
JOB DESCRIPTION	Tucson House	**SALESMAN**	Varitec Solutions (Phoenix)
		CUSTOMER	
MODEL NUMBER	WGZ150D - Standard Efficiency		
UNIT TAGGING	CH-150	**VERSION**	9.20.004

PHYSICAL DATA			
Length (ins)	170.3	Shipping weight (lb)	5873.0
Width (ins)	37.1	Operating weight (lb)	6662.0
Height (ins)	76.9	Refrigerant	R410a
		Refrigerant charge (lb)	300.0

DESIGN PERFORMANCE

Capacity (tons)	Input Power (kW)	Performance (kW/ton)	Flow (gpm)	IPLV (kW/ton)	Evaporator			Condenser		
					P.D. (ftHd)	T in (°F)	T out (°F)	P.D. (ftHd)	T in (°F)	T out (°F)
148.2	111.2	0.750	355.7	0.568	15.2	54.0	44.0	15.8	85.0	95.0

EVAPORATOR DATA		CONDENSER DATA	
Design Flow (gpm) / P.D. (ftHd)	355.7 / 15.2	Design Flow (gpm) / P.D. (ftHd)	444.6 / 15.8
Fluid type	Water	Fluid type	Water
Percentage of fluid	100	Percentage of fluid	100
Number of passes	2	Number of passes	2
Fouling Factor (F.ft².h/Btu)	0.00010	Fouling Factor (F.ft².h/Btu)	0.00025
Tube material	Cu	Tube material	Cu
Tube wall thickness (ins)	Contact factory	Tube wall thickness (ins)	0.025
Water volume (gal)	57.6	Water volume (gal)	35.4
Min flow (gpm) / P.D. (ftHd)	222.3 / 6.2	Min flow (gpm) / P.D. (ftHd)	277.9 / 6.5
Max flow (gpm) / P.D. (ftHd)	592.8 / 40.1	Max flow (gpm) / P.D. (ftHd)	741.0 / 41.7

PART LOAD PERFORMANCE AT AHRI STANDARD CONDITIONS

P#	%load request	Capacity (tons)	Total unit input power (kW)	Performance (kW/ton)
1	100	148.2	111.2	0.750
2	75	111.2	67.7	0.609
3	50	74.1	39.9	0.538
4	25	37.1	20.1	0.543

SOUND DATA

Sound pressure (at 1 meter) – octave band at center frequency (Without sound insulation)

63Hz	125Hz	250Hz	500Hz	1000Hz	2000Hz	4000Hz	8000Hz	Overall
76	70	75	79	80	77	74	65	84

Sound power – octave band at center frequency (Without sound insulation)

63Hz	125Hz	250Hz	500Hz	1000Hz	2000Hz	4000Hz	8000Hz	Overall
84	78	83	87	88	85	82	73	92

Octave band is non 'A' weighted and overall readings are 'A' weighted. Sound data rated in accordance with AHRI Standard-575.

DRAFT

© 2013 Daikin www.DaikinApplied.com

UNIT ELECTRICAL DATA (ETL / Canadian ETL Listed and Labeled) ***				
Volts	460	Hertz		60
	Single Point+	Multi Point+		
[with optional supplemental overloads]		Ckt 1	Ckt 2	Ckt 3
MCA	237 [185]	123 [96]	123 [96]	N/A
Field Wire Gauge	250 MCM [3/0 AWG]	1 AWG [3 AWG]	1 AWG [3 AWG]	N/A
Field Wire Qty	3 [3]	3 [3]	3 [3]	N/A
Conduit Qty	1 [1]	1 [1]	1 [1]	N/A
Conduit Nom Size	2.00 [2.00]	1.25 [1]	1.25 [1]	N/A
Rec Fuse Size	250 [200]	150 [125]	150 [125]	N/A
Max Fuse Size	250 [200]	150 [125]	150 [125]	N/A
Terminal Amps for Standard Power Block**	380	175	175	N/A
Connector Wire Range for Standard Power Block**	(1) 500 - #4	(1) 2/0 - #14	(1) 2/0 - #14	N/A
Terminal Amps for Optional Disconnect Switch**	400	250	250	N/A
Connector Wire Range for Optional Disconnect Switch**	(2) 500 - 3/0	(1) 350 - #6	(1) 350 - #6	N/A

+ Both single and multiple point data are shown for user convenience.
*** Both standard power block and optional disconnect data are shown for user convenience.*
**** Electrical data does not include items configured in the Job Editor such as a pump package.*
For all options refer to the order acknowledgement for the actual configuration

COMPRESSOR ELECTRICAL DATA						
Type / Quantity	Scroll/6					
	Comp 1	Comp 2	Comp 3	Comp 4	Comp 5	Comp 6
RLA	37.8 [29.6]	37.8 [29.6]	37.8 [29.6]	37.8 [29.6]	37.8 [29.6]	37.8 [29.6]
LRA						
Across the Line	320.0	320.0	320.0	320.0	320.0	320.0
Reduced Inrush / Part Winding	N/A	N/A	N/A	N/A	N/A	N/A
Reduced Inrush / Solid State	N/A	N/A	N/A	N/A	N/A	N/A

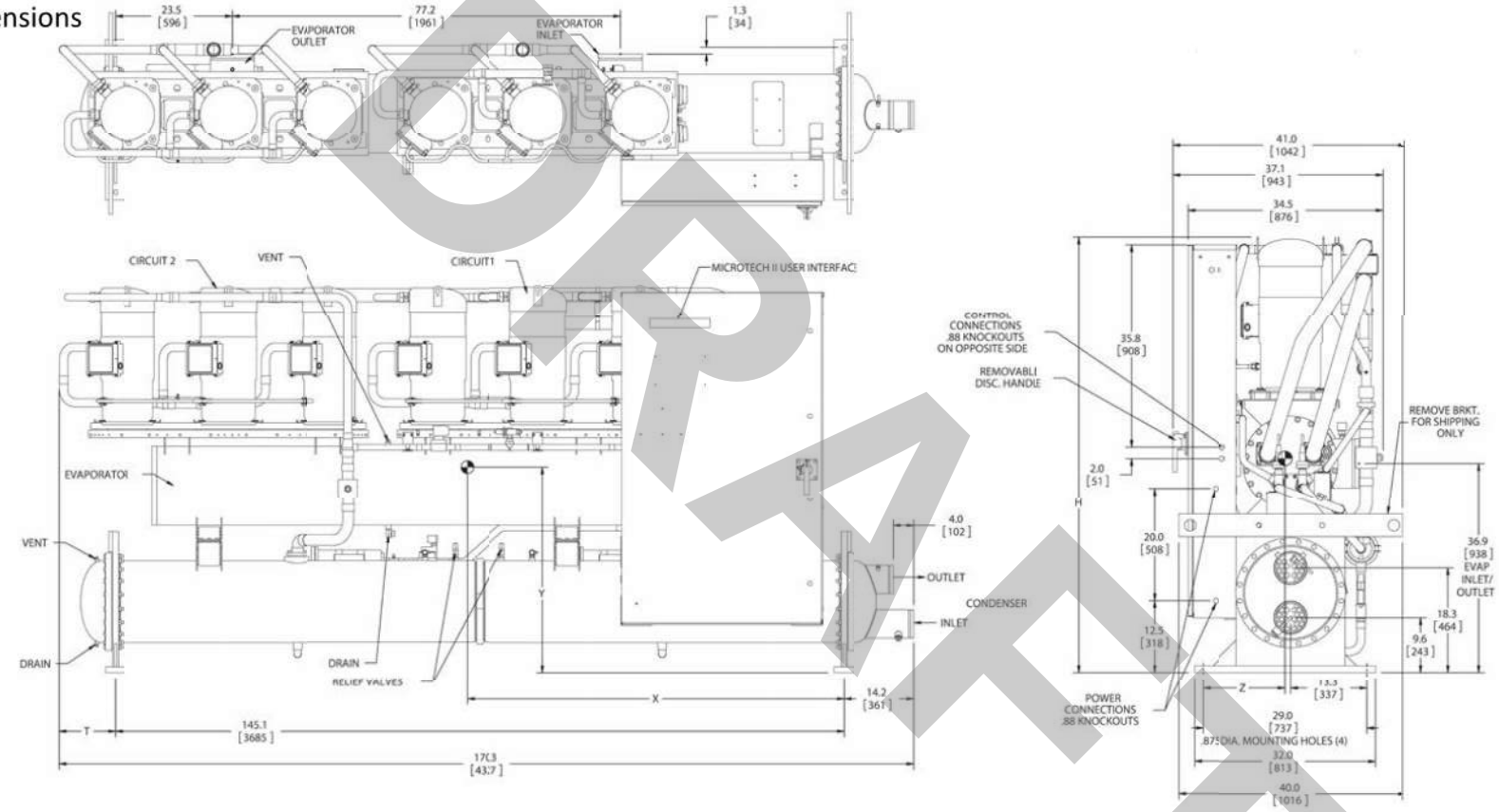
AHRI 550/590 CERTIFICATION

Certified in accordance with the AHRI Water-Cooled Water-Chilling and Heat Pump Water-Heating Packages Using Vapor Compression Cycle Certification Program, which is based on AHRI Standard 550/590 (I-P) and AHRI Standard 551/591 (SI). Certified units may be found in the AHRI Directory at www.ahridirectory.org.

DRAFT

WGZ150DW Packaged Water-Cooled Scroll Chiller

Unit Dimensions



Dimensions							
Unit of Measure	Maximum Overall Height	Chilled Water Connection Victaulic	Condenser Water Connection Victaulic		Center of Gravity		
	H	Nominal Size (OD)	Nominal Size (OD)	T	X	Y	Z
in	76.9	8	5	11	75	37.8	14.8
mm	1953	203	127	279	1905	960	376

Dimension Notes
The drawings shown on sheet 1 and 2 are for the default configuration; your unit may be configured differently. Consult the Item Summary sheet for exact configuration.

Product Drawing	Unit Tag:			Sales Office:		
Product: Water-Cooled Scroll Chiller	Project Name:			Sales Engineer:		
Model: WGZ150DW	Date:	Ver/Rev:	Sheet: 1 of 2	Scale: NTS	Tolerance: +/- 1.0"	Dwg Units: in [mm]

DAIKIN
13600 Industrial Park Blvd. Minneapolis, MN 55441
www.DaikinApplied.com Software Version:

No change to this drawing may be made unless approved in writing by Daikin Applied. Purchaser must determine that the equipment is fit and sufficient for the job specifications.

DRAFT

MAGNITUDE™ Water Cooled Centrifugal Chiller

Job Information	*Technical Data Sheet*
Job Name	Tucson House
Date	1/28/2016
Submitted By	Steve Williams
Software Version	10.80
Unit Tag	CH-250
Country of Origin	USA

Unit Overview

Model Number	Capacity ton	IPLV kW/ton	Voltage	Starter Type	ASHRAE 90.1	LEED EA Credit 4
WMC290DC	250.0	0.319	460 v / 60 Hz	VFD	'04, '07 & '10	Qualifies

Unit

Model Number:	WMC290DCSN15/E2612-HB2C-2/C2212-HB2C-2/R134-DAABA-U
Approval:	AHRI and ETL / cETL
Vessel Code:	ASME

Compressor Quantity	Capacity Control	Refrigerant Type	Refrigerant Weight
2	VFD / Inlet Guide Vanes	R134a	887 lb

Evaporator

Entering Fluid Temperature	Leaving Fluid Temperature	Fluid Type	Actual Fluid Flow	Minimum Fluid Flow
53.99 °F	44.00 °F	Water	600.00 gpm	222.8 gpm

Length	Diameter	Number of Passes	Tube		Fouling Factor
			Material	Wall Thickness	
12 ft	26 in	2	Copper	0.025 in	0.00010 °F.ft².h/Btu

Condenser

Entering Fluid Temperature	Leaving Fluid Temperature	Fluid Type	Fluid Flow
85.00 °F	94.42 °F	Water	750.00 gpm

Length	Diameter	Number of Passes	Tube		Fouling Factor
			Material	Wall Thickness	
12 ft	22 in	2	Copper	0.025 in	0.00025 °F.ft².h/Btu

Unit Performance

Design Points Rated with AHRI Condenser Relief

Capacity ton	Input kW	Efficiency kW/ton	RLA A	IPLV kW/ton	Part Load Efficiency			Evaporator Fluid		Condenser Fluid	
					75% kW/ton	50% kW/ton	25% kW/ton	Pressure Drop ft H_2O	Entering Temperature °F	Pressure Drop ft H_2O	Leaving Temperature °F
250.0	145.1	0.581	206	0.319	0.409	0.275	0.267	20.0	53.99	15.5	94.42

Performance Points Rated with AHRI Condenser Relief

Point #	% of Design Load	Capacity ton	Input kW	Efficiency kW/ton	RLA A	Evaporator Fluid				Condenser Fluid			
						Flow gpm	Temperature		Pressure Drop ft H_2O	Flow gpm	Temperature		Pressure Drop ft H_2O
							Entering °F	Leaving °F			Entering °F	Leaving °F	
1	100.0	250.0	145.1	0.581	206	600.00	53.99	44.00	20.0	750.00	85.00	94.42	15.5
2	75.0	187.5	76.6	0.409	112	600.00	51.49	44.00	20.0	750.00	75.00	81.76	16.1
3	50.0	125.0	34.4	0.275	56	600.00	48.99	44.00	20.0	750.00	65.00	69.34	16.8
4	25.0	62.5	16.7	0.267	27	600.00	46.50	44.00	20.0	750.00	65.00	67.15	16.9

DRAFT

Service Data

Service Points Rated with AHRI Condenser Relief								
Point #	Superheat Δ °F	Subcooling Δ °F	Evaporator Fluid			Condenser Fluid		
			Temperature °F	Pressure psig	Velocity ft/s	Temperature °F	Pressure psig	Velocity ft/s
1	1.0	8.8	43.1	38.1	6.1	96.1	116.2	6.3
2	1.0	7.1	43.2	38.2	6.1	83.1	91.9	6.3
3	1.0	5.0	43.4	38.4	6.1	70.2	71.4	6.3
4	1.0	2.5	43.5	38.5	6.1	67.5	67.5	6.3

Physical

Evaporator				
Inlet Location	Header Type	Header Material	Tube Sheet Material	Design Pressure (Waterside)
Left	Dished, Grooved	Carbon Steel	Carbon Steel	150 psig

Condenser				
Inlet Location	Header Type	Header Material	Tube Sheet Material	Design Pressure (Waterside)
Left	Dished, Grooved	Carbon Steel	Carbon Steel	150 psig

Electrical

Voltage	RLA (per unit)	LRA* (per compressor)	Power Connection	MCA	MOCP	Lug Size (wires per phase)
460 V / 60 Hz / 3 Phase	206 A	113 A	Single Point	232 A	300 A	(1) 250MCM - 500MCM

** The field wiring must be sized in accordance with the MCA and not the RLA as some selections may be below the minimum required protection.*

Drive

Type	Model	Location	Enclosure Type	Motor Protection
VFD	Integral	Terminal Mounted	NEMA 1	Standard

Line Reactor	Compressor Circuit Breaker	Disconnect Switch	Power Connection	Short Circuit Current Rating	Approval
Standard	Standard	Standard	Single Point	Standard	ETL, ETLc

Sound (without insulation)

Sound Pressure									
Load	Overall	63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz
100%	81.5	37.5	51.5	59.5	72.0	75.0	72.5	76.5	75.0
75%	78.0	37.0	50.5	62.5	66.5	70.0	69.5	74.0	70.5
50%	75.0	37.5	50.0	60.0	65.0	65.5	66.0	71.5	66.0
25%	73.5	37.5	49.0	59.0	63.0	65.0	66.0	69.5	64.0

Sound Pressure (dB) measured in accordance with ANSI/AHRI Standard 575-2008 ('A' weighted)

Options

Basic Unit	
Packaging:	Bagging only

Insulation	
Thermal:	0.75" on Evaporator Shell, Suction Piping, Compressor Inlet, Motor Barrel & High Humidity
Head:	Evaporator Return & Connection Heads

Drive	
Disconnect / Breaker Type:	Disconnect Switch

DRAFT

Lifecycle Cost

Operation	Electricity Cost	Annual Energy Cost	Life of Equipment	Total Lifecycle Equipment and Energy Cost
2340 hours / year	0.12 $/kWh	$14,358.00	25 years	$493,426.00

Warranty

Unit Startup:	Domestic by Daikin Factory Service (Std.)
Standard Warranty:	Domestic, First Year Standard Warranty (Parts & Labor)
Delayed Warranty Start:	None (Startup 12-18 months after ship date)

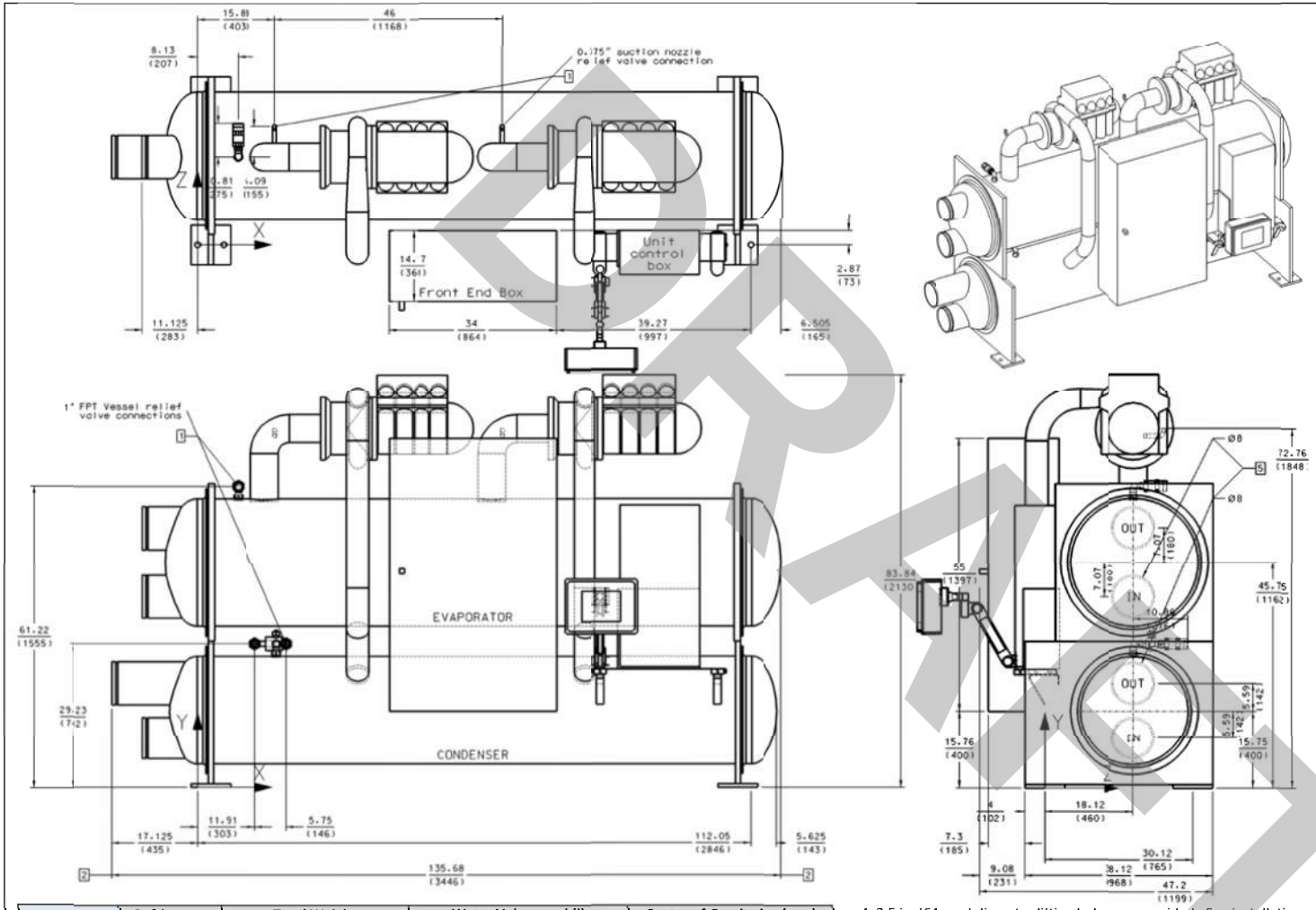
AHRI Certification

Certified in accordance with the AHRI Water-Cooled Water-Chilling and Heat Pump Water-Heating Packages Using Vapor Compression Cycle Certification Program, which is based on AHRI Standard 550/590 (I-P) and AHRI Standard 551/591 (SI). Certified units may be found in the AHRI Directory at www.ahridirectory.org.

Notes

1. Above RLA values are per Unit.
2. Performance kW & kW/ton values are total values unless noted otherwise.
3. Minimum flow is based upon standard condenser water relief and not increased lift due to constant condenser water temperature.
4. The field wiring must be sized in accordance with the MCA and not the RLA as some selections may be below the minimum required protection.
5. Use only copper supply wires with ampacity based on 75°C conductor rating. Connections to terminals must be made with copper lugs and copper wire.
6. For orientation purposes, left and right hand vessel connection locations are determined by facing the OITS panel (Operator Interface Touch Screen). The unit front is the long dimension side with the OITS panel and rear is the opposite side long dimension.

DRAFT



	Refrigerant lbs (kg)	Total Weight (inc. Refrigerant) lbs (kg)	Water Volume gal (l)		Center of Gravity ins (mm)		
			Evap	Cond	X	Y	Z
Operating	666 (302)	8283 (3757)	63 (240)	55 (209)	57 (1450)	36 (904)	17 (434)
Shipping		7293 (3308)	- (-)	- (-)	58 (1463)	35 (900)	17 (430)

1. 1 in. (25 mm) FPT evaporator and condenser relief valves and .375 in. (9mm) suction nozzle relief valves must be piped per ANSI/ASHRAE 15.
2. At a minimum, length of tube sheet to tube sheet dimensions is required at either end for tube removal, 36 in. (914 mm) is required at other end and each side and top for service.
3. Final connections must allow for 0.5 in. (12.7 mm) manufacturing tolerance.
4. 2.5 in. (64 mm) diameter lifting holes are provided. See installation manual for lifting instructions.
5. All water connections are given in standard U.S. pipe sizes. Standard connections are suitable for welding or grooved couplings.
6. Vibration isolator pads are provided for field installation (0.25 in (6 mm) thick when loaded).
7. If main power wiring is brought up through the floor, this wiring must be outside the envelope of the unit.
8. The shipping skid adds 4 in. (105 mm) to the overall unit height.
9. Dimensions shown are for units with standard 150 psi (1034 kPa) design water side pressure. Check factory for unit dimensions with higher pressures.

Product Drawing	Unit Tag: CH-250			Sales Office: Varitec Solutions (Phoenix)		DAIKIN 13600 Industrial Park Blvd. Minneapolis, MN5544 www.DaikinApplied.com
Product: Magnitude™ Chiller	Project Name: Tucson House			Sales Engineer: Steve Williams		
Model: WMC225DC/E2609-UD2CL2V/C2209-HB2CL2V	Date: 28/01/2016	Ver/Rev:	Sheet: 1 of 5	Scale: NTS	Tolerance: +/- 1.0"	Dwg Units: in (mm)
WMC225DCSN1400460H6D/E2609UD2CDKL2VCNA/C2209HB2CDRL2VCNA/NB						

No change to this drawing may be made unless approved in writing by Daikin Applied. Purchaser must determine that the equipment is fit and sufficient for the job specifications.

DRAFT

Water Cooled Centrifugal Chiller

Job Information	*Technical Data Sheet*
Job Name	Tucson House
Date	1/28/2016
Submitted By	Steve Williams
Software Version	10.80
Unit Tag	CH-350
Country of Origin	USA

Unit Overview

Model Number	Capacity ton	IPLV kW/ton	Voltage	Starter Type	LEED EA Credit 4
WSC079L	350.0	0.360	460 V / 60 Hz	VFD	Qualifies

Unit

Model Number:	WSC079LAY29R/E2612-KE-2**/C2212-CLYY-2*****/R134-DBABM-U
Approval:	AHRI and ETL / cETL
Vessel Code:	ASME

Compressor Quantity	Capacity Control	Refrigerant Type	Refrigerant Weight
1	Inlet Guide Vanes	R134a	860 lb

Evaporator

Entering Fluid Temperature	Leaving Fluid Temperature	Fluid Type	Actual Fluid Flow	Minimum Fluid Flow
53.99 °F	44.00 °F	Water	840.00 gpm	157.7 gpm

Length	Diameter	Number of Passes	Tube		Fouling Factor
			Material	Wall Thickness	
12 ft	26 in	2	Copper	0.025 in	0.00010 °F.ft².h/Btu

Condenser

Entering Fluid Temperature	Leaving Fluid Temperature	Fluid Type	Fluid Flow
85.00 °F	94.28 °F	Water	1050.00 gpm

Length	Diameter	Number of Passes	Tube		Fouling Factor
			Material	Wall Thickness	
12 ft	22 in	2	Copper	0.025 in	0.00025 °F.ft².h/Btu

Unit Performance

Design Points Rated with AHRI Condenser Relief

Capacity ton	Input kW	Efficiency kW/ton	RLA A	IPLV kW/ton	Part Load Efficiency			Evaporator Fluid		Condenser Fluid	
					75% kW/ton	50% kW/ton	25% kW/ton	Pressure Drop ft H_2O	Entering Temperature °F	Pressure Drop ft H_2O	Leaving Temperature °F
350.0	221.1	0.632	307	0.360	0.442	0.304	0.360	27.9	53.99	27.8	94.28

Performance Points Rated with AHRI Condenser Relief

Point #	% of Design Load	Capacity ton	Input kW	Efficiency kW/ton	RLA A	Evaporator Fluid				Condenser Fluid			
						Flow gpm	Temperature		Pressure Drop ft H_2O	Flow gpm	Temperature		Pressure Drop ft H_2O
							Entering °F	Leaving °F			Entering °F	Leaving °F	
1	100.0	350.0	221.1	0.632	307	840.00	53.99	44.00	27.9	1,050.00	85.00	94.28	27.8
2	75.0	262.5	116.0	0.442	180	840.00	51.49	44.00	27.9	1,050.00	75.00	81.62	28.9
3	50.0	175.0	53.3	0.304	117	840.00	49.00	44.00	27.9	1,050.00	65.00	69.23	30.2
4	25.0	87.5	31.5	0.360	98	840.00	46.50	44.00	28.0	1,050.00	65.00	67.10	30.3

DRAFT

Service Data

Service Points Rated with AHRI Condenser Relief

Point #	Superheat Δ °F	Subcooling Δ °F	Evaporator Fluid Temperature °F	Evaporator Fluid Pressure psig	Evaporator Fluid Velocity ft/s	Condenser Fluid Temperature °F	Condenser Fluid Pressure psig	Condenser Fluid Velocity ft/s
1	1.0	8.7	42.4	37.5	9.7	96.3	116.5	8.8
2	1.0	6.6	42.8	37.9	9.7	83.1	92.0	8.8
3	1.0	4.5	43.2	38.2	9.7	70.2	71.5	8.8
4	1.0	2.4	43.6	38.6	9.7	67.6	67.7	8.8

Physical

Evaporator

Inlet Location	Header Type	Header Material	Tube Sheet Material	Design Pressure (Waterside)
Right	Dished, Grooved	Carbon Steel	Carbon Steel	150 psig

Condenser

Inlet Location	Header Type	Header Material	Tube Sheet Material	Design Pressure (Waterside)
Right	Dished, Grooved	Carbon Steel	Carbon Steel	150 psig

Electrical

Voltage	RLA	LRA	Power Connection	Power Factor Correction	Power Factor Corrected	MCA	MOCP	Inrush Value
460 V / 60 Hz / 3 Phase	307 A	1780 A	Single Point	Inherent	0.96	390 A	544 A	368 A

Drive

Type	Model	Location	Harmonic Distortion	Enclosure Type	Motor Protection
VFD	035AMA	Unit Mounted	Standard	NEMA 1	Standard

Sound (without insulation)

Sound Pressure

63 Hz	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz	Overall	75% Load	50% Load	25% Load
69.0	67.0	69.0	71.0	76.0	78.0	78.0	74.0	**83.5**	81.5	81.5	82.5

Sound Pressure (dB) measured in accordance with ANSI/AHRI Standard 575-2008 ('A' weighted)

Options

Basic Unit

Packaging:	Bagging only

Evaporator

Hinge Type:	Hinges on Both Ends

Condenser

Insulation

Thermal:	0.75" on Evaporator Shell, Suction Piping, Compressor Inlet, Motor Barrel & High Humidity
Head:	Evaporator Return & Connection Heads

Drive

Disconnect / Breaker Type:	Std - Load Break Disconnect Switch
Line Reactors:	Included as standard

Lifecycle Cost

Operation	Electricity Cost	Annual Energy Cost	Life of Equipment	Total Lifecycle Equipment and Energy Cost
2340 hours / year	0.12 $/kWh	$22,088.00	25 years	$662,174.00

DRAFT

Warranty

Unit Startup:	Domestic by Daikin Factory Service (Std.)
Standard Warranty:	Domestic, First Year Standard Warranty (Parts & Labor)
Delayed Warranty Start:	None (Startup 12-18 months after ship date)

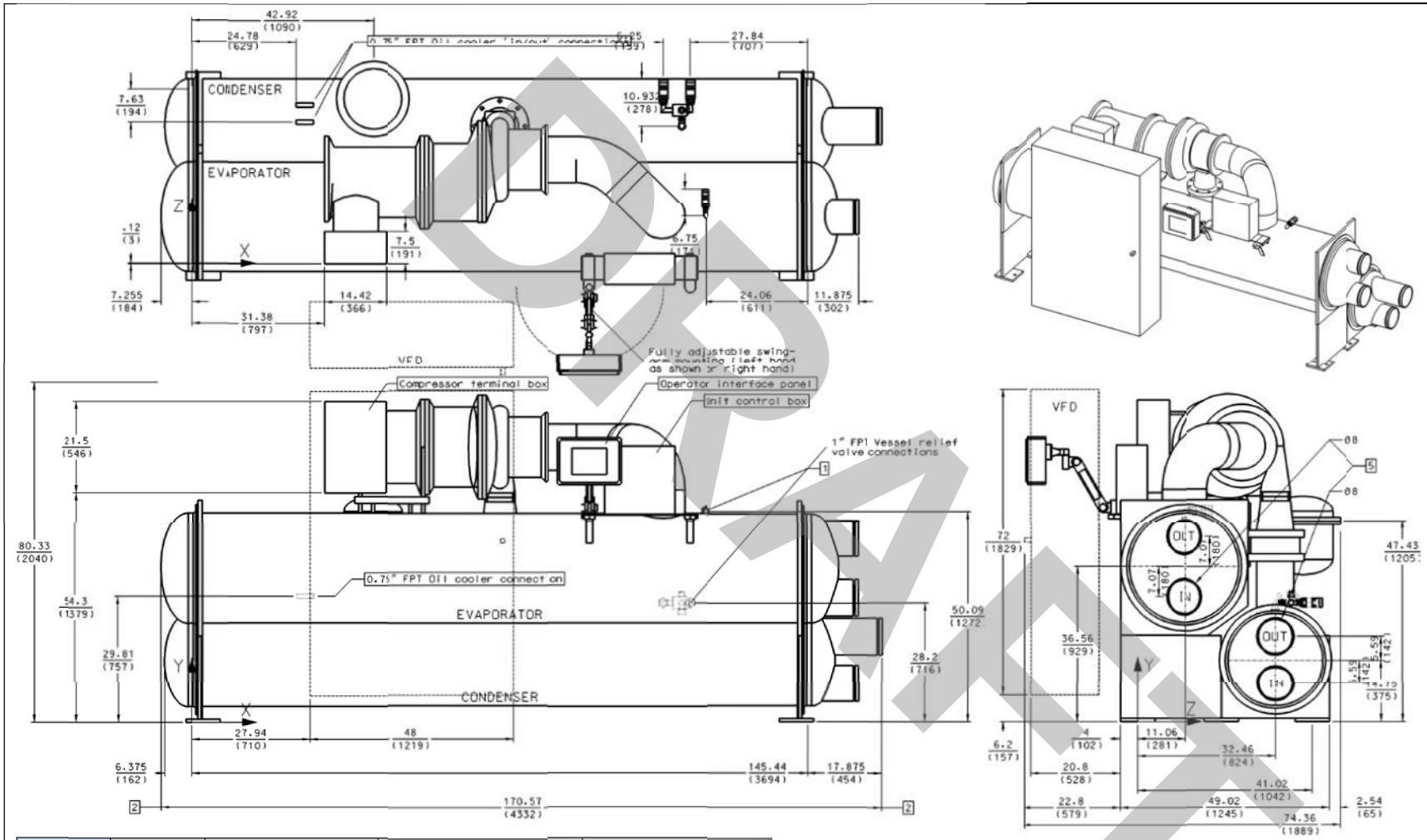
AHRI Certification

Certified in accordance with the AHRI Water-Cooled Water-Chilling and Heat Pump Water-Heating Packages Using Vapor Compression Cycle Certification Program, which is based on AHRI Standard 550/590 (I-P) and AHRI Standard 551/591 (SI). Certified units may be found in the AHRI Directory at www.ahridirectory.org.

Notes

1. Above RLA, MCA and MOCP values are per Compressor.
2. Performance kW & kW/ton values are total values unless noted otherwise.
3. Minimum flow is based upon standard condenser water relief and not increased lift due to constant condenser water temperature.
4. This model utilizes a water cooled oil cooler as standard equipment.
5. Use only copper supply wires with ampacity based on 75°C conductor rating. (Exception: for equipment rated over 2,000 volts, 90°C or 105°C rated conductors shall be used). Connections to terminals must be made with copper lugs and copper wire.
6. For orientation purposes, left and right hand vessel connection locations are determined by facing the OITS panel (Operator Interface Touch Screen). The unit front is the long dimension side with the OITS panel and rear is the opposite side long dimension.

DRAFT



	Refrigerant lbs (kg)	Total Weight (inc. Refrigerant) lbs (kg)	Water Volume gal (l)		Center of Gravity ins (mm)		
			Evap	Cond	X	Y	Z
Operating	859 (390)	14208 (6445)	66 (249)	69 (261)	68 (1715)	36 (922)	17 (444)
Shipping		13085 (5935)	- (-)	- (-)	67 (1704)	36 (917)	18 (463)

1. 1 in. (25 mm) FPT evaporator and condenser relief valves must be piped per ANSI/ASHRAE 15.
2. At a minimum, length of tube sheet to tube sheet dimensions is required at either end for tube removal, 36 in. (914 mm) is required at other end and each side and top for service.
3. Final connections must allow for 0.5 in. (12.7 mm) manufacturing tolerance.
4. 2.5 in. (64 mm) diameter lifting holes are provided. See installation manual for lifting instructions.
5. All water connections are given in standard U.S. pipe sizes. Standard connections are suitable for welding or grooved couplings.
6. Vibration isolator pads are provided for field installation (0.25 in (6 mm) thick when loaded).
7. If main power wiring is brought up through the floor, this wiring must be outside the envelope of the unit.
8. The shipping skid adds 4 in. (105 mm) to the overall unit height.
9. Dimensions shown are for units with standard 150 psi (1034 kPa) design water side pressure. Check factory for unit dimensions with higher pressures.

Product Drawing	Unit Tag: CH-350			Sales Office: Varitec Solutions (Phoenix)			DAIKIN
Product: Water Cooled Centrifugal Chiller	Project Name: Tucson House			Sales Engineer: Steve Williams			13600 Industrial Park Blvd. Minneapolis, MN5544
Model: WSC079L/E2612-2RA/C2212-2RA	Date: 28/01/2016	Ver/Rev:	Sheet: 1 of 5	Scale: NTS	Tolerance: +/- 1.0"	Dwg Units: in (mm)	www.DaikinApplied.com
WSC079LAY29RD/E2612KE2RAB/C2212CLYY2RAYYYA/AHN							
No change to this drawing may be made unless approved in writing by Daikin Applied. Purchaser must determine that the equipment is fit and sufficient for the job specifications							

DRAFT

Produced on 1/28/2016 with Xpress Selection V7.1.0 - database Central_USA 9.8.8

Project name	Tucson House Renovation
Project address	Tucson
Reference	Water-Cooled VRV (1/2 of Typical Apartment Floor)
Client name	PH Mechanical

Selection parameters of the indoor units can be found under the chapter Indoor unit details
Selection parameters of the outdoor units can be found under the chapter Outdoor unit details
Only the data published in the data book are correct. This program uses close approximations of these data.

1. Material List

Model	Qty	Description
RWEYQ84PCYD -HR	2	Heat recovery VRV IV W-SERIES 460V
BS6Q54TVJ	2	Branch selector unit
BSQ36TVJ	1	Branch selector unit
FXDQ12MVJU	10	VRV D - Concealed Slim Duct (Low Static)
FXDQ18MVJU	3	VRV D - Concealed Slim Duct (Low Static)
KHRP25A33T9	1	Refnet branch piping kit
KHRP25M72TU9	1	Refnet branch piping kit
DCM601A71	1	intelligent Touch Manager (iTM)
BRC1E73	13	new Navigation Remote Controller
BHFP26MA56U	1	VRV-WII Connection Piping Kit (2 Unit, HR)
Strainer	2	Strainer, field supply

DRAFT

2. Indoor Unit Details

2.1. Table of Abbreviations

Name	Logical name of the device
FCU	Device model name
Tmp C	Indoor conditions in cooling (dry bulb temp. / wet bulb temp.)
Rq TC	Required total cooling capacity
Max TC	Available total cooling capacity
Rq SC	Required sensible cooling capacity
Max SC	Available sensible cooling capacity
Tevap	Evaporating temperature of indoor unit coil
Tmp H	Indoor temperature in heating
Rq HC	Required heating capacity
Max HC	Available heating capacity
Airflow	Supplied airflow
Sound	Sound pressure low and high
PS	Power supply (voltage and phases)
MCA	Minimum Circuit Amps
Fuses	Fuses
WxHxD	WidthxHeightxDepth
Wght	Weight of the device

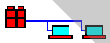
DRAFT

2.2. CU-1 - RWEYQ168PCYD -HR

Capacity data at conditions and connection ratio (104%) as entered

Name	FCU	Tmp C	Rq TC	Max TC	Rq SC	Max SC	Tevap	Tmp H	Rq HC	Max HC	Airflow
		°F	BTU/h	BTU/h	BTU/h	BTU/h	°F	°F	BTU/h	BTU/h	cfm
FC-1	FXDQ18MVJU	75.0 / 62.0	n/a	14833	n/a	11107	42.8	70.0	n/a	20000	440
FC-2	FXDQ12MVJU	75.0 / 62.0	n/a	9900	n/a	7531	42.8	68.0	n/a	14000	280
FC-3	FXDQ12MVJU	75.0 / 62.0	n/a	9900	n/a	7531	42.8	68.0	n/a	14000	280
FC-4	FXDQ12MVJU	75.0 / 62.0	n/a	9900	n/a	7531	42.8	68.0	n/a	14000	280
FC-5	FXDQ12MVJU	75.0 / 62.0	n/a	9900	n/a	7531	42.8	68.0	n/a	14000	280
FC-6	FXDQ18MVJU	75.0 / 62.0	n/a	14833	n/a	11107	42.8	68.0	n/a	21000	440
FC-7	FXDQ12MVJU	75.0 / 62.0	n/a	9900	n/a	7531	42.8	68.0	n/a	14000	280
FC-8	FXDQ12MVJU	75.0 / 62.0	n/a	9900	n/a	7531	42.8	68.0	n/a	14000	280
FC-9	FXDQ12MVJU	75.0 / 62.0	n/a	9900	n/a	7531	42.8	68.0	n/a	14000	280
FC-10	FXDQ12MVJU	75.0 / 62.0	n/a	9900	n/a	7531	42.8	68.0	n/a	14000	280
FC-11	FXDQ12MVJU	75.0 / 62.0	n/a	9900	n/a	7531	42.8	68.0	n/a	14000	280
FC-12	FXDQ12MVJU	75.0 / 62.0	n/a	9900	n/a	7531	42.8	68.0	n/a	14000	280
FC-13	FXDQ18MVJU	75.0 / 62.0	n/a	14833	n/a	11107	42.8	68.0	n/a	21000	440
Σ			143501						202000		

Name	Sound	PS	MCA	Fuses	WxHxD	Wght
	dBA		A		inch	lbs
FC-1	31-35	230V 1ph	1.3	15A	35.8x7.9x24.7	68
FC-2	29-33	230V 1ph	0.9	15A	27.8x7.9x24.7	49
FC-3	29-33	230V 1ph	0.9	15A	27.8x7.9x24.7	49
FC-4	29-33	230V 1ph	0.9	15A	27.8x7.9x24.7	49
FC-5	29-33	230V 1ph	0.9	15A	27.8x7.9x24.7	49
FC-6	31-35	230V 1ph	1.3	15A	35.8x7.9x24.7	68
FC-7	29-33	230V 1ph	0.9	15A	27.8x7.9x24.7	49
FC-8	29-33	230V 1ph	0.9	15A	27.8x7.9x24.7	49
FC-9	29-33	230V 1ph	0.9	15A	27.8x7.9x24.7	49
FC-10	29-33	230V 1ph	0.9	15A	27.8x7.9x24.7	49
FC-11	29-33	230V 1ph	0.9	15A	27.8x7.9x24.7	49
FC-12	29-33	230V 1ph	0.9	15A	27.8x7.9x24.7	49
FC-13	31-35	230V 1ph	1.3	15A	35.8x7.9x24.7	68



Outdoor unit placed at the same level as the indoor units.

DRAFT

3. Outdoor Unit Details

3.1. Table of Abbreviations

Name	Logical name of the device
Model	Device model name
Comb	Connection ratio
WFR	Water flow per outdoor unit module
CC	Available cooling capacity
Rq CC	Required cooling capacity
PIC	Power input in cooling mode
InC	Water inlet temperature in cooling mode
OutC	Water outlet temperature in cooling mode
HC	Available heating capacity (integrated heating capacity)
Rq HC	Required heating capacity
PIH	Power input in heating mode
InH	Water inlet temperature in heating mode
OutH	Water outlet temperature in heating mode
Piping	Largest distance from indoor unit to outdoor unit
Bse Refr	Standard factory refrigerant charge (5m actual piping length)
	excluding extra refrigerant charge
	For calculation of extra refrigerant charge refer to the databook
PS	Power supply (voltage and phases)
MCA	Minimum Circuit Amps
MFA	Maximum Fuse Amps
Run Amps	Running Amps
St Curr	Starting current
Fuses	Fuses
WxHxD	WidthxHeightxDepth
Wght	Weight of the device
EER	EER value at nominal conditions
IEER	IEER value at nominal conditions
COP 47°F	COP value at nominal conditions and ambient temperature of 47°F
SCHE	SCHE (Simultaneous Cooling and Heating Efficiency) value at nominal conditions

DRAFT

3.2. Outdoor Details

Name	Model	Comb	WFR	CC	Rq CC	PIC	InC	OutC	HC	Rq HC	PIH	InH	OutH	Piping
		%	gpm (us)	BTU/h	BTU/h	kW	°F	°F	BTU/h	BTU/h	kW	°F	°F	ft
CU-1	RWEY Q168P CYD - HR	104	30.0	138878	129151 BTU/h	7.9	80.0	85.8	191242	141400 BTU/h	12.9	60.0	55.0	250.0

Name	Model	Refrigerant		
		Type	Bse Refr	Ex Refr
			lbs	lbs
CU-1	RWEYQ168PCYD -HR	R410A	22.9	n/a

Name	Model	PS	MCA	MFA	Run Amps	St Curr	Fuses	WxHxD	Wght
			A	A	A	A		inch	lbs
CU-1	RWEYQ168PCYD -HR	460V 3ph							
	* RWEYQ84PCYD -HR		10.2	15	7		15 A	30.7x39.4x21.7	343
	* RWEYQ84PCYD -HR		10.2	15	7		15 A	30.7x39.4x21.7	343
BS 1	BS6Q54TVJ	230V 1ph	0.6	15				22.8x11.7x18.9	68
BS 2	BS6Q54TVJ	230V 1ph	0.6	15				22.8x11.7x18.9	68
BS 3	BSQ36TVJ	230V 1ph	0.1	15				15.3x8.1x12.8	27

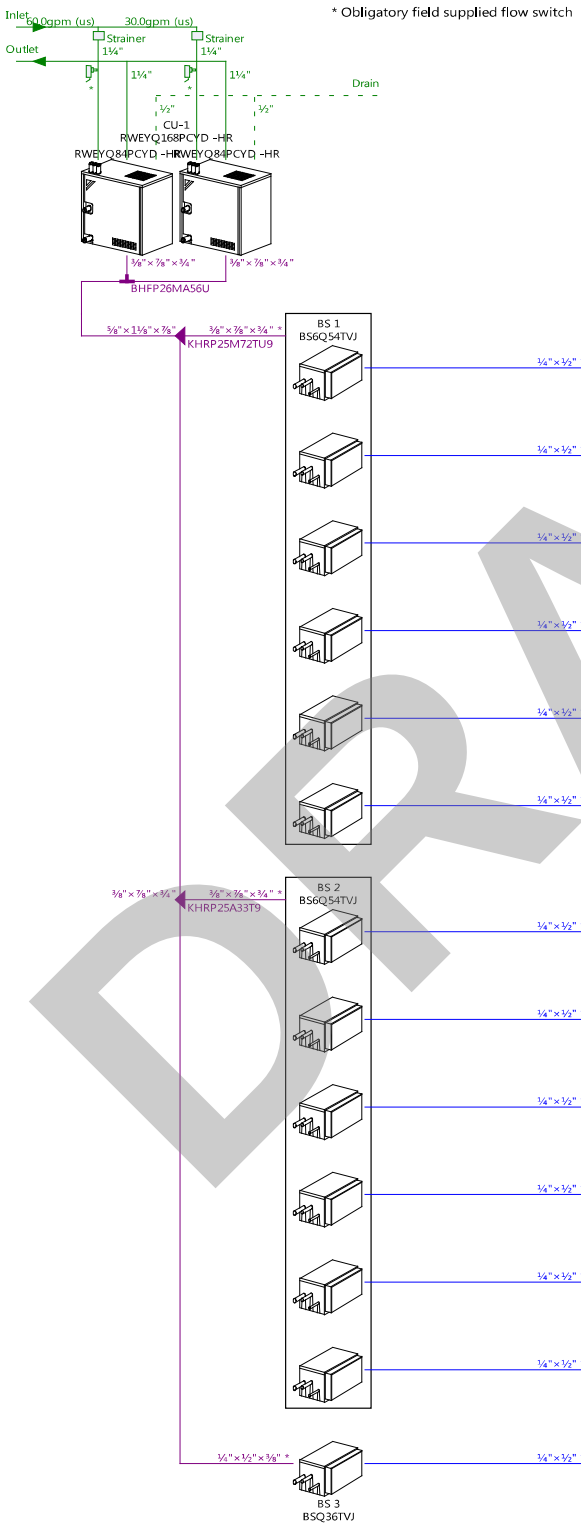
Sufficient distance should be respected between the modules according to the service & operation space rules as mentioned in the databook.

Name	Ducted				Non-ducted			
	EER	IEER	COP 47°F	SCHE	EER	IEER	COP 47°F	SCHE
CU-1	12.7	21.3	4.38	17.8	12.7	23.1	4.38	17

DRAFT

4. Piping Diagrams

Pipes marked with * in the diagrams must be connected to the device with a reducing joint

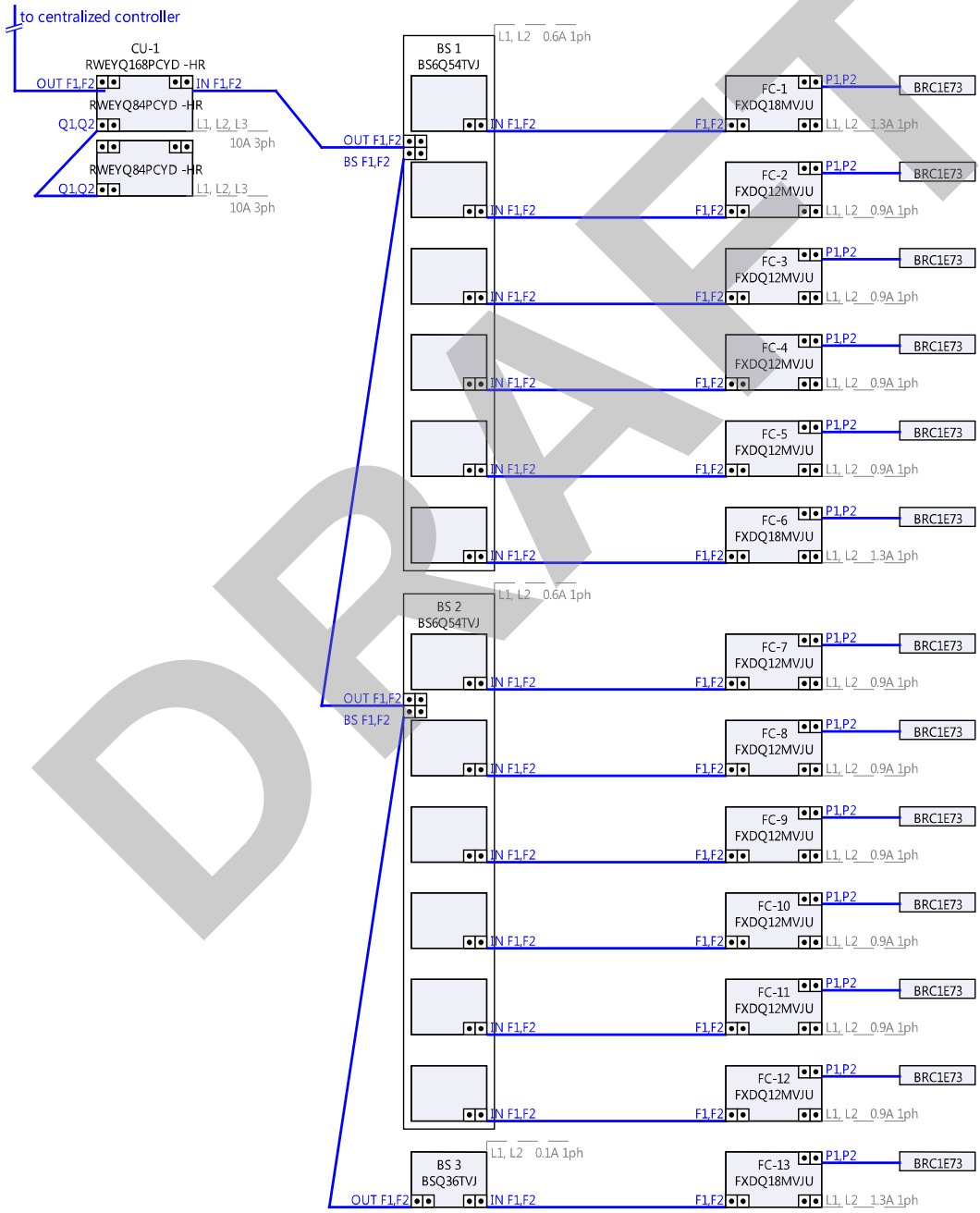


DRAFT

5. Wiring Diagrams

P1P2 = Please select the cable type and size in accordance with the databook.
F1F2 = Please select the cable type and size in accordance with the databook.

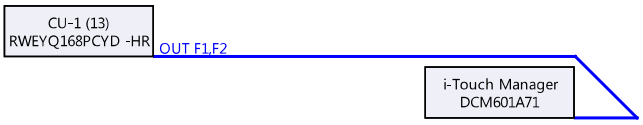
5.1. Wiring CU-1



DRAFT

6. Centralized Controllers

6.1. Control group 1



DRAFT

SITE DATA

Design Load	10,500,000
Cd	0.65
Eff. Sys. 1	70%
Eff. Sys. 2	
Gas	$ 1.00

Accounts for Internal Loads and Solar Gains

Design Load X LOAD%

LOAD X HRS X Cd
EFF. 1 X 100,000

LOAD X HRS X Cd
EFF. 2 X 100,000

SITE TEMP and LOAD DATA

PLANT PERFORMANCE

AVG (F)	BIN RANGE (F)	TOTAL (HRS)	TOTAL (%)	CUM (%)	LOAD (%)	LOAD BTUs/Hr	System 1 Therms	System 2 Therms	Difference Therms	CUM Diff. Therms	CUM DIF Price
63	62 to 64	337	11.05	11.1	5.3	552,632	1,729.34	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
61	60 to 62	313	10.27	21.3	10.5	1,105,263	3,212.37	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
59	58 to 60	193	6.33	27.6	15.8	1,657,895	2,971.18	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
57	56 to 58	302	9.90	37.6	21.1	2,210,526	6,198.95	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
55	54 to 56	447	14.66	52.2	26.3	2,763,158	11,469.08	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
53	52 to 54	287	9.41	61.6	31.6	3,315,789	8,836.58	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
51	50 to 52	239	7.84	69.5	36.8	3,868,421	8,585.13	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
49	48 to 50	223	7.31	76.8	42.1	4,421,053	9,154.74	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
47	46 to 48	183	6.00	82.8	47.4	4,973,684	8,451.71	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
45	44 to 46	155	5.08	87.9	52.6	5,526,316	7,953.95	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
43	42 to 44	123	4.03	91.9	57.9	6,078,947	6,943.03	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
41	40 to 42	51	1.67	93.6	63.2	6,631,579	3,140.53	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
39	38 to 40	81	2.66	96.2	68.4	7,184,211	5,403.55	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
37	36 to 38	69	2.26	98.5	73.7	7,736,842	4,957.11	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
35	34 to 36	27	0.89	99.4	78.9	8,289,474	2,078.29	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
33	32 to 34	11	0.36	99.7	84.2	8,842,105	903.16	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
31	30 to 32	2	0.07	99.8	89.5	9,394,737	174.47	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
29	28 to 30	3	0.10	99.9	94.7	9,947,368	277.11	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
27	26 to 28	3	0.10	100.0	100.0	10,500,000	292.50	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
							92,732.76	#DIV/0!	#DIV/0!		
		3049									

LP Total (gal) 101,347.28 #DIV/0!

DRAFT

SITE DATA

Design Load	6,000,000
Cd	0.65
Eff. Sys. 1	95%
Eff. Sys. 2	
Gas	$ 1.00

Accounts for Internal Loads and Solar Gains

Design Load X LOAD%

LOAD X HRS X Cd
EFF. 1 X 100,000

LOAD X HRS X Cd
EFF. 2 X 100,000

SITE TEMP and LOAD DATA

PLANT PERFORMANCE

AVG (F)	BIN RANGE (F)	TOTAL (HRS)	TOTAL (%)	CUM (%)	LOAD (%)	LOAD BTUs/Hr	System 1 Therms	System 2 Therms	Difference Therms	CUM Diff. Therms	CUM DIF Price
63	62 to 64	337	11.05	11.1	5.3	315,789	728.14	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
61	60 to 62	313	10.27	21.3	10.5	631,579	1,352.58	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
59	58 to 60	193	6.33	27.6	15.8	947,368	1,251.02	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
57	56 to 58	302	9.90	37.6	21.1	1,263,158	2,610.08	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
55	54 to 56	447	14.66	52.2	26.3	1,578,947	4,829.09	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
53	52 to 54	287	9.41	61.6	31.6	1,894,737	3,720.66	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
51	50 to 52	239	7.84	69.5	36.8	2,210,526	3,614.79	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
49	48 to 50	223	7.31	76.8	42.1	2,526,316	3,854.63	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
47	46 to 48	183	6.00	82.8	47.4	2,842,105	3,558.61	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
45	44 to 46	155	5.08	87.9	52.6	3,157,895	3,349.03	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
43	42 to 44	123	4.03	91.9	57.9	3,473,684	2,923.38	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
41	40 to 42	51	1.67	93.6	63.2	3,789,474	1,322.33	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
39	38 to 40	81	2.66	96.2	68.4	4,105,263	2,275.18	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
37	36 to 38	69	2.26	98.5	73.7	4,421,053	2,087.20	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
35	34 to 36	27	0.89	99.4	78.9	4,736,842	875.07	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
33	32 to 34	11	0.36	99.7	84.2	5,052,632	380.28	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
31	30 to 32	2	0.07	99.8	89.5	5,368,421	73.46	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
29	28 to 30	3	0.10	99.9	94.7	5,684,211	116.68	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
27	26 to 28	3	0.10	100.0	100.0	6,000,000	123.16	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
							39,045.37	#DIV/0!	#DIV/0!		
		3049									

LP Total (gal) 42,672.54 #DIV/0!

TOC

DRAFT

NIST BLCC 5.3-12: Comparative Analysis

Consistent with Federal Life Cycle Cost Methodology and Procedures, 10 CFR, Part 436, Subpart A

Base Case: Existing Boilers: 6.5mmBTU Heating, 4mmBTU Domestic
Alternative: New P-K Combined System: 95% efficient 6mmBTU total

General Information

File Name:	
Date of Study:	Tue Jan 26 15:57:03 EST 2016
Project Name:	Tucson House
Project Location:	Arizona
Analysis Type:	FEMP Analysis, Energy Project
Analyst:	Quinton Lamoreaux
Base Date:	January 1, 2016
Service Date:	July 1, 2016
Study Period:	20 years 6 months(January 1, 2016 through June 30, 2036)
Discount Rate:	3.5%
Discounting Convention:	End-of-Year

Comparison of Present-Value Costs

PV Life-Cycle Cost

	Base Case	Alternative	Savings from Alternative
Initial Investment Costs:			
Capital Requirements as of Base Date	$0	$200,000	-$200,000
Future Costs:			
Energy Consumption Costs	$1,646,327	$693,189	$953,137
Energy Demand Charges	$0	$0	$0
Energy Utility Rebates	$0	$0	$0
Water Costs	$0	$0	$0
Recurring and Non-Recurring OM&R Costs	$0	$0	$0
Capital Replacements	$0	$0	$0
Residual Value at End of Study Period	$0	$0	$0
Subtotal (for Future Cost Items)	$1,646,327	$693,189	$953,137
Total PV Life-Cycle Cost	$1,646,327	$893,189	$753,137

DRAFT

Net Savings from Alternative Compared with Base Case

PV of Non-Investment Savings	$953,137
- Increased Total Investment	$200,000

Net Savings	$753,137

Savings-to-Investment Ratio (SIR)

SIR = 4.77

Adjusted Internal Rate of Return

AIRR = 11.69%

Payback Period

Estimated Years to Payback (from beginning of Service Period)

Simple Payback occurs in year	4
Discounted Payback occurs in year	4

Energy Savings Summary

Energy Savings Summary (in stated units)

Energy	-----Average	Annual	Consumption-----	Life-Cycle
Type	Base Case	Alternative	Savings	Savings
Natural Gas	92,732.0 Therm	39,045.0 Therm	53,687.0 Therm	1,073,593.0 Therm

Energy Savings Summary (in MBtu)

Energy	-----Average	Annual	Consumption-----	Life-Cycle
Type	Base Case	Alternative	Savings	Savings
Natural Gas	9,273.2 MBtu	3,904.5 MBtu	5,368.7 MBtu	107,359.7 MBtu

Emissions Reduction Summary

Energy	-----Average	Annual	Emissions-----	Life-Cycle
Type	Base Case	Alternative	Reduction	Reduction
Natural Gas				
CO2	489,843.23 kg	206,249.50 kg	283,593.73 kg	5,671,098.15 kg
SO2	3,953.19 kg	1,664.50 kg	2,288.69 kg	45,767.55 kg
NOx	410.98 kg	28.84 kg	382.13 kg	7,641.65 kg
Total:				
CO2	489,843.23 kg	206,249.50 kg	283,593.73 kg	5,671,098.15 kg
SO2	3,953.19 kg	1,664.50 kg	2,288.69 kg	45,767.55 kg
NOx	410.98 kg	28.84 kg	382.13 kg	7,641.65 kg

DRAFT

The Harsco Industrial Patterson-Kelley Difference

Access to best-in-class technology, the strength of our people, and the reliability of our product are reason alone to partner with Harsco Industrial Patterson-Kelley. But ultimately, customers rely on us for our commitment to provide the right solution with the lowest total cost of ownership in the industry.

Our Approach

- Customized solutions through in-depth discovery focused on customer needs
- Deployed through experienced Harsco Industrial Patterson-Kelley employees and our authorized resellers

MODELS		DOMESTIC WATER FLOW RATE 60F - 140F	BOILER WATER FLOW RATE 160F - 100F	DOMESTIC WATER FLOW RATE 40F - 140F	BOILER WATER FLOW RATE 160F - 100F
D2DW-30S	SIMPLEX 30 PLATE HEAT EXCHANGER	55 GPM	62 GPM	25 GPM	42 GPM
D2DW-30D	DUPLEX 30 PLATE HEAT EXCHANGER	110 GPM	124 GPM	50 GPM	84 GPM
D2DW-80S	SIMPLEX 80 PLATE HEAT EXCHANGER	85 GPM	115 GPM	65 GPM	108 GPM
D2DW-80D	DUPLEX 80 PLATE HEAT EXCHANGER	280 GPM	330 GPM	140 GPM	216 GPM

Harsco Industrial Patterson-Kelley
155 Burson Street
East Stroudsburg, PA 18301
www.harscopk.com

Phone: 570.476.7261
Toll Free: 877.728.5351
Fax: 570.476.7247

HARSCO INDUSTRIAL Patterson-Kelley

Certifications

GE GAP (RI) GAP4.1.0 AND GAI4.1.3

FM Global 6-4/12-69

ASME Code Section VIII-Div. 1
Applies to Heating Boilers

U.S. Green Building Council Member

Control panels are UL labeled by Britech

PROUDLY DESIGNED & ASSEMBLED IN THE U.S.A.

© 2015 Harsco Corporation. All Rights Reserved
DURATION II 001 02-2015

P-K DURATION II™
WATER-TO-WATER INDIRECT DOMESTIC HOT WATER SYSTEM

HARSCO INDUSTRIAL Patterson-Kelley

DRAFT

Introducing the P-K DURATION I™

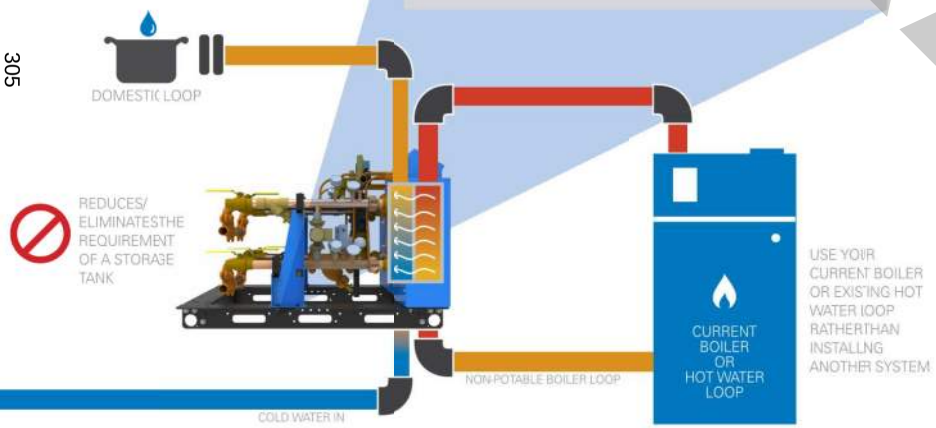
Tap into **savings**

The **DURATION II™** is a fuly packaged water-to-water indirect domestic hot water system specificaly engineered to compement any hot water source or boiler. More impo·tantly, it offers low cost of ownership, simplcity, high-efficiency, durability and ease of installation.

TAP INTO SAVINGS WITHIN YOUR CURRENT SYSTEM

Isolated for a lcnger life

The DURATION II is fitted with a high quality stainless steel brazed plate heat exchanger and is designed o operate with low approach temperatures to prevent scaling These low approach temperatures protect the system from the harsh conditions found in domestic water



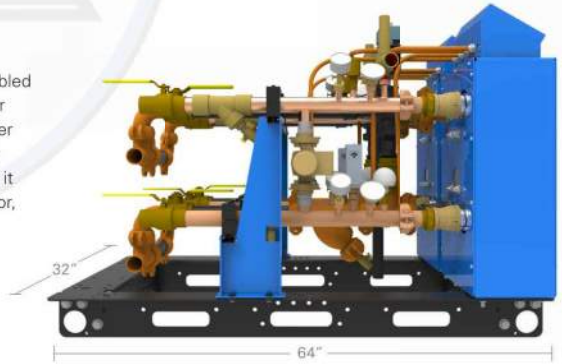
STAINLESS STEEL BRAZED PLATE HEAT EXCHANGER

P-K Lorg-Term Durability

To maintain bngevity the **DURATION II** is cesigned with stainless steel, coppe and copper alloy materials (pctable water side), including a durable stainless steel double wall brazed plate heat exchanger. To ensure safe potable water, al materials on the potable water side are lead free.

Easy-to-install

Easy-to-install, the 32"W x 64"D ships fuly assembled with two point connections for domestichot water outlet / inlst, one point header connectiom for boiler water outbt/ inlet and two electrical power supply connections. Its small footprint lets you naneuver it through a mechanical room door or onto an elevator, making installation easy anywhere. No need for expensiverigging or construction.



Easy-to-integrate

It easilyintegrates with building automation system (BAS) software via the integrated Modbus RS-485 protocol. Also supports LONWORKS/BACnet and METASYS N2 are available by adding an optional protocol for even greater flexibility.

The skidded solution includes a control panel, sensor, a potable water side circulation pump, domestic hot water drain valve as well as shut-off valves and inlet strainers on both the boiler water and domestic hot water sides.

Responsive Temperature / Process Controler providing precision temperature control and is available in 30 & 80 plate simplex / duplex configuration. The duplex configuration can provide either redundancy or double capacity.

Easy-to-service

The DURATION II was designed with service in mind as all components are fully accessible.

MODBUS® is a registered trademark of Schneider Automation Inc. LONWORKS® is a registered trademark of Echelon Corporation. METASYS® is a registered trademark of Johnson Controls, Inc.

DRAFT