WEINSTEIN A+U
ARCHITECTS + URBAN DESIGNERS

TUKWILA FIRE STATIONS
PROGRAMMING DOCUMENT
JULY 14, 2017

COVER PHOTO CREDIT: www.tukwilawa.gov/departments/fire/stations-apparatus

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EXECUTIVE SUMMARY

Executive Summary
This project includes the design and construction of three new fire stations for the City of Tukwila to replace the existing stations 51, 52, and 54. As the Tukwila population has grown, Fire Department call load has increased, and the services and impacts on the Fire Department have evolved, these three aging stations have been deemed inadequate to accommodate modern operational requirements. Additionally, these essential facilities have also been identified as having the greatest risk of seismic damage as classified in the 2015 Essential Government Services Facilities Plan.

The new stations will all be constructed on new, optimally-located sites, identified and analyzed by the owner's site selection committee to improve response times in the neighborhoods currently served by the existing stations. Of the three new stations, only Station 51 has an identified and secured site to date. This station will be located at the intersection of Southcenter Parkway and South 180th Street. Studies are ongoing regarding potentially locating Station 52 at Tukwila's City Hall campus area. The Fire Department administration, currently co-located with Station 51, will be relocated with the new Station 52, capitalizing on its potential proximity to other municipal offices. As the site selection process advances, the design team will work with the City of Tukwila and SOJ to evaluate potential sites and conduct high-level, test-fit exercises.

Working together with the Owner Team, the Design Team identified three major goals for the new Tukwila fire stations. These goals, based on feedback from the stakeholders, include: the new buildings must be designed for ease of maintenance and functionality, firefighter health and safety is a priority, and the stations should be attractive, safe and adaptable over time. During the Performance and Value Workshop (re-branded from the originally planned Sustainability Workshop to focus on overall synergistic opportunities and less on specific sustainability accreditation), the following three major focus categories were established: Health and Safety, Low Cost Operations and Maintenance, and Resiliency. Within these categories, the design team identified strategies that would provide significant benefit for the projects with little or no added cost. Additional goals of increased turnout and response efficiency and community connectivity were discussed and will be themes throughout the design process. These goals will be outlined in more detail in the Sustainability Design Criteria section of this document.

The three new stations will be designed to meet or exceed the current needs of the Tukwila Fire Department, with as much accommodation of future departmental growth as is feasible within the budget.

2 | PROGRAMMING PHASE PROCESS

PROGRAMMING PROCESS

Programming Phase Process
The Programming Phase began with the dissemination of a questionnaire to the owner stakeholder team, with an extensive list of questions about both the operational and civic aspirations of the project. The answers to this questionnaire were compiled and reviewed by the Architect and discussed at the Project Kick-Off Meeting on April 28th, which resulted in a set of over-arching goals for the fire station projects.

In order to delve into the specific space programming of each station, a Programming Charrette was held on May 1st with the Architect, Fire Station Specialist Architect, representatives of Tukwila Fire Department and the Owner's Representative. A draft program was presented and the attendees sorted the proposed spaces between the three new stations, prioritizing firefighter health and safety and accommodation for future departmental growth. Additional spaces and specific space requirements, as developed by internal Tukwila Fire Department (TFD) committees, were also incorporated into the discussions. The results of this Charrette were compiled by the Architects into an ideal program for all three stations.

To facilitate a discussion of the program with the Tukwila City Council – ultimately, the community's stewards of these of the stations – the ideal station programs were further filtered into three levels of potential financial investment, eventually termed the 2040, 2060 and 2080 program options. The 2040 and 2060 programs featured "a la carte" items with very rough associated price tags so that the City Council might be able to choose certain spaces to build out in the upcoming construction phases, rather than at a future date. While the names imply preparation of the department for specific points in time, the different levels simply refer to increasing degrees of both growth potential and optimal space allowances within each building and should not be taken as literal predictions of what the department may need in those identified benchmark years.

After reconciling the space programming results with the fiscal realities of the Public Safety Bond measure, the City's Executive Team recommended that the Council choose to proceed with the 2040 program, with the understanding that "a la carte" program items might be added to the project if construction estimates came in lower than expected, or if additional funding sources were identified. The Design Team was given a directive to proceed with the 2040 program as the basis of Design, while making accommodations in the massing and site design of each station to accept the potential future addition of the "a la carte" program elements.

Although the City of Tukwila has relatively high aspirations for the sustainable performance of its public buildings and their influence on the rest of the community, it was determined by the Owner Team that the current budget could not accommodate the added cost of third-party certification, nor of intensive added green building features. Instead, the Design Team will strive to provide the most responsible buildings possible within the current budget using established best practices and maximizing potential synergies between building, site and the operational necessities of the stations.

With a definitive program in hand, the remainder of the Design Consultants were introduced to the project at the Consultant Kick-off Meeting, held June 6th at the Tukwila Fire Headquarters. The meeting was followed by a tour of the existing Station 51 (HQ) and a visit to the future FS51 site for those consultants whose works focuses primarily on the exterior of the buildings.

Once the consultants commenced work, the Architect and Sustainability Consultant developed a list of potential "baseline" strategies that the design team could potentially incorporate with no additional cost to the owner. These strategies and additional design synergies and goals were discussed at the Performance and Value Workshop, held June 15th at the offices of Weinstein A+U. The results of that workshop have been both incorporated into the individual discipline narratives in this document, as well as summed up in the Owner's Performance and Value Requirements (OPR) document.

The results of all the programming research and discussions to date are compiled in this document, which will be reviewed and vetted by the Owner Stakeholder Team before being used as the working assumptions for a Programming Phase cost exercise. Assuming the estimated costs are still within the preliminary budget set by the Owner Team, this document will become the Basis of Design moving into the Schematic Design Phase of Fire Station 51. Additional information on the chosen sites for Stations 52 and 54 will be incorporated as it becomes available.

DESIGN TEAM

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PROGRAMMING PARTICIPANTS

OWNER TEAM:

Project Manager, SOJ:	Justine Kim, Principal
Project Manager, SOJ:	Carrie Holmes, Project Manager
City of Tukwila:	Bob Giberson, Public Works Director
City of Tukwila:	David Cline, City Administrator
City of Tukwila:	Rachel Bianchi, Communications Manager
Tukwila Fire Department:	Chief Jay Wittwer
Tukwila Fire Department:	Captain Andy Nevens

DESIGN TEAM:

Architect:	**Weinstein A+U** Ed Weinstein, Principal Emma Nowinski, Project Manager Lauren Rock, Project Architect
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Cost Estimating:	**The Robinson Company** Sharon Kennedy, Principal

STATION MATRIX

	2040 PROGRAM		
ROOM	51	52	54
ON-DUTY STAFF	6 + 4	8	6 + 4
ASSIGNED STAFF (4 SHIFTS, NO SWING STAFF)	24 + 16	32	24 + 16
APPARATUS BAYS	2 + 1	3	2 + 1
OPERATIONS			
Apparatus Bay	2875	3757	2875
Cleaning Alcove	30	30	30
Battery Charging Area	18	18	18
ADA Restroom w/ shower (wet room)	60	60	60
Hose Storage Rack	42	0	0
Shop/ Tool	60	80	224
EMS Storage	100	600	100
Decon/ Bunker Gear Cleaning	250	250	250
Bunker Gear Storage	360	440	360
App Bay Storage	150	150	150
SCBA Room/ Cascade	250	12	12
OPERATIONS SUBTOTAL	4,195	5,397	4,079
Additional App Bays and Accessory Spaces	1,197		1,197
ADD'L OPERATIONS SUBTOTAL			2,394
PUBLIC			
Vestibule	50	50	50
Public Lobby	200	250	200
ADA Restroom	60	60	60
HQ Reception	0	80	0
HAM Radio Storage	0	120	0
Explorer's Storage	0	120	0
PUBLIC SUBTOTAL	310	680	310
OFFICE			
Station Office	300	350	300
Captain's Office	140	140	140
Supply Closet	10	50	10
OFFICE SUBTOTAL	450	540	450
Additional Office Space	100		100
ADD'L OFFICE SUBTOTAL			200
DEPT ADMIN			
Chief's Office	0	240	0
Asst. Chief's Office	0	180	0
Asst. Chief's Office	0	180	0
Admin's Office (2 workstations)	0	120	0
BC's Office (2 Workstations)	0	180	0
Office Support Area	0	100	0
Office Supply Storage	0	60	0
Lunch Room	0	200	0
Conference Room	0	300	0
Back-Up EOC / Training Room	0	750	0
Unisex Restroom	0	60	0
Unisex Restroom	0	60	0
DEPT ADMIN SUBTOTAL	0	2430	0

	2040 PROGRAM		
ROOM	51	52	54
ON-DUTY STAFF	6 + 4	8	6 + 4
ASSIGNED STAFF (4 SHIFTS, NO SWING STAFF)	24 + 16	32	24 + 16
APPARATUS BAYS	2 + 1	3	2 + 1
LIVING			
Kitchen/ Dining	450	500	450
Dayroom	250	300	250
Physical Training	600	600	600
Laundry/ Janitor Closet	100	140	100
Quantity	6	8	6
Sleeping Rooms (70 sf each)	420	560	420
Locker Alcoves (55 sf each)	330	440	330
Quantity	3	4	3
Toilet/ Shower (100 sf each)	300	400	300
LIVING SUBTOTAL	2450	2940	2450
Extra Crew Common Areas	490		490
ADD'L LIVING SUBTOTAL			980
UTILITY			
Mechanical	225	225	225
Electrical	125	125	125
Communications/ Data	100	180	100
Elevator Machine Room	0	40	0
Elevator	0	60	0
UTILITY SUBTOTAL	450	570	450
BUILDING SUBTOTAL (SF)	7,855	12,557	7,739
Circulation and Structure (approx 20%)	1,571	2,511	1,548
TOTAL BUILDING SQUARE FOOTAGE	9,426	15,068	9,287
SITE			
Visitor Parking Spaces	3	4	3
Admin Parking Spaces	0	8	0
On-Duty FF Parking Spaces	12	16	12
Future FF Parking	8	0	8
Covered Parking Spaces for 120V Vehicles	8	2	2
FF Courtyard: BBQ and Physical Training (sf)	500	700	500
Add'l Staff Area	200	0	200
Waste/ Recycling Collection (sf)	50	75	50
Add'l Area	20	0	20
Delivery Area (sf)	0	64	0
Generator/ Fuel Port	YES	YES	YES

ROUGH ORDER OF MAGNITUDE CONSTRUCTION BUDGET		
ROM Bldg + Site Work @ $575/SF	$19,424,190	33,781 sf
TOTAL ROM BUDGET	$19,424,190	
ADD'L PROGRAM (INCL. 20% CIRC, ETC):		
ADD'L APP BAYS + SUPPORT @ $575/SF	$2,466,060	4,289 sf
EQUIPMENT BARN	$1,250,000	6,400 sf
15 trailers, 3 spare engines, 3 AC powered trucks, misc. storage, bikes 4000sf "carport" @ $150/sf		
TRAINING TOWER	$420,000	1,200 sf
1200sf @ $350/sf		
SUBTOTAL	$4,136,060	
TOTAL ROM BUDGET + ADD'L PROGRAM	$23,560,250	

RED TEXT INDICATES A LA CARTE ITEM
Program Option Matrix

SPACE REQUIREMENTS

OPERATIONS

APPARATUS BAY

Function:	Indoor parking area for station apparatus.
Notes:	2 or 3 Bays, all drive-through, one large enough to fit tiller ladder truck (meet NFPA & WAC 296-305 clearance standards). Minimum height clearance in 18' where vehicles park. 51: Engine (4 crew), Aid Car (2 crew) 52. BC (1), Aid Car (2), and Engine (4) or Ladder (4) 54: Engine (4) or Ladder, Aid Car (2)
Equipment:	Indoor training: anchor points, ladder access, high ceilings. Bi-fold doors preferred at front apron.
Furnishings:	Dry erase board, wall space for maps.
Fire Protection:	Wet sprinkler system throughout interior, dry sprinkler system at exterior canopies and unconditioned spaces.
HVAC:	"Nederman" or similar style dedicated vehicle exhaust system, general exhaust system, CO/NO sensor control for general exhaust, radiant or gas-fired unit heaters, heat shuts off when doors open, negative air pressure.
Plumbing:	Trench drains, hot/cold hose bibs at front & rear, hose reels, compressed air drops, engine fill spout for water tank top-off.
Lighting:	Functional daylighting, LED high bay electric lights
Power:	Flexible power drops with breakaway pigtail for apparatus hookup.
Communications:	Wireless access point
Finishes:	Epoxy paint at walls up to 8' AFF, ground concrete floors. Areas of high-impact GWB to be determined. Ceiling open to structure.

Cleaning Alcove

Function:	For apparatus bay-specific janitorial and truck cleaning, mop hanging.
HVAC:	Constant low-volume exhaust.
Plumbing:	Floor drain, hot/cold hose bib at height for bucket filling.
Finishes:	Grated floor over floor drain, epoxy paint at walls.

Battery Charging Area

Function:	Dedicated space for charging batteries for handheld equipment.
Notes:	Counter with base cabinets for extra storage and shelves above. Located in corridor or vestibule to App Bay to protect from overspray.
HVAC:	Design exhaust to ventilate fumes/excess heat from battery charging.
Power:	Two rows of power strips with lots of outlets. Provide multiple circuits.
Communications:	1 data & phone connection.
Finishes:	P-Lam cabinets, solid surface countertop.

Hand/Boot Wash

Function:	Wash and decontamination area for hands and boots at all transitions from App Bay to Station.
Notes:	Boot scrubbers and multi-level scraper walk-off mats; Study airlock/transition zone concept.
Equipment:	Consider ice in bay transition zone
HVAC:	Additional exhaust ventilation, if located in an airlock / transition zone outside of the App Bay.
Plumbing:	Hands-free stainless steel sinks and dispensers. Hot-and-cold water hose bibs for boot wash down. Grate and floor sink for boot wash drainage. Water supply and drain if ice maker is provided.

ADA Restroom with shower

Function:	Restroom serving App Bay with Decontamination shower.
Notes:	Adjacent to Decon area. All-wet room with hose bib and no casework.
HVAC:	HVAC and constant exhaust ventilation.
Plumbing:	Wall-mounted toilet, sink, open shower, hose bib, floor drain.
Finishes:	All-tile walls, sealed concrete floor.

Bike Storage

Function:	Secure bike storage for on-duty firefighters.
Equipment:	Wall-mounted bike hooks located within the App Bay. (Visitor bike parking is located near station entry. See SITE.)

Hose Storage Rack (51 only)

Function:	Storage for extra hose.
Notes:	Include a small storage area for hose at all stations; larger departmental storage at 51. Departmental hose storage (12' L x 10'H x 3.5D)
Equipment:	Consider reusing existing rack.

Shop/Tool Area (51 & 52)

Function:	Workspace for equipment checks & maintenance and storage area for shop supplies and tools.
Notes:	Large counter/ work bench with tool chest located off App Bay.
Equipment:	Parts washer.
Furnishings:	Upper and lower cabinets, possible peg board for hanging tools, vice, grinder, flammable storage locker.
HVAC:	Compressor (sound isolate); 51 potentially shares SCBA space with compressor; Heating and ventilation. Dedicated ventilation for parts washer if solvent based. Vent for flammable storage locker, if present.
Plumbing:	Compressor (sound isolate) and compressed air distribution piping.
Power:	Power strip above bench.
Finishes:	P-lam cabinets, stainless steel countertop, white board.

SHOP / TOOL ROOM (54)

Function:	Workroom with large counter/work bench and tool chest for equipment checks & maintenance and storage area for shop supplies and tools.
Notes:	Small tool, chainsaw maintenance (this room should be located at the station with the ladder truck).
Equipment:	Solvent/parts washer.
Furnishings:	Upper and lower cabinets, 3x6 work table in center of room, possible peg board for hanging tools, flammable liquids cabinet, 2x3 white board, vice, grinder.
Fire Protection:	Wet sprinkler system.
HVAC:	Compressor (sound isolate), fume hood desired for painting and handling haz-mat chemicals.
Plumbing:	Shop sink, compressed air, air distribution piping, eyewash and drench shower.
Acoustics:	Consider acoustic surface treatment at ceiling.
Finishes:	Ceiling open to structure.

EMS STORAGE CLOSET (51 & 54)

Function:	Storage for medical supplies, station supplies, backboard storage, and equipment.
Equipment:	Under-counter refrigerator, include space for a rolling cart.
Furnishings:	24x36" white board, heavy-duty shelving, consider lockable cabinets.
Fire Protection:	Wet sprinkler system.
HVAC:	Heat and ventilation.
Finishes:	Ceiling open to structure.

EMS STORAGE ROOM (52)

Function:	Larger storage for medical supplies, departmental supplies, backboard storage, equipment, and oxygen cascade system.
Notes:	Oxygen cascade system would be reduced if TFD decides to switch to an O2 exchange program.
Equipment:	Under-counter refrigerator, oxygen cascade system - try to stay under 514 cu.ft. O2 for rating.
Furnishings:	24x36" white board, heavy-duty shelving, consider lockable cabinets.
Fire Protection:	Wet sprinkler system.
HVAC:	Heat and ventilation.
Finishes:	Ceiling open to structure.

DECON / BUNKER GEAR CLEANING

Function:	Decontamination of personal gear and equipment; storage for extra cleaning supplies and vehicle washing supplies.
Notes:	Exterior access ideal; Cleaning area to be separated from decon area. Access to bunker gear storage and storage for decon air packs. Provide hanging rod in drying area.
Equipment:	Extractor (assumes Extractor and not dryer per Workshop conversation). Locate on housekeeping slab (vfy with mfr), requires 42" door to room.
Furnishings:	Stainless steel counter / sloped drainboard with integral sink, sst shelving above, cabinet to store chemicals.
Fire Protection:	Wet sprinkler system.
HVAC:	Dedicated heating and exhaust ventilation. Additional heat and ventilation (high air flow with extra heat) for drying gear in hanging area.
Plumbing:	Floor drain, hot/cold hose bib, hands-free (knee) sink control and hands-free dispensers, eyewash, possible grated floor, Consider dirty mop sink/decon wash station. Verify if backflow preventer is needed (if there are wash chemicals in the extractor a backflow preventer is recommended). Floor drain in Wash Area and Hanging Area.
Finishes:	GWB ceiling, epoxy paint at walls and epoxy cove base.

BUNKER GEAR STORAGE

Function:	Bunker gear lockers and shelving for extra gear bins.
Notes:	UV sensitive.
Furnishings:	Metal wire gear lockers and heavy duty built-in shelving.
Fire Protection:	Wet sprinkler system.
HVAC:	Heat and ventilation - high-air-cycle mode NOT required.
Plumbing:	Floor drain.
Finishes:	Consider acoustic tile ceiling.

APP BAY STORAGE

Function:	Storage for emergency supplies/disaster relief, station consumables, bottled water, tire chains, flares and fire extinguishers (51).
Notes:	Emergency supplies/disaster relief may be separate.
Furnishings:	Heavy-duty shelving.
Fire Protection:	Wet sprinkler system.
HVAC:	Heat and ventilation.
Plumbing:	Floor drain.
Finishes:	Ceiling open to structure.

SCBA ROOM (51)

Function:	Fill station and workspace for equipment checks and maintenance for SCBA system.
Notes:	Separate closet for compressor and possible general shop compressor (sound isolate)
Fire Protection:	Wet sprinkler system.
HVAC:	Address high heat load of compressor - provide exhaust ventilation.
Plumbing:	Possible sink; area/floor/trench drains, hose bib, plumbing for air from cascade system to fill SCBA.
Power:	Connect compressor.
Finishes:	Open to structure. Acoustic ceiling in compressor closet.

PUBLIC

PUBLIC LOBBY

Function:	Reception for visitors, space for performing blood pressure checks.
Notes:	Secure entrance, with controlled access to station. Display area (larger history display at 52).
Furnishings:	Built in blood pressure check station with bench and supply storage drawer, wood veneer casework.
Fire Protection:	Wet sprinkler system.
HVAC:	HVAC with supplemental heat to offset infiltration.
Plumbing:	Possible drinking fountain.

PUBLIC ADA RESTROOM

Function:	Accessible restroom for visitors, located near the Lobby.
Furnishings:	ADA-accessible coat hook and toilet accessories.
Fire Protection:	Wet sprinkler system.
HVAC:	HVAC with exhaust fan on occupancy sensor, with adjustable run-on after start interval.
Plumbing:	Wall-hung toilet, wall-hung lavatory, floor drain.
Finishes:	GWB ceiling, tile at two walls.

EXPLORER'S STORAGE CLOSET (52)

Function:	Storage area for the Firefighter Explorer's Club.
Notes:	Secured access provided to the public.
Furnishings:	Medium-duty shelving.
Fire Protection:	Wet sprinkler system.
HVAC:	Venting and undercut door air circulation.
Finishes:	Open to structure.

HAM RADIO STORAGE CLOSET (52)

Function:	Storage area for the Ham Radio group.
Notes:	Secured access provided to the public.
Furnishings:	Medium-duty shelving.
Fire Protection:	Wet sprinkler system.
HVAC:	Venting and undercut door air circulation.
Finishes:	Open to structure.

HQ RECEPTION (52)

Function:	Located in the Public Lobby, controls access to the Admin area.
Notes:	Workstation for 1 person.
Fire Protection:	Wet sprinkler system.
HVAC:	Heating, ventilation and air conditioning
Lighting:	Functional daylighting.
Finishes:	GWB ceiling, wood veneer casework.

OFFICE

STATION OFFICE

Function:	Workstations for all on-duty FFs to handle paperwork, answer phones, and complete online training exercises.
Notes:	View towards entry and view into App Bay ideal.
Equipment:	1 Computer per workstation + 1 shared printer/copier & 1 shared phone. 1 Lateral file per shift. 1 TV Monitor. 1 Additional floating work station for use by the Police Dept and IT.
Furnishings:	Wall space for maps. Tackboard/pin-up space.
Fire Protection:	Wet sprinkler system.
HVAC:	Heating, ventilation, and air conditioning.
Lighting:	Functional daylighting.
Power:	Receptacles coordinated with desk and equipment layout.
Communications:	Data outlets coordinated with desk and equipment layout.
Finishes:	Acoustic tile ceiling, combination of wood veneer and p-lam casework.

CAPTAIN'S OFFICE

Function:	Two workstations for daily operations and meetings for the Captains.
Notes:	Near Station Office, acoustically separate for privacy.
Equipment:	1 computer and phone per work station.
Furnishings:	Small table with 2 guest chairs. Filing cabinets for all station filing storage and public education storage.
Fire Protection:	Wet sprinkler system.
HVAC:	Heating, ventilation, and air conditioning.
Finishes:	Acoustic tile ceiling, p-lam casework.

SUPPLY CLOSET

Notes:	Minimal need - could be large cabinet at 51 & 54
Fire Protection:	Wet sprinkler system.
HVAC:	Heating, ventilation, and air conditioning.
Finishes:	Ceiling open to structure, p-lam casework (if cabinet), heavy-duty shelving.

DEPT ADMIN (52 ONLY)

CHIEF'S OFFICE

Furnishings:	Table for +/- 4; Wardrobe.
Fire Protection:	Wet sprinkler system.
HVAC:	Heating, ventilation and air conditioning.
Finishes:	Acoustic tile ceiling, wood veneer casework.

(2) ASSISTANT CHIEF'S OFFICES

Furnishings:	2 Guest chairs; Wardrobe.
Fire Protection:	Wet sprinkler system.
HVAC:	Heating, ventilation and air conditioning.
Finishes:	Acoustic tile ceiling, p-lam casework.

ADMIN'S OFFICE

Furnishings:	2 Guest chairs; 2 Workstations.
Fire Protection:	Wet sprinkler system.
HVAC:	Heating, ventilation and air conditioning.
Finishes:	Acoustic tile ceiling, p-lam casework.

BC'S OFFICE

Furnishings:	2 Guest chairs; 2 Workstations.
Fire Protection:	Wet sprinkler system.
HVAC:	Heating, ventilation and air conditioning.
Finishes:	Acoustic tile ceiling, p-lam casework.

OFFICE SUPPORT AREA

Furnishings:	2 Guest chairs; 2 Workstations.
Fire Protection:	Wet sprinkler system.
HVAC:	Heating, ventilation and air conditioning.
Finishes:	P-lam casework; Consider open to structure ceiling with acoustic treatment.

OFFICE SUPPLY STORAGE

Notes:	Large closet
Fire Protection:	Wet sprinkler system.
HVAC:	Heating, ventilation, and air conditioning.
Finishes:	Open to structure.

LUNCH ROOM

Function:	Lunch Room with small kitchenette for administrative staff.
Notes:	Include a janitor cabinet. Access to exterior courtyard BBQ space (could be shared with FF space).
Fire Protection:	Wet sprinkler system.
HVAC:	Heating, ventilation, and air conditioning, supplemental exhaust by microwave/food prep, locally controlled on timer switch. If wet mops are stored in janitor's cupboard, additional ventilation in that area will be required.

CONFERENCE ROOM

Notes:	Seating for 15.
Fire Protection:	Wet sprinkler system.
HVAC:	Heating, ventilation, and air conditioning with additional capacity for large groups.
Finishes:	Acoustic tile ceiling.

BACK-UP EOC / TRAINING ROOM

Function:	Back-up Emergency Operations Center and TFD Training Room with flexible seating for 20 people.
Notes:	Located off the Lobby. Signal security needs. Secure to protect equipment. Storage closet for tables and chairs. Secure storage for EOC equipment.
Fire Protection:	Wet sprinkler system.
HVAC:	Heating, ventilation, and air conditioning, with additional capacity for large groups and increased A/V equipment.
Power:	Significant power needs.
Communications:	Significant data needs - details TBD
Finishes:	Acoustic tile ceiling.

(2) UNISEX RESTROOMS (1 ADA)

Notes:	(No shower)
Furnishings:	(2) coat hooks
Fire Protection:	Wet sprinkler system.
HVAC:	Heating, ventilation, and air conditioning, with exhaust fan on sensor.
Plumbing:	Wall-hung (low flow) toilet, counter with undermount sink.
Finishes:	GWB ceiling, tile at two walls, solid-surface vanity.

LIVING

GREAT ROOM
A combined space for kitchen, dining and gathering that opens to outdoor living space.

KITCHEN / DINING AREA

Function:	Space for 4 platoons' storage needs: 3 to be built-out at this time (See Program Matrix).
Notes:	Individual food lockers (12w x 18h x 15d), shift lockers (48"h x 18"w x 18"d), 1 refrigerator per shift, coffee bar; Plenty of counter space, easy to clean.
Equipment:	Commercial dishwasher, range with hood, microwave, ice machine. Evaluate commercial cooler/freezer vs. residential for energy consumption.
Furnishings:	Table may be made of wood harvested from Foster Golf Course fallen maple.
Fire Protection:	Wet sprinkler system.
HVAC:	Range hood should not need to be Type 1; Heating, ventilation and air conditioning. Residential style vapor/odor hood is planned at this time. Additional smaller exhaust fan with local control for quieter ventilation when hood is off.
Plumbing:	Insta-hot, disposal, large sink, dishwasher; plumb water to refrigerator water dispenser and ice maker. Provide any gas-fired kitchen appliance's gas supply line with automatic shut off on alarm call and reset button to restore service on return.
Lighting:	General and under-cabinet
Power:	Include adequate outlets along counters for small appliances, including within ADA reach range.
Communications:	Phone line.
Finishes:	GWB or specialty acoustic ceiling, combination of p-lam and wood veneer cabinets, solid surface or stainless steel counters.

DAYROOM

Function:	Crew lounge area.
Notes:	Open to kitchen/dining; space for 1 recliner for each on-duty FF.
Equipment:	TV/gaming/movie consoles.
Fire Protection:	Wet sprinkler system.
HVAC:	Heating, ventilation and air conditioning.
Communications:	TV/data hookup.
Acoustics:	High acoustic separation from other areas.
Finishes:	Acoustic/tackboard at select walls, wood veneer casework.

PHYSICAL TRAINING

Function:	Physical training room for weightlifting and cardiovascular fitness activity; expands to covered common outdoor space.
Notes:	Entire crew to work out together - dept. policy. High ceilings to accommodate activity on tall machines. Will be shared with Admin staff at 52, include several day use lockers.
Equipment:	Wall-mounted TV Include space for future detox units, 2 per station. Should have provisions for 100% outside air system with high ventilation rates; Ligature resistant security grilles, etc.
Furnishings:	Wall mirrors
Fire Protection:	Wet sprinkler system.
HVAC:	Heating, ventilation and air conditioning, and additional exhaust sized for loads due to high activity levels.
Plumbing:	Drinking fountain with water bottle filler.
Power:	Dedicated circuits for fitness machines, verify power requirements.
Acoustics:	High acoustic separation from other areas.
Finishes:	Rubber mat flooring, high-impact drywall for medicine ball wall.

LAUNDRY / JANITOR CLOSET

Function:	Washer and dryer for washing house linens and uniforms. Storage for clean linens, cleaning supplies, and cleaning equipment.
Notes:	Metered soap dispensing system desired, counter for folding, acoustic separation, hanging bar. If room is larger than 100sf, it will need fire rating.
Equipment:	2 sets washer/dryer (minimum 1 front-loading for ADA) at 52, 1 set elsewhere (unless planning for future crew expansion).
Furnishings:	Counter space, fold-down ironing board, minimal cupboards needed. Heavy duty shelving, mop hooks.
Fire Protection:	Wet sprinkler system.
HVAC:	HVAC with dedicated laundry exhaust. Vents for dryers.
Plumbing:	Mop sink with pail faucet, floor drain, wall service boxes with water and sanitary for washers.
Finishes:	Acoustic tile ceiling or open to structure with acoustic treatment.

SLEEPING ROOMS

Function:	Sleeping facilities for firefighters.
Notes:	Quantity per Station Matrix.
Furnishings:	Extra long twin bed, hooks, shelves/bench for clothes, blackout shades.
Fire Protection:	Wet sprinkler system.
HVAC:	Individual climate control in each room is desirable, i.e. one temperature control zone per sleeping room.
Lighting:	Dimmable overhead light and wall-mounted reading light near bunk.
Power:	Outlets and USB charging for phones adjacent to bed.
Communications:	Programmable by apparatus assignment.
Acoustics:	High degree of separation from adjacent spaces/exterior.
Finishes:	GWB ceiling, wood veneer furnishings.

LOCKER ALCOVES

Function:	Lockers located outside sleeping rooms, ideally with adjacent bench.
Notes:	1 locker/FF + 1 Class A locker + 1 visitor locker. Doors vented at top and bottom; 24" x 24" lockers.
Furnishings:	Lockers: wood veneered plywood boxes with vented doors, adjustable shelves, hanging bar, boot drawer, upper cubby for bedding, tackable pinup surface and mirror in door.
Fire Protection:	Wet sprinkler system.
HVAC:	HVAC with robust ventilation and exhaust.
Acoustics:	Consider acoustic ceiling to minimize locker door noise.
Finishes:	GWB ceiling.

TOILET / SHOWER

Function:	Firefighter toilet and bathing facilities. Located close to sleeping rooms.
Equipment:	Grab bars in ADA, backing at all others.
Furnishings:	Hooks, counterspace, space for bench, provide minimal storage for shared cleaning supplies and toilet paper. Cabinet/drawers not needed. Shelf in shower for shampoo, etc.
Fire Protection:	Wet sprinkler system.
HVAC:	HVAC with exhaust fan on occupancy sensor, with adjustable run-on after start interval.
Plumbing:	Include urinal in restroom closest to the Great Room; floor drain, one-piece fiberglass (or other low-maintenance solution) shower with adjustable shower head, wall-hung toilet, under-mount sink.
Power:	GFCI outlet at sink.
Finishes:	GWB ceiling, tile walls, solid surface counter.

UTILITY

MECHANICAL

Function:	Centralized location for HVAC, plumbing, and controls equipment. Provide good accessibility for maintenance access and equipment replacement.
Notes:	Exterior access desired.
Fire Protection:	Wet sprinkler system.
HVAC:	Exhaust ventilation, heat for tempering and freeze protection.
Plumbing:	Water service entrance, domestic hot water heaters, control system head end.
Acoustics:	Acoustically separate from other occupied areas of the station.
Finishes:	Ceiling open to structure.

ELECTRICAL

Function:	Station electrical equipment, main distribution center, automatic transfer switches, and other electrical infrastructure.
Notes:	Exterior access desired.
Fire Protection:	Wet sprinkler system.
HVAC:	Exhaust ventilation.
Finishes:	Ceiling open to structure.

COMMUNICATIONS / DATA

Function:	Centralized location for information technology and communications equipment and MDF (Main Distribution Frame).
Notes:	Larger room at 52, lockable.
Equipment:	Install IT equipment on seismic rollers/slides
Furnishings:	Plywood on walls.
Fire Protection:	Lowest cost - wet system with high temperature heads, low temperature heat and smoke detectors Medium cost - Pre-Action High cost - Pre-Action + Clean Agent (FM 200 et al)
HVAC:	Dedicated air conditioning for Data Room.
Plumbing:	Floor drain.
Power:	Emergency battery backup to maintain IT equipment until generator is online.
Finishes:	Ceiling open to structure.

FIRE SUPPRESSION RISER ALCOVE

Fire Protection:	Wet and dry (as required) fire sprinkler riser.
HVAC:	Heating for freeze protection and tempering.
Plumbing:	Floor drain, sprinkler standpipe drain.
Finishes:	Ceiling open to structure.

ELEVATOR

Notes:	Required in two-story station (52). Low speed, medium capacity, sized to fit stretcher. Manufacturer's standard finishes with rubber flooring.
Fire Protection:	Provide heads in shaft coordinate with electrical to activate shunt trip.

ELEVATOR MACHINE ROOM

Notes:	Required in two-story station (52).
Fire Protection:	Wet sprinkler system.
HVAC:	HVAC to maintain equipment temperature tolerances. No non-elevator related piping or equipment in room.
Finishes:	GWB ceiling

ROOF / GREEN ROOF (if included in program)

Plumbing:	Roof drains and internal rainwater where required. Water supply to temp irrigation for green roof.

SITE

FRONT APRON

Notes: Minimum depth to accommodate longest apparatus. Outside security perimeter, max 2% slope.

COMMUNITY OUTDOOR SPACE

Notes: Patio/benches outside lobby, as site allows. Outside security perimeter. Associated with interior community space, if included in program. Flexible space to allow for a variety of small events/gatherings.

Furnishings: Fixed seating. Garbage receptacles.

VISITOR PARKING (including accessible parking)

Notes: Exact number of spaces to be confirmed with City Planner. Outside security perimeter, max 2% slope at ADA stall.
9' x 18' standard parking stall size.
60" wide access aisle located adjacent to each ADA space.
ADA stalls to be located in close proximity to building entry.

ADMIN PARKING (52)

Notes: 1 space per staff member (~6 stalls for admin), 10 minimum desired. Outside security perimeter, max 2% slope at ADA stall. Consider electric vehicle stall.
9' x 18' standard parking stall size.
60" wide access aisle located adjacent to each ADA space.

ON-DUTY FF PARKING

Notes: 2 spaces per on-duty FF to accommodate shift changes. Inside security perimeter.
Consider electric vehicle stalls.

COVERED PARKING

Notes: For duty vehicles with 120V power connections. Inside security perimeter.

BICYCLE PARKING (Visitor and Admin)

Notes: Exact number of spaces to be confirmed with City Planner and Owner. Adjacent to building entry.
Overhead coverage preferred. 2' x 6' area per bicycle.

Lighting: IES standards for pedestrian routes.

WASTE / RECYCLING COLLECTION

Notes: Per TMC planning code. Outside security perimeter, screened. Provide buffer from exterior gathering spaces.
Direct or semi-direct vehicle access.
Required truck turning/maneuvering radius.
Limit of distance from the building.

DELIVERY AREA

Notes:	Secure receiving and storage area for supplies and equipment pickup and return at all stations. Could be interior or covered exterior storage with exterior access for deliveries. Situated inside or outside security perimeter, TBD.

REAR APRON

Notes:	Verify size requirement. Inside security perimeter, max 2% slope.
HVAC:	HVAC outdoor units (VRF heatpumps, AC, etc.) may be located in this area.
Plumbing:	Adjacent hose bib; hydrant for training.

COURTYARD

Notes:	Access from Great Room and Physical Training. Inside security perimeter. Preferably screened from views of parking areas, mechanical/service elements. There should be a focus on the quality of space to be successful. Screened from public view. Some covered space. Large enough to accommodate admin at 52. Planted area and hardscape, preferably with southern exposure.
Equipment:	Furnished by FF?
Furnishings:	Variety of fixed and movable seating for flexibility.
Plumbing:	Hose-bib, gas line for BBQ with automatic shut off on fire alarm call, push button reset to restore service when they return.
Lighting:	Site lighting for day to evening use.
Power:	Outlets
Acoustics:	Situate away from acoustic distractions, or provide acoustic buffering.
Finishes:	Ensure the quality of space and material selection invites use. Durable, cleanable, materials.

GENERATOR / FUEL PORT

Notes:	Area/clearance required based on mechanical input. Inside security perimeter. Separate, second fence or wall. Determine distance from building. Locate adjacent to Rear Apron for fueling access.
HVAC:	Coordinate mechanical outdoor equipment with electrical.
Acoustics:	Provide acoustic enclosure.

TRANSFORMERS

Notes:	Area/clearance required based on mechanical/electrical input. Access from R.O.W and/or access drive? Consider locating adjacent to delivery area and near gas meter. Goal is to group service/ maintenance/facilities/operations elements to simplify access and minimize impermeable surfaces.

GENERAL SITE NOTES

PEDESTRIAN CIRCULATION AND ENTRY SEQUENCE

Surface materials per ADA standard, free of trip hazards. Safe, continuous path to entry with clear wayfinding. Outside security perimeter, max 2% cross and 5% slope in the direction of travel. 5% + necessitates handrails. Clear width must be 36" min. Route shall be per ADA standards Chapter 4 for Accessible Routes.

TREE PROTECTION ZONES 18.54

Critical root zones surrounding existing trees to be retained. See Tukwila Municipal Code. 1' of radius per every 1" diameter of existing tree trunk at breast height (DBH). Goal is to protect existing tree to maximum extent feasible.

VEGETATION PROTECTION ZONES

Existing non-invasive, native vegetation for protection/retention. Extent TBD based on site analysis/ inventory and building siting.

SOIL PROTECTION ZONES

Existing healthy soil to be protected. Extent TBD based on site analysis/inventory and building siting.

ON-SITE PLANTED AREAS

See Tukwila Municipal Code Section 18.52. Re: Landscape areas/types. Also used to provide buffering between non-compatible uses.

ON-SITE PLANTED AREAS RELATED TO GRADING AND DRAINAGE

To be coordinated with civil, related to drainage strategy for each site.

IRRIGATION CONTROLLER

Electronic controller in an outdoor-access location. Equipment and location needs to comply with City of Tukwila Parks requirements based on their maintenance. Wall-mounted or pedestal mounted controller in metal cabinet.120V power service with ground. Likely ethernet or cellular modem connection to internet for smart controller functions.

PUBLIC ART

Type/extent/location to be coordinated with city planner/owner. Locate outside security perimeter. Consider locating in community outdoor space. Potential lighting for artwork.

SIGNAGE

Type/extent/location to be coordinated with city planner/owner. Potential lighting for signage.

GAS METER

Location/type/clearance to be coordinated with mechanical.

A/C UNITS

Location/type/clearance to be coordinated with mechanical.

RADIO TOWER

Required?

FUTURE PROGRAM ITEMS

TRAINING TOWER (51)

Notes:	Incorporate hillside, include a rope rescue prop in hill. Simulate a mid-rise building. Inside security perimeter.
Equipment:	TBD
Fire Protection:	Sprinkler system, standpipe, hydrant.
HVAC:	Unconditioned
Plumbing:	Sprinkler system, standpipe, hydrant.
Lighting:	Basic, durable
Communications:	Alarm panel for training.

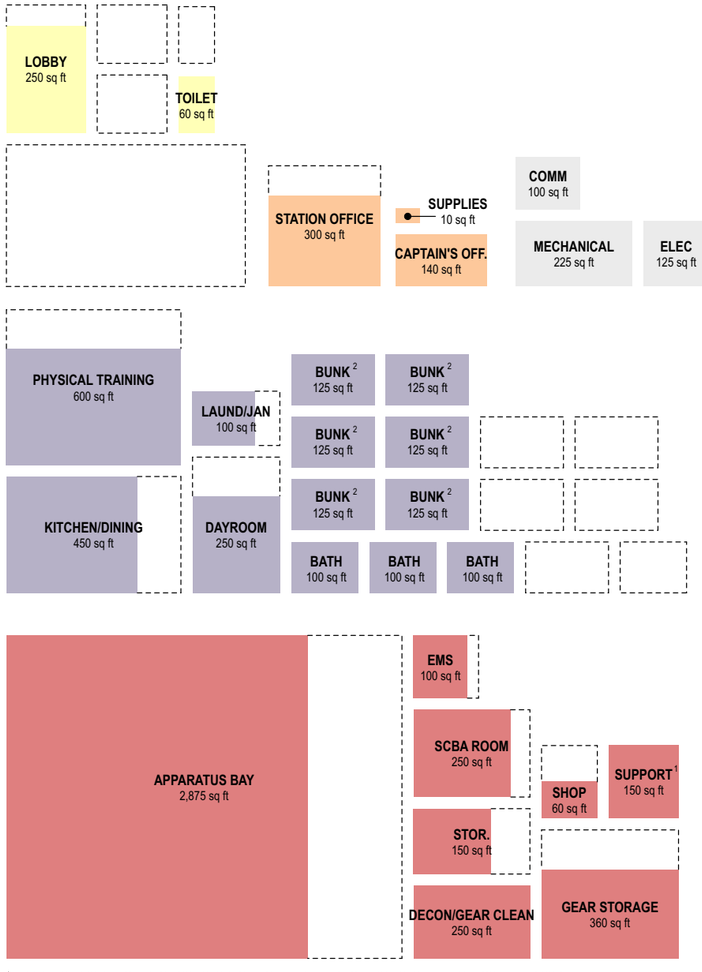
EQUIPMENT BARN / CARPORT (51)

Notes:	Conditioned Storage: 2 MCI trailers 3 spare engines Consumable disaster supplies Open carport: 1 boat 13 trailers 4 trucks, some need electrical outlet Police RV (maybe) Conex container
Plumbing:	Exterior hose bibs for vehicle washing.
Power:	Exterior truck outlets, interior outlets for spare engines.

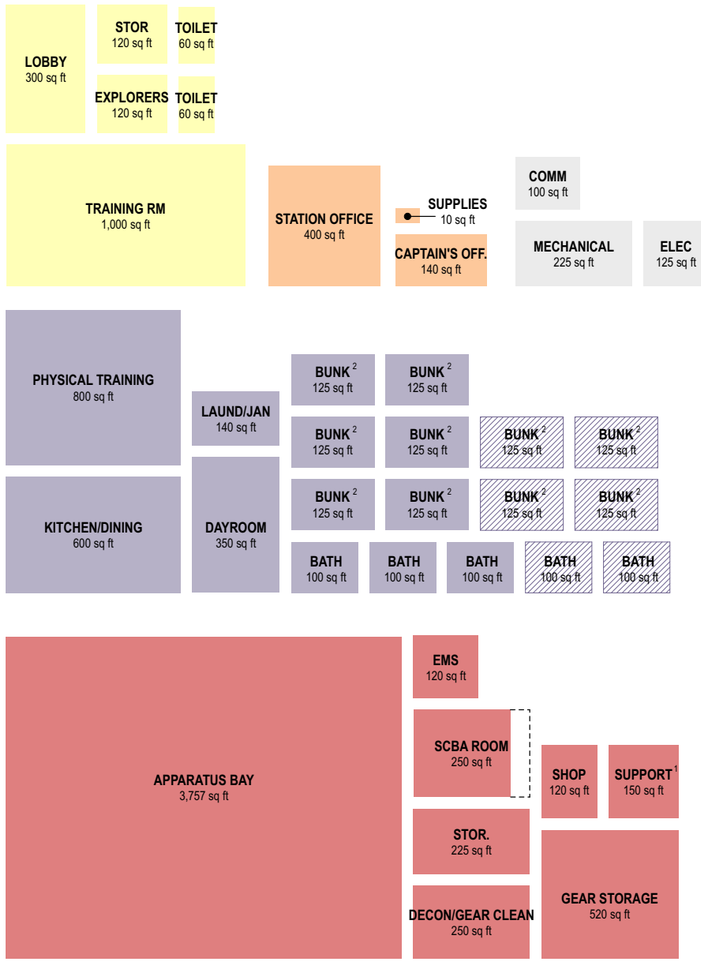
PROGRAM OPTION DIAGRAMS

FS51

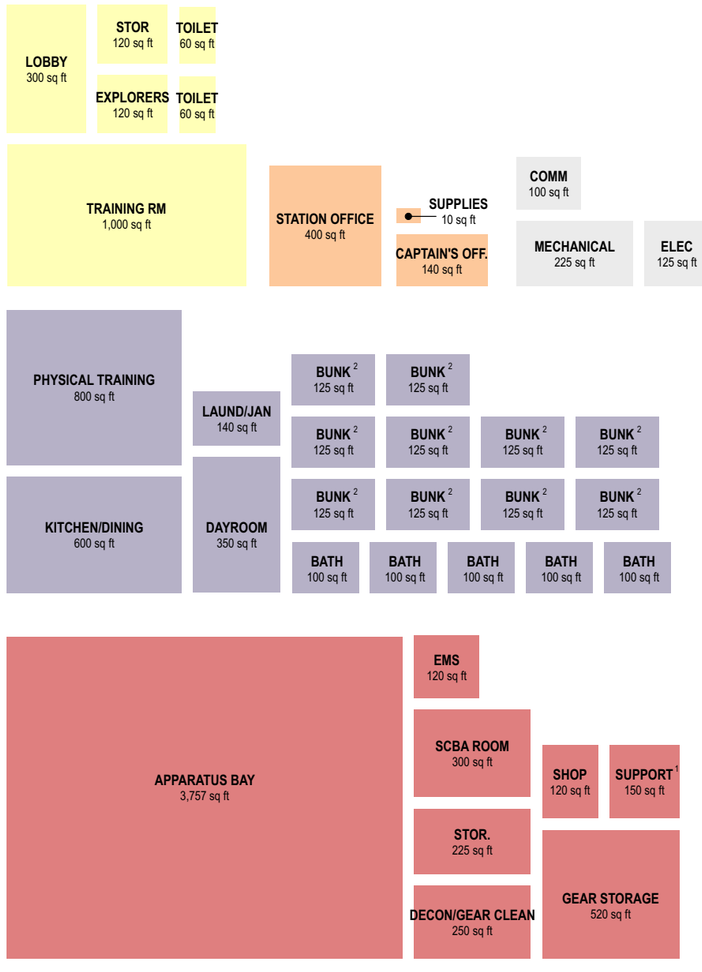
FS51 - 2040 PROGRAM
TOTAL BLDG = 9,426 SQ FT (INC. 20% CIRCULATION)
ON-DUTY STAFF: 6
APPARATUS: 2



FS51 - 2060 PROGRAM
TOTAL BLDG = 13,190 SQ FT (INC. 20% CIRCULATION)
ON-DUTY STAFF: 6 *(+ 4)*
APPARATUS: 3



FS51 - 2080 PROGRAM
TOTAL BLDG = 14,090 SQ FT (INC. 20% CIRCULATION)
ON-DUTY STAFF: 10
APPARATUS: 3

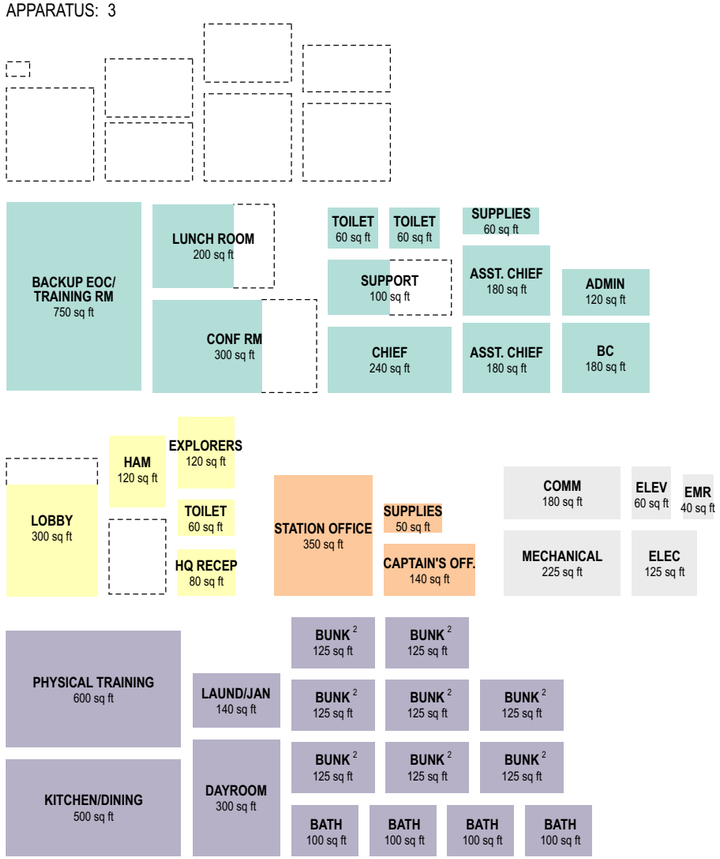


[1] *APP BAY SUPPORT* INCLUDES HOSE STORAGE, TOILET, BATTERY CHARGING, CLEANING ALCOVE, AND SCBA
[2] *BUNK* INCLUDES LOCKER ALCOVE

FS52

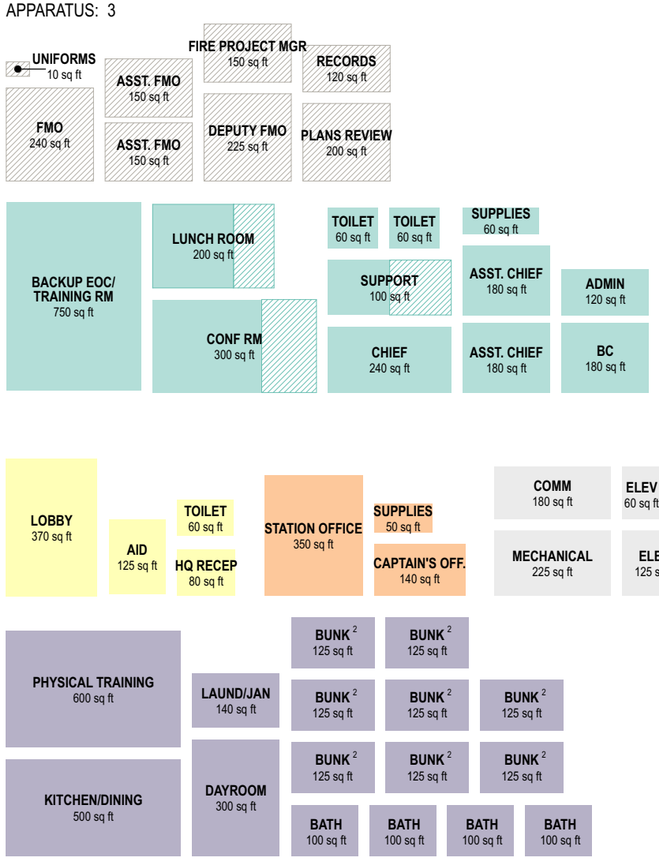
FS52 - 2040 PROGRAM

TOTAL BLDG = 15,068 SQ FT (INC. 20% CIRCULATION)
ON-DUTY STAFF: 8
APPARATUS: 3



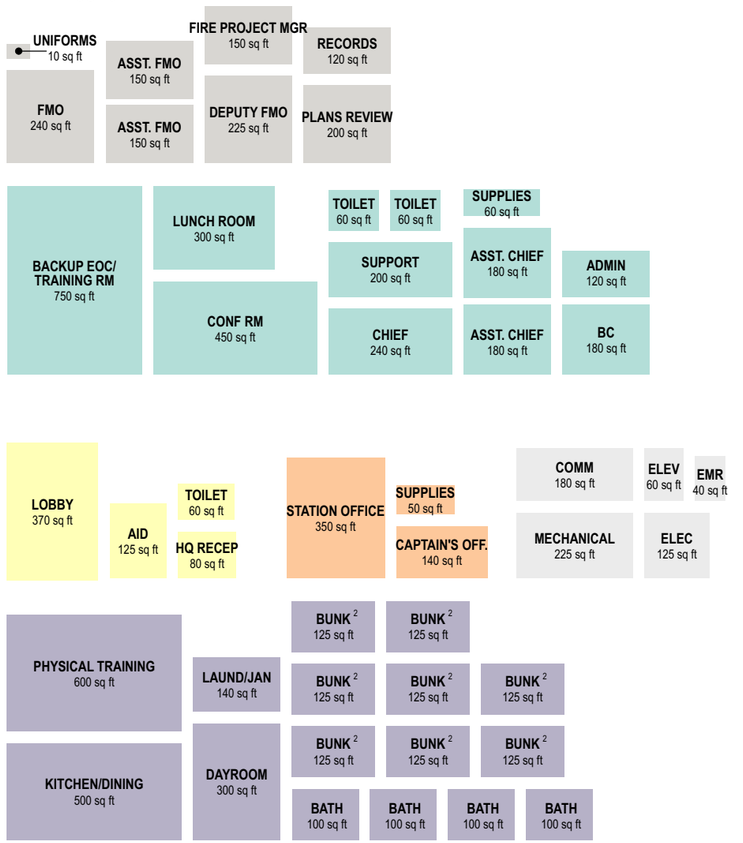
FS52 - 2060 PROGRAM

TOTAL BLDG = 15,152 SQ FT (INC. 20% CIRCULATION)
ON-DUTY STAFF: 8
APPARATUS: 3



FS52 - 2080 PROGRAM

TOTAL BLDG = 17,066 SQ FT (INC. 20% CIRCULATION)
ON-DUTY STAFF: 8
APPARATUS: 3

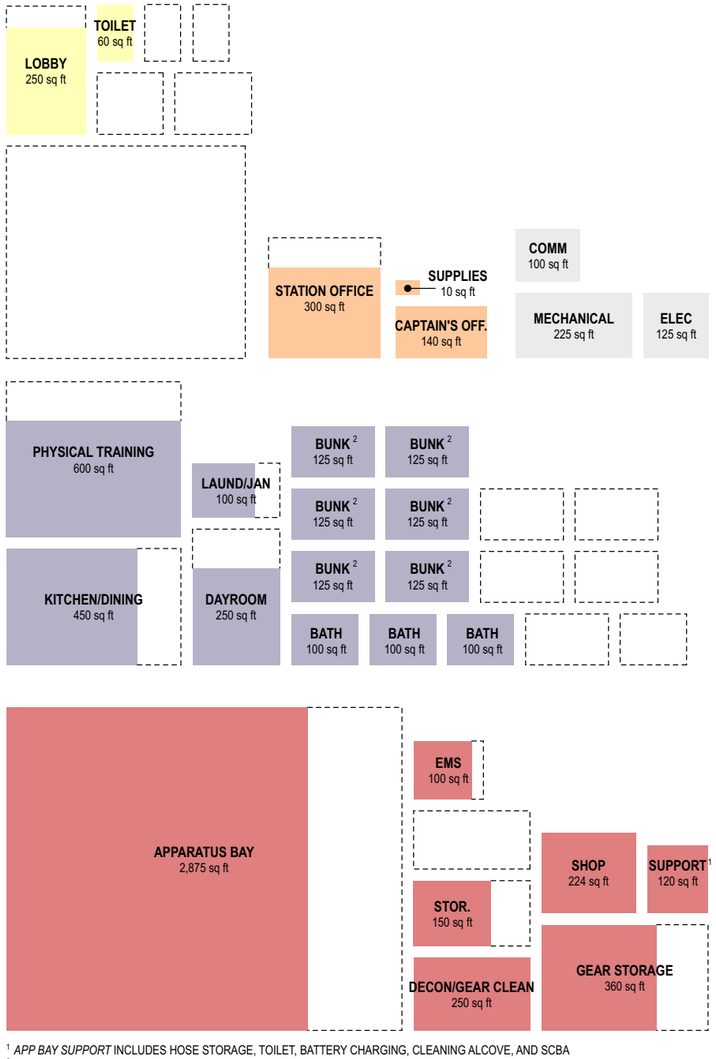


[1] *APP BAY SUPPORT* INCLUDES HOSE STORAGE, TOILET, BATTERY CHARGING, CLEANING ALCOVE, AND SCBA
[2] *BUNK* INCLUDES LOCKER ALCOVE

FS54

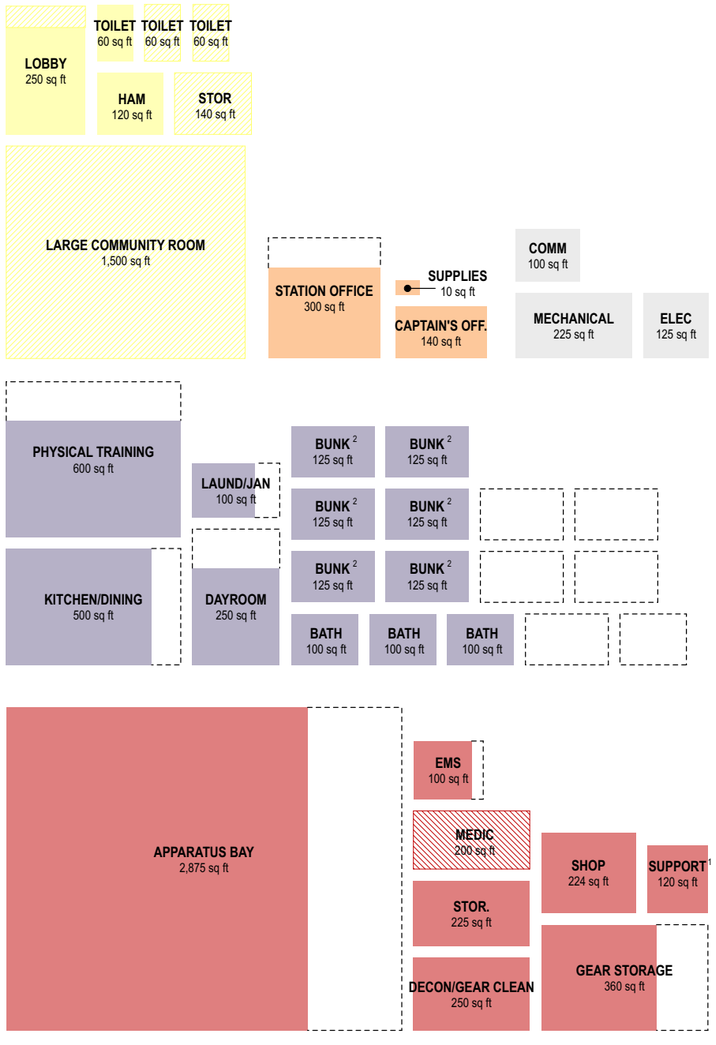
FS54 - 2040 PROGRAM

TOTAL BLDG = 9,287 SQ FT (INC. 20% CIRCULATION)
ON-DUTY STAFF: 6
APPARATUS: 2



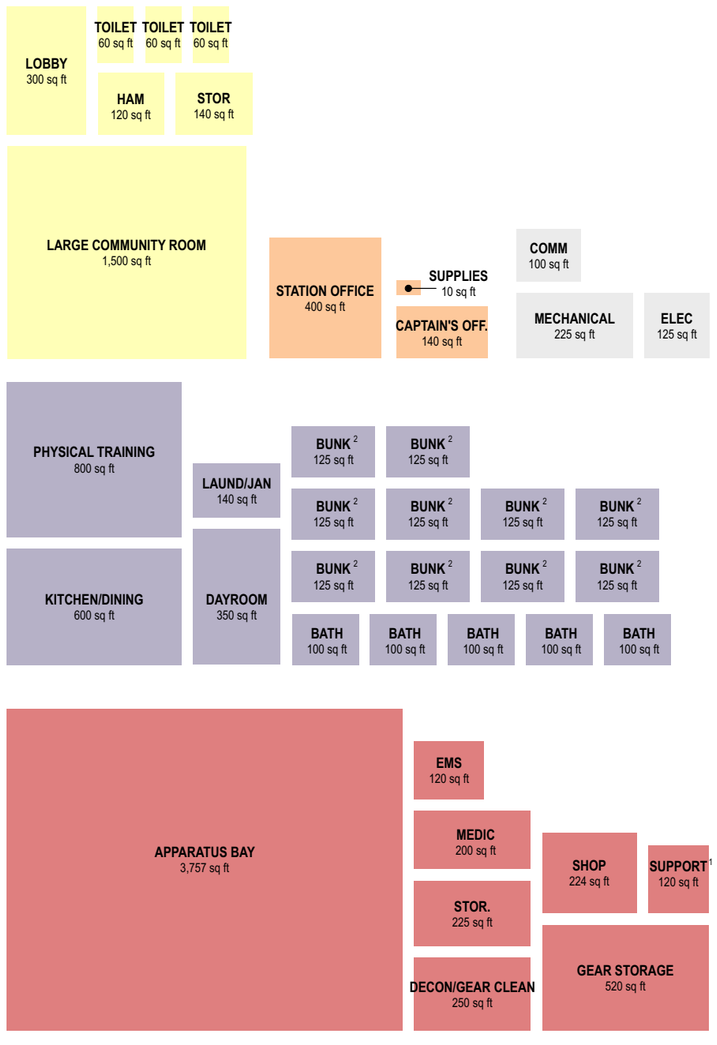
FS54 - 2060 PROGRAM

TOTAL BLDG = 9,491 SQ FT (INC. 20% CIRCULATION)
ON-DUTY STAFF: 6
APPARATUS: 2



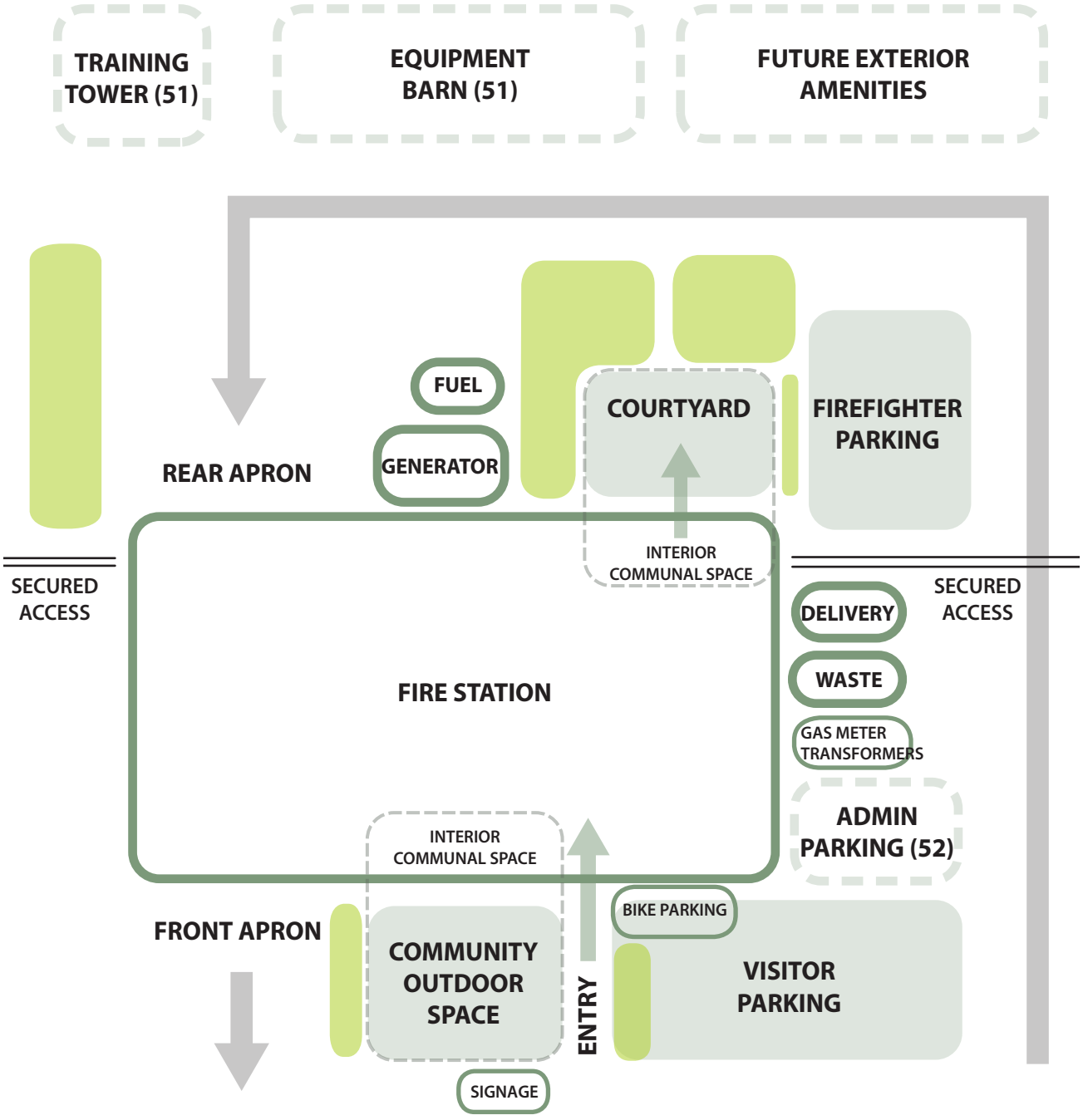
FS54 - 2080 PROGRAM

TOTAL BLDG = 14,755 SQ FT (INC. 20% CIRCULATION)
ON-DUTY STAFF: 10
APPARATUS: 3

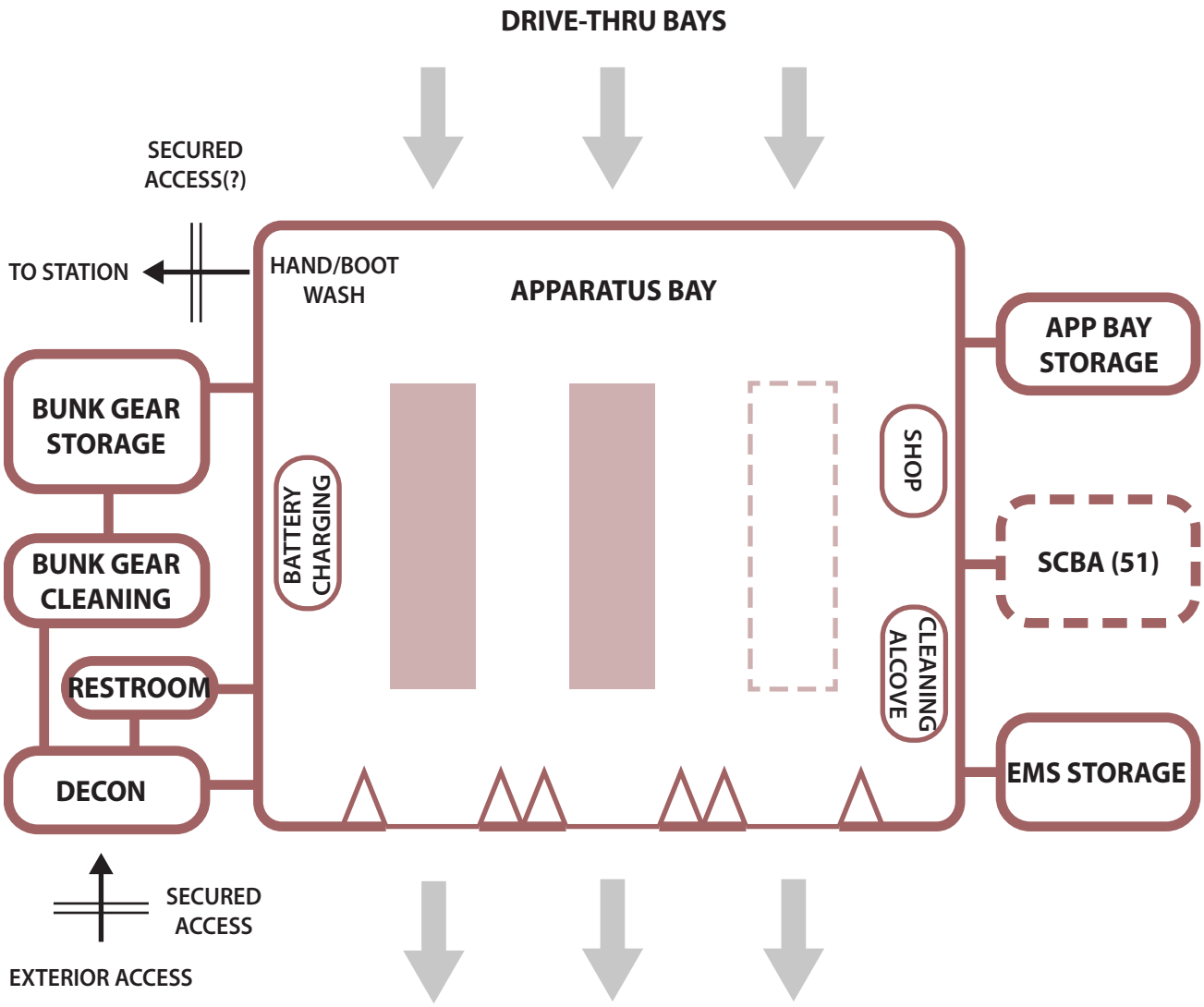


[1] *APP BAY SUPPORT* INCLUDES HOSE STORAGE, TOILET, BATTERY CHARGING, CLEANING ALCOVE, AND SCBA
[2] *BUNK* INCLUDES LOCKER ALCOVE

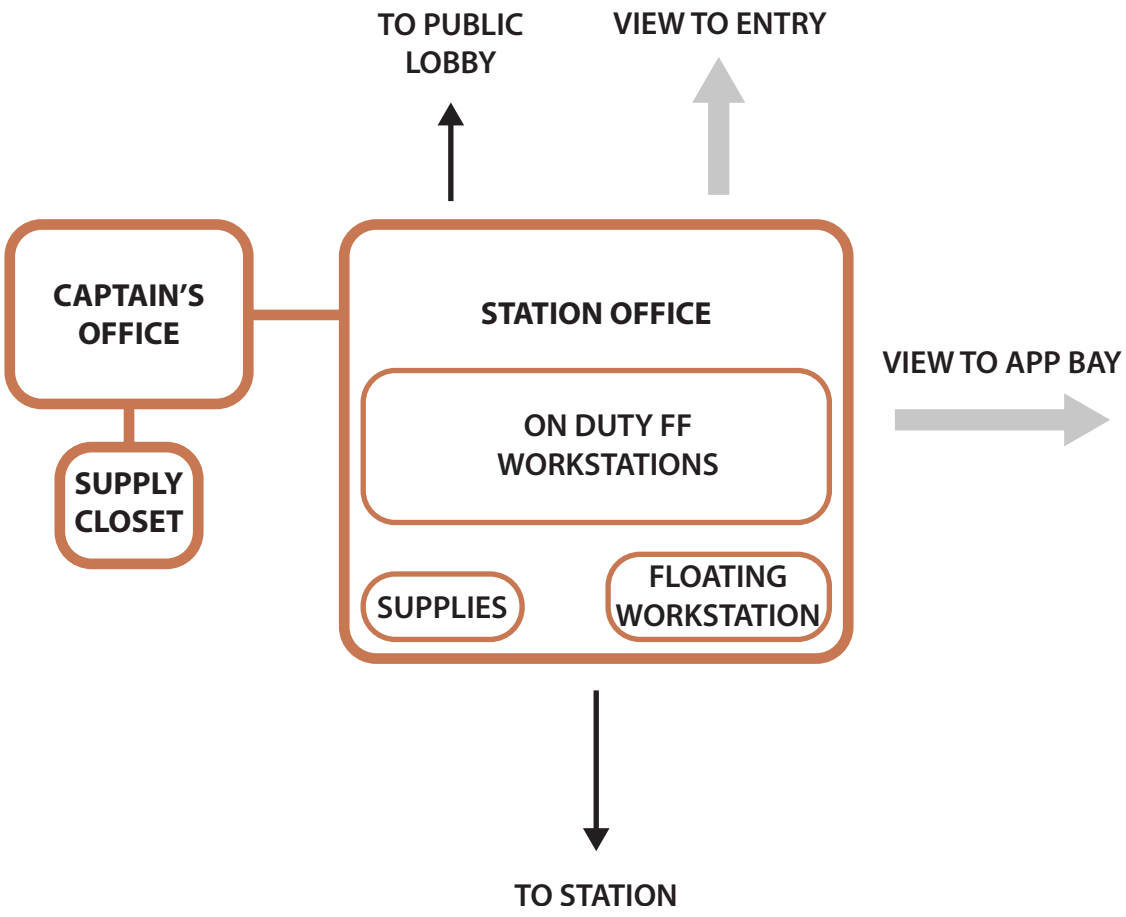
SITE ADJACENCY DIAGRAM



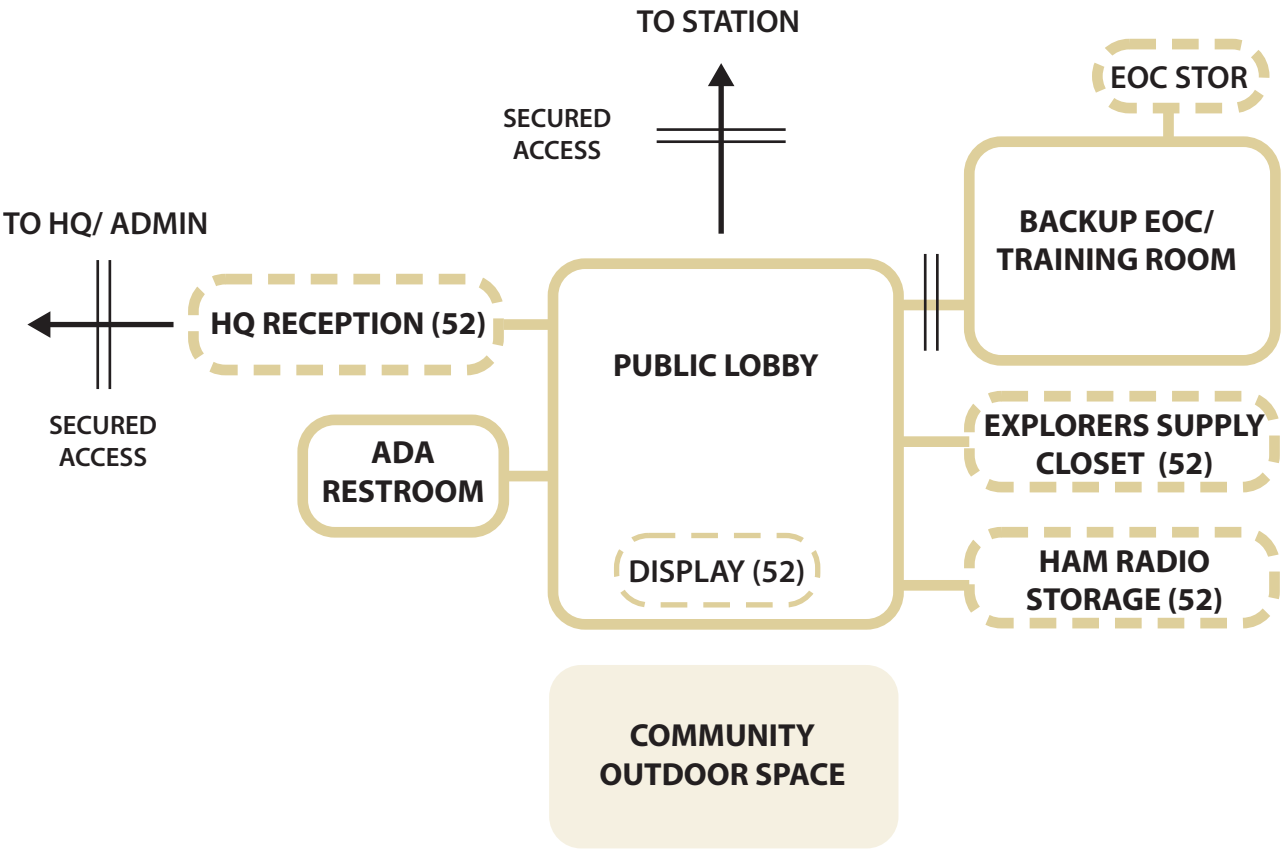
OPERATIONS ADJACENCY DIAGRAM



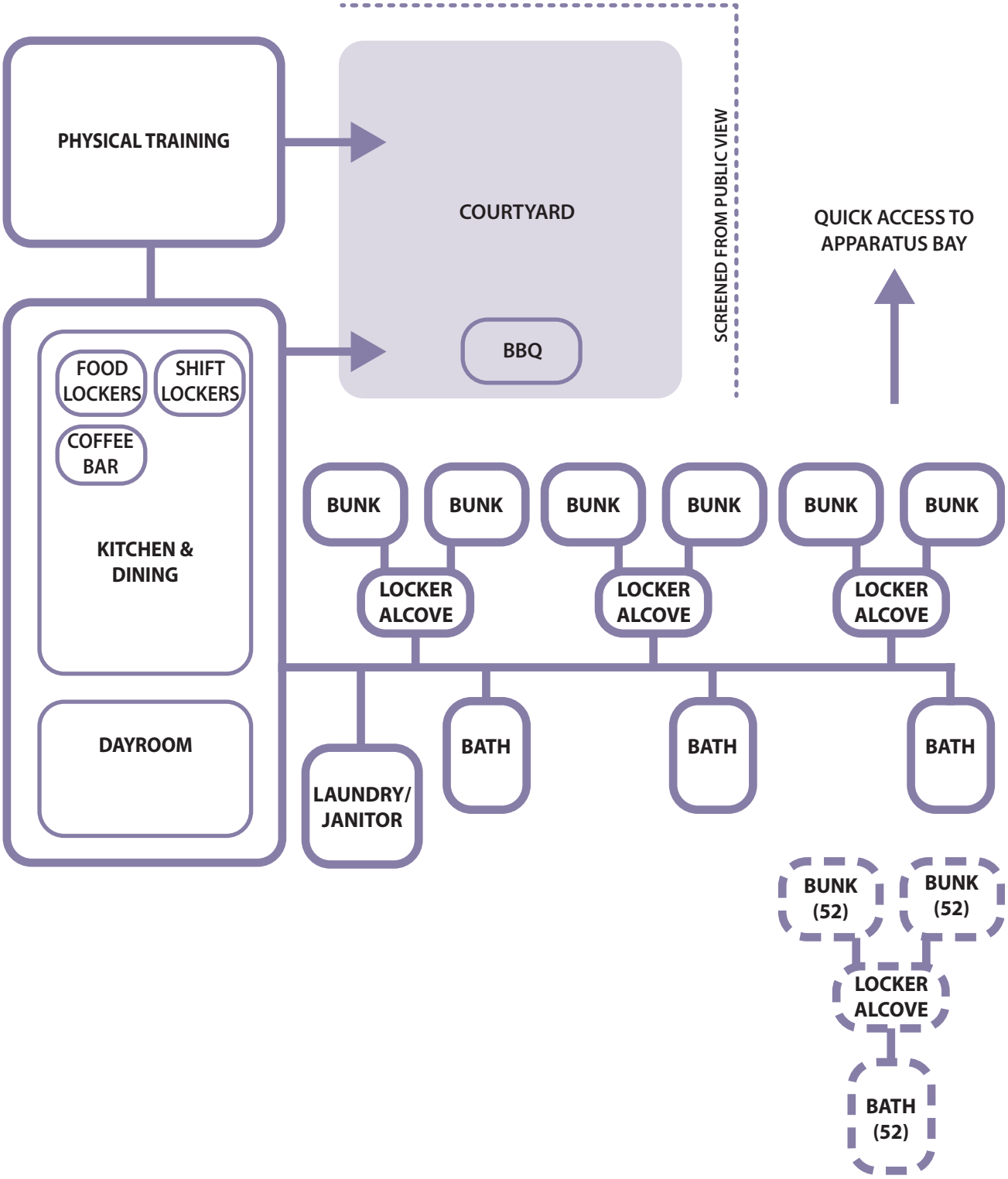
OFFICE ADJACENCY DIAGRAM



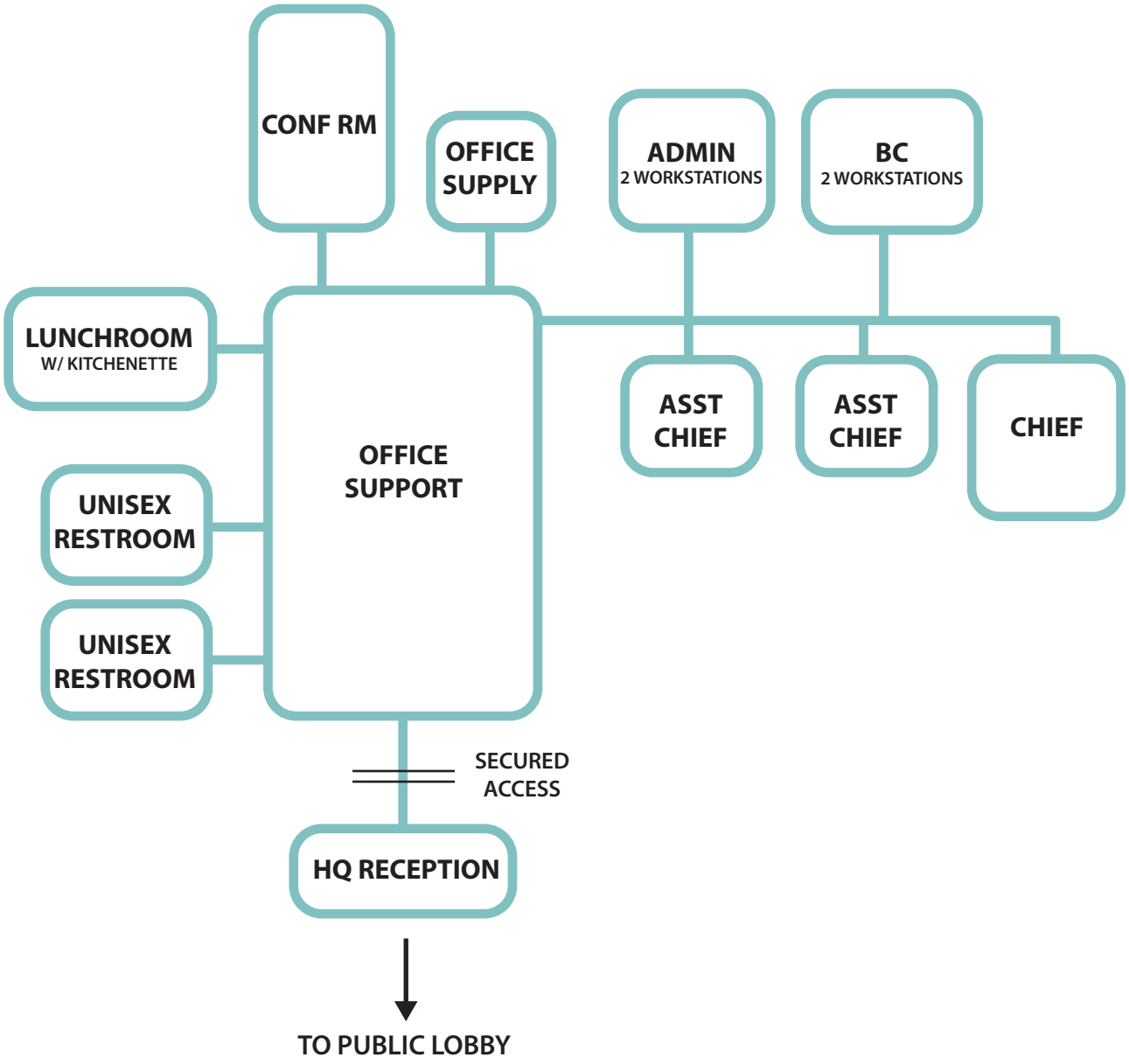
PUBLIC ADJACENCY DIAGRAM



LIVING ADJACENCY DIAGRAM



HQ ADMIN ADJACENCY DIAGRAM



1.0 – Description of Project – All Sites - Baseline Requirements

This project is for the design and construction of three new fire stations for the City of Tukwila; including FS51, FS52, and FS54. This section describes the civil components that are expected on all sites and are considered Baseline requirements. Specific criteria for site #51 (Segale site) is provided in Section 2.

Each of the three fire stations will be constructed on new sites that are strategically located to yield optimal response times to designated service areas. The siting process for FS51 has been completed; site analysis and selection for the additional fire stations will be a part of the future scope of work for this project.

The proposed delivery method for this project is GC/CM. At this time, LEED certification is not a required component of work or goal for this project; however, per the proposed programming phase scope, sustainability goals and approaches could be integrated into the project design. The extent of applicable civil work for the sustainability portion of the scope has been discussed in the sustainability workshop and included herein as applicable.

Permitting will be through the City of Tukwila. Design criteria will be subject to:

- Infrastructure Design and Construction Standards, City of Tukwila Department of Public Works, 2010
- King County Surface Water Design Manual, 2016.

1.1 – Frontage Improvements

Each site will require a wide commercial driveway for fire truck access via the main doors, a second curb cut to access the parking lot, curb, gutter, sidewalk, and planter strip for the frontage of the project, dependent upon the classification of the frontage road and current conditions. Traffic modifications, including signal, signing, striping and channelization are site specific and will be designed by a Traffic Engineer.

1.2 – Grading

The site should be graded with a minimum slope of 1% for drainage. Paved areas should be a maximum of 6% for parking and turning movements. Longitudinal slope of access driveways should be limited to 10%. Graded and landscaped slopes within the site should be limited to 2:1. Additional slope gain will be accomplished with retaining walls, as necessary. Each design will be specific based upon existing topography, soils and vegetation.

ADA accessibility will be required to all buildings, ADA accessible parking stalls and the public sidewalk.

1.3 – Storm Drainage

The City has adopted the *2016 King County Surface Water Design Manual* (2016 KCSWDM) and the *2016 King County Stormwater Pollution Prevention Manual. The minimum requirements and their applicability to the Baseline requirements are indicated below*.

Minimum Core Requirements

Core Requirement #1: Discharge at the Natural Location

- Each site must discharge in its natural location.

Core Requirement #2: Offsite Analysis

- Upstream and downstream Analysis is required of all projects. It is assumed that all sites will drain to the Green River/Duwamish River, which is a fish-bearing river.

Core Requirement #3: Flow Control

- Flow control (detention) is required of all projects. This can be accomplished with an onsite pond, vault or infiltration system.

- The required Flow Control Level is per the City of Tukwila 2013 Surface Water Comprehensive Plan, Figure 5 – Level 2 Storm Water Detention or City of Tukwila Design and Construction Standards Fig 5.9.1.

Core Requirement #4: Conveyance System

- The conveyance system will be comprised of the following elements:

    - Onsite collection and piped drainage system for the driveway roads, parking and access areas will collect road runoff and direct it to a treatment facility. This will include 8" – 12" pipe, catch basins and trench drains.

    - Footing drains around each enclosed building. 6" perforated drains with rock backfill.

    - Roof drains will discharge to downspout connections. Downstream of the building, roof drains will connect with footing drains. The combined pipe will discharge directly to a detention or infiltration system.

    - Water quality treatment is not required for roofs.

Core Requirement #5: Erosion and Sediment Control

- The TESC system will be designed in accordance with 2016 KCSWDM - clearing and grading requirements. TESC facilities will include at a minimum: stabilized construction entrance, silt fencing, catch basin inserts, interceptor swales, and other sediment control facilities. In addition, existing pavement surfaces will need to be used for construction access to the various locations of the proposed building and site improvements. Based on the topography and site constraints, it is

possible that Baker tanks will need to be used for sediment control during construction. The construction documents will include the requirements for the contractor to manage the construction site in accordance with BMPs, including marking the clearing limits, limiting the site area that is exposed, and stabilizing exposed areas with mulch or other approved measures, protecting the slopes and managing any water from construction dewatering.

- Erosion and Sediment Control is required of all projects. Details will be determined during design and construction. An NPDES/NOI permit is required, and will require turbidity monitoring for stormwater runoff leaving the site during construction.

Core Requirement #6: Maintenance and Operation

- Required for all projects. Maintenance of the detention, water quality and onsite stormwater systems will be required on a regular basis.

Core Requirement #7: Financial Guarantees and Liability

- Required for all projects.

Core Requirement #8: Water Quality

- For commercial sites, per Section 1.2.8.1, enhanced water quality treatment is required.. Consequently the project must use Table 6.1.2A – Enhanced Treatment Train. Possible scenarios use the following facilities:
    - Combined wetvault / proprietary systems (i.e. StormFilter)
    - Bio-swale/proprietary system
    - Combined wetpond/ proprietary systems (i.e. StormFilter)
- Roofs:
    - Roofs do not require water quality treatment. Note that metal roofs must are considered to be pollution generating impervious surface unless they are coated with an inert, non-leachable material

Core Requirement #9: Flow Control BMP's

- Onsite Stormwater Management implemented for the proposed site development will be designed according to the 2016 KCSWDM requirements.
- All impervious or pollution generating surfaces must be analyzed and a BMP specified for each target surface. It is expect that most areas will be treated with BMP's such as the bioretention cells, permeable pavements, trees, and landscaping.
- Compost will be amended into all pervious, landscape soils.

King County Special Requirements Section 1.3

Section 1.3.1 Special Requirement #1: Other Adopted Area-Specific Requirements

The site is within:

- City of Tukwila 2013 Surface Water Comprehensive Plan
- Tukwila South Development Agreement (Segale Site)

Section 1.3.2 Special Requirement #2: Flood Hazard Area Delineation

- The Segale and City Hall sites are not within a Flood Hazard area, per King County GIS. Any other future site will need confirmation that it is not within a Flood Hazard Area.

Section 1.3.3 Special Requirement #3: Flood Protection Facilities

- The Segale and City Hall sites are not within a Flood Hazard area, per King County GIS. Any other future site will need confirmation that it is not within a Flood Hazard Area. It is assumed that the project is not within a Flood Hazard area, per King County GIS.

Section 1.3.4 Special Requirement #4: Source Control

- All applicable structural source control measures shall be shown on the site improvement plans submitted for engineering review and approval. Other, **nonstructural source control measures**, such as covering storage piles with plastic or isolating areas where pollutants are used or stored, are to be implemented after occupancy and need not be addressed during the plan review process.
- All commercial, industrial projects (irrespective of size) undergoing drainage review are required to implement applicable source controls.
- Water quality source controls applicable to the proposed project shall be applied as described below in accordance with the *King County Stormwater Pollution Prevention Manual* and King County Code 9.12.

Section 1.3.5 Special Requirement #5: Oil Control

- Fueling areas and truck (diesel) parking and staging areas will require oil treatment. Facility choices include catch basin inserts, linear sand filters, and oil/water separators.

1.4 – Sanitary Sewer

Each Fire Station will need a sanitary side sewer to drain bathrooms, kitchen and internal truck wash. A minimum 6-inch PVC sewer is recommended. The sewer will connect to a public sewer main, with a clean out near the exit from the building and near the right of way.

Sewer Districts serve the following locations:

FS #51 Segale Site: City of Tukwila Sewer

FS #52 City Hall site (tentative): City of Tukwila Sewer

FS #54 site: City of Tukwila or Valley View, depending upon actual location.

1.5 – Water Service

Each site will require domestic and fire service. Each system will need to be sized for each building. For cost estimating purposes, we recommend a 2" domestic meter and a 4" Fire service.

The City standard requires a hydrant within 150 feet of the building and no farther than 300 feet from any perimeter point of the building. Therefore, it may be necessary to construct a fire hydrant onsite, depending on the actual site plan.

Water Districts serve the following locations:

FS #51/Segale Site: Highline Water District

FS #52/ City Hall site (tentative): City of Tukwila Water

FS #54 site: Water District #125

1.6 – On-site Paving

The main driveway in front of the truck doors will be heavy duty concrete pavement to support fire trucks, service vehicles and fire department apparatus. The main route to the rear of the station and other areas that support heavy duty vehicles typically will be heavy duty concrete.

The passenger vehicle parking areas will have permeable asphalt or permeable concrete for flow control BMP.

ADA Parking stalls should be constructed with concrete to control grades.

The pedestrian walkway, patios, and other areas subject to light loads will have pervious concrete to be considered for use as a stormwater BMP. If pervious concrete is used for the majority of the pedestrian areas, there will still be limited areas of standard concrete at the landings outside of the building doors, ADA ramps, site stairs, retaining walls, and curbs.

1.7 – Salmon-Safe Requirements

The project proposes to design and construct the project in conformance with Salmon Safe Urban Standards Draft 1.0 2014. Salmon Safe includes the following standards. Civil Engineering considerations are listed were appropriate.

U.1 Stormwater Management

The Storm water Management Section U.1 provides additional framework and documentation processes beyond that provided by the King County Drainage Manual. The end design is not expected to be substantively different than a drainage design in accordance with the KCDM.

U.2 Water Use Management

The project will meet the criteria for avoiding surface water withdrawals, high efficiency appliances, toilets, showers, mechanical systems; connect sanitary sewer to municipal main, low water landscape,

Those items that will require further consideration include documentation; re-use of runoff for gray water, vehicle washdown, etc; and future site operations and maintenance methods.

U.3 Erosion Prevention and Sediment Control

An Erosion and Sediment control plan will be prepared and implemented in accordance with King County standards. Also, a NOI will be procured from the Department of Ecology. It is expected that there is not substantive change to meet the Salmon-Safe requirements.

U.4 Pesticide Reduction and Water Quality Protection.

Not addressed in Civil Engineering narrative.

U.5 Enhancement of Urban Ecological Function

Primarily a Landscape Architectural function.

U6 Instream Habitat Protection and Restoration

Not applicable.

General considerations

Additional documentation on behalf of the Owner and Consultant Team is required to obtain Salmon-Safe certification.

2.0 – Tukwila FS #51 – Segale Site

The following provides site specific criteria for FS #51.

The site selected for FS51 is located west of Southcenter Parkway in Tukwila, Washington (parcel number: 3523049008). The site is bounded on the east by Southcenter Parkway and where the parkway intersects S 180th Street, to the west by S 184th Place/S 178th Street with an adjacent densely wooded area and I-5 beyond; to the south by undeveloped parcels and a storm water pond, and to the north by existing commercial properties. The site is approximately 169,218 square feet (3.88 acres).

The FS51 site is located in the northern section of an overall project site development area referred to as the Tukwila South development project. In preparation for proposed site development, a preliminary mass re-grading of the site area was completed to stabilize the existing hillside, and create what is now a relatively flat 3-acre parcel. The full length of the parcel extends from Southcenter Parkway to the base of

the slope on the west side of the parcel. The most recent site plan reflects this grading, which shows even topography in the site area with the slope increasing going west towards S 184th Place/S 178th Street. Furthermore, the preliminary re-grading also removed the existing alignment of S 178th Street and S 180th Street. As part of the City's CIP, S 178th Street was realigned in 2013 with S 184th Place.

A geotechnical report completed by GeoEngineers in 2012 concluded that the soils, characterized as very dense/hard glacially consolidated soils, present in the site area at the current cut elevation would accommodate the anticipated capacity loads for the proposed site development.

2.1 – Vehicular Access and Frontage

According to aerial maps and site visits of the FS51 site area, the existing frontage along FS51 parcel has curb and gutter as well as stormwater infrastructure. It is assumed that a landscape strip and sidewalk will be required as part of the improvements. It is anticipated that the fire station emergency egress will utilize the existing light at S 180th Street. Any traffic light, loop or pedestrian activation modifications will be by others. We are assuming that ingress and parking egress for the site area will be via Southcenter Parkway at the northeast of the parcel boundary.

The existing concrete road that was the extension of S 178th St is now only approximately 30-feet long. However, it is relatively steep, and does not appear to be suitable for fire truck access. Therefore, approximately 20-feet of roadway will be removed and replaced with a new driveway. The ADA ramps, pedestrian push-buttons and signal poles appear to be constructed per current code. A topographic survey is needed to confirm slopes and suitability. The scope of a topographic survey will be developed and coordinated with the team and City.

2.2 – Grading

The existing site is a consistent grade at 1% - 2% draining towards Southcenter Parkways. There is a 3-foot rise at the Right of Way. Proposed grading will include preparation for pavement, footing and utilities. Significant grade changes are not expected and grading volumes are expected to be minimal.

2.3 – Storm Drainage

According to mapping available in the City of Tukwila's *2013 Surface Water Comprehensive Plan*, the site area is located in the P17 drainage basin and is subject to the Tukwila South Development Agreement.

The FS51 site is part of a larger redevelopment project with a large storm water facility. It appears that the storm water pond constructed at 180th and Southcenter Parkway was constructed for the purposes of detention (Level 3) and water quality (Basic Level) treatment runoff from the subject site and others.

Per the City's infiltration map, the FS51 project site is located in an area where infiltration is allowed. However, actual soil conditions as primarily reported by Hart Crowser indicate that the material is till and is not likely available for infiltration.

Summary of site requirements:

- The existing detention facility is designed to Level 3 and appears to be constructed to accommodate the subject site.
- The existing pond is a combined water quality/detention pond. It is designed to a Basic water quality treatment level. Because the fire station is a commercial land use, it will need Enhanced Water Quality treatment per King County Table 6.1.2.A; which specifies a treatment train. There are a number of options available. The most likely systems are:
    - Filterra System (Tree installed in a large catch basin with media material)
    - StormFilter with Metal Rx
    - Compost Amended Biofiltration swale.

  Actual facility selection will be determined during design.

- Flow Control BMP's are required, and are expected to include:
    - Bioretention pond or planters incorporated into the landscape; preferably at the low (Southcenter Parkway) side of the site
    - Permeable pavements (sidewalks, walkways, parking stalls, other paved areas not subject to heavy loading.
- Conveyance system, per Baseline description above.

2.4 – Water System

The FS51 site area is located in the Highline Water District within the 365 Zone (Segale) pressure zone. Per available mapping, it appears that existing 8-inch water mains are in the site area. There is a convergence of a 12-inch water main and a 10-inch main at the intersection of Southcenter Parkway and S 180th Street adjacent to the southeastern edge of the project site area. These pipes extend from and serve the Tukwila water service area.

There is an existing fire hydrant on the SE corner of 178th and Southcenter Parkway, immediately across the parkway from the fire station site. Per paint markings (June 2017), there is a 2-inch service on the south side of 178th, extending into the site and terminating at a meter box.

The size of the existing service lines will need confirmation. The proposed project may require an extension for building fire service to the main on the east side of Southcenter Parkway. The building service is typically a 4-inch or 6-inch service.

Our experience with other fire stations indicates that a fire hydrant is used for training purposes in the vicinity of the training tower. A fire hydrant will require an 8-inch extension from the main on the east side of Southcenter Parkway to service the fire hydrant. This will include one or two crossings of Southcenter Parkway. If installed, the building fire connection will tap into the 8-inch extension.

2.5 – Sewer System

The sanitary sewer system for FS51 site is within the City of Tukwila's sewer service area and is owned, maintained and operated by the City. According to sanitary sewer maps available in the City's *2013 Comprehensive Sanitary Sewer Plan Update*, the project site area is located within a discharge area designated by the City as Basin No. 13. Basin No. 13, which is considered the largest in the City's sanitary sewer system, serves the southern part of the City. The sewers in Basin No. 13 mostly flow by gravity to lift stations. Overall, wastewater from the City of Tukwila is conveyed to King County trunk lines for treatment at King County's South Wastewater Treatment Plant.

Adjacent to the FS51 site, there is existing 12-inch PVC gravity main within S 180th Street that was installed in the 1970s. Additionally, a 20-inch ductile iron (DI) gravity main, which was installed in or after 2010, runs north-south in the western portion of Southcenter Parkway. The record drawings indicate a 12-inch sanitary sewer stub that is intended to serve the site. The record drawing show it located approximately 100-feet north of S 178th Street and behind the curb.

The mechanical engineer will determine whether a grease interceptor is required for the kitchen.

2.6 – Paving

Design per Baseline recommendations.

2.7 – Action Items

The following items appear to be the next items to move forward:

1. Site Survey, including utility locates.
2. Geotechnical exploration to confirm soils types and potential for infiltration.
3. Site design

3.0 Civil Design References

- City of Tukwila Infrastructure Design and Construction 2010 Standards (Water, Sewer, Storm, Roads)
- City of Tukwila Municipal Code
- WSDOT Standard Specifications 2016
- WSDOT Standard Plans 2013
- MUTCD
- King County Surface Water Design Manual 2016
- Criteria for Sewage Works Design (Washington State Department of Ecology)
- ADA Accessibility Guidelines for Buildings and Facilities, ICC A117.1
- Salmon Safe Urban Standards Draft 1.0 October 2014

Landscape/Site Narrative

This narrative serves as a summary of landscape program, code requirements, and sustainability/performance metrics for the site work at the Tukwila Fire Stations 51, 52, and 54.

The programmatic landscape strategies listed throughout the document serve to support the following big picture goals, as listed in the City of Tukwila Strategic and Comprehensive Plan, which we have identified as relevant to the landscape design and planning of the Fire Station projects:

- Contribute to a positive community identity and image
- Help to create inviting neighborhoods and vibrant districts
- Ensure city facilities are safe, efficient and inviting to the public
- Restore and protect the City's air, land, and water resources for future generations
- Promote public health
- Ensure that public facilities anticipate the needs of growth through acceptable levels of service, prudent use of fiscal resources, and realistic timelines

In addition to the big picture goals listed above, strategies have been prioritized to create flexible sites to accommodate future growth and to provide civic facilities that are beautiful, contextually sensitive, resilient, easy to maintain, spatially efficient, and low in cost.

1. Overview of Site Program:

While each station will be unique based on its context and site constraints, there are a number of baseline spatial program parameters that Stations 51, 52 and 54 share. These are listed below. Please refer to the TFS Program Matrix for more detail related to SF requirements, features and adjacencies

- Front Apron
- Rear Apron
- Parking
    - Visitor Parking, including ADA
    - Admin Parking
    - On-duty FF Parking
    - Covered Parking
- Bicycle Parking
    - Publically accessible
    - Private bicycle storage for staff
- Delivery Area
    - Temporary loading zone
    - Secure, covered storage area with access door for deliveries.
    - Loading dock assumed
- Generators
- Transformers
- Gas Meters

- A/C Units?
- Radio Towers?
- Waste/Recycling collection
    - Dumpsters/bins
    - Trash receptacles near building entries
- Pedestrian circulation and entry sequence
- Public outdoor gathering space
- Flexible gathering space/fitness area for firefighters and staff
- Tree/vegetation protection zones
    - Critical root zones surrounding existing trees to be retained
    - Existing non-invasive, native vegetation for protection
    - Healthy soils for protection
- Landscaped/ planted areas
    - Per the City of Tukwila Code Requirements
    - Related to site grading and drainage
- Improved R.O.W. landscape per City of Tukwila Code Requirements
- Public Art
- Signage
- Sustainable strategies as appropriate for each station (see Section 3).
- Additional exterior amenities identified by Firefighters/staff

2. Baseline Code Requirements and Standards:

Each Fire Station will be designed to adhere to the following list of Codes, Standards and Regulatory Frameworks:

- City of Tukwila Strategic Plan, 2012
- City of Tukwila Comprehensive Plan, 2015
- City of Tukwila Municipal Code, 2016
- King County Surface Water Design Manual, 2016
- Crime Prevention Through Environmental Design Standards
- ADA Standards for Accessible Design, 2010
- Salmon-Safe Urban Development Standards, 2014

Please refer to Appendix A – Tukwila Fire Stations Landscape Code Requirements Matrix for a breakdown of code requirements related to Station 51, 52, and 54.

3. Landscape/Site Development Assumptions:

Tree Protection:

Existing mature trees, native and ornamental, provide ecological function including habitat creation/retention, vegetative diversity, and contribute to environmental health. Trees and plants within and adjacent to the construction site will be protected to the maximum extent feasible balanced with the other requirements of the new building and facilities. This will support City of Tukwila goals to minimize ecological disturbance. This

will also help reduce construction and long-term maintenance costs associated with re-establishment of new trees.

Site pavements, stairs, ramps and walls:

The new fire stations will have a network of concrete paths to connect parking facilities and public sidewalks to the building. Site stairs and pedestrian ramps will be concrete and include metal handrails, although the site design will be developed to limit stairs and ramps to control costs. Concrete retaining walls or rockeries will provide grade separation between terraces, landings and adjacent slopes, where needed. Materials will be chosen for durability over time, and thus, reduced long term maintenance.

Site Furnishings:

Site furnishings will be located to support the areas and functions noted in the site program. Where appropriate, site seat walls may be incorporated into the design to leverage grade separations as flexible seating opportunities. Materials and products will be durable and locally sourced when possible.

Soil Preparation:

Soil preparation in all new planting areas will be focused on providing sufficient soil areas to support the proposed planting. Soil preparation for existing planting areas will be reduced imported topsoil integrated into existing topsoil retained in these areas.

Planting:

Plants will be selected for the site function, climatic condition and aesthetic objectives. All plants will be hardy and low maintenance for plant longevity and reduced costs. Tree sizing will be range from 2 to 2.5 inch caliper for deciduous trees and 10-12 feet in height for evergreen trees. Meadow and lawn seed mixes will be focused on low maintenance and performance. Plant sizes and spacing have been selected to maximize planting coverage, support plant establishment, and reduce site costs. All non-lawn planting areas will receive one 3" lift of mulch to insulate plant roots from extreme temperature fluctuations, reduce weeding, retain moisture, and provide a slow release of organic nutrients. The principals of an Integrated Pest Management Plan (IPM) will be employed to limit pesticide and herbicide applications through healthy landscape management practices.

Irrigation:

The project site will be watered by a fully automatic, water-efficient irrigation system utilizing a new water service and automatic, smart irrigation controller. Irrigated landscape area will include trees, shrub planting, and grass lawn areas. The method of irrigation will be pop-up sprinklers or dripline systems determined by the most efficient means for watering areas or specific plants. All piping and equipment will be in accordance with Tukwila parks design standards in response to their maintenance requirements.

4. Sustainable Performance and Value Goals and Strategies:

The content for this section was generated for and during the Thursday June 15th Performance and Value workshop at Weinstein A+U. The following have been identified as baseline sustainable strategies that are either required by the Tukwila Municipal Code, or have been identified as typical landscape architectural best practices:

Location and Transportation:

- Avoid developing on sensitive land - i.e., previously undeveloped, floodplains, farmland, parkland, wetlands, threatened or endangered habitat.
- Avoid developing sites that have the potential to limit the ability to respond after an environmental event (liquefaction prone sites, tall tree hazards from windstorms, etc.
- Provide firefighter bicycle storage in a secure location. Provide showers for employees.
- Provide on-site amenities that support physical activity and community gathering, as feasible on the selected sites.
- Provide secure parking for on-duty firefighter vehicles.

Sustainable Sites:

- Design to reduce rainwater runoff. Install permeable pavement at non-apparatus drive areas (parking stalls, pedestrian and patio areas), if feasible, use LID techniques, and retain natural areas of site.
- Storm water detention – code required
- Flow Control BMP – code required. BMP includes:
    - Place permeable pavement to the maximum extent feasible/affordable, per code. Include sidewalks, walkways. Effectiveness is site specific.
    - Full or limited infiltration of roof runoff and / or pavement runoff. Site and soil condition specific.
    - Use biorentention / rain garden for pavement runoff. Site specific.
    - Compost amended soils - code required.
- Reduce the heat island effect by using light/white roofing and hardscape material.
- Use capped exterior lighting fixtures to reduce light pollution.
- Retain existing trees and their related ecological functions. Replace any existing trees that cannot be retained. See Tukwila Municipal Code Section 18.54
- Protect existing vegetation and healthy soils, where feasible.
- Use native, drought tolerant plantings in landscape. Consider creating open natural spaces for employees or public to enjoy.
- Control and manage invasive plants.
- Utilize fire-safe landscape design at Station 51

Water Efficiency:

- Manage all precipitation on-site. See Tukwila Municipal Code 14.30
- Ensure surface water discharge does not exceed pre-design condition.
- Use native and adapted plantings and specify appropriate soils.
- Consider storm water facilities that support planting areas with limited irrigation (swales, etc.)
- Use high-efficiency irrigation systems where required.

Energy and Atmosphere:

- Use vegetation, including trees, to minimize building energy use.

Materials and Resources

- Possible use of reclaimed concrete material from existing buildings as base material for pavements and slabs, and potential use as aggregate in concrete mixes for concrete pavements.
- Use regional materials where possible. Steel, concrete, and bike racks are some of the most common regionally sourced materials.
- Use salvaged materials where possible, both from the site and/or the wider region (reclaimed timbers).

The following were identified as landscape architectural strategies that would provide significant benefit for the project with little or no added design cost. They have been ranked A,B,C, with A being highest priority to implement based on low-cost and/or synergies with other disciplines.

GOAL: Health and Safety

A.

- Exterior open spaces that are flexible for different uses: gathering, fitness
- Visual and physical connectivity to nature/restorative spaces
- Use of durable materials that are easy to clean and maintain

B.

- Japanese forest bathing concepts

C

- Urban agriculture, garden space for edible plants: low capital cost, high value (Note: minimal interest from TFD).

GOAL: Low Operations & Maintenance Costs

A

- Integrate stormwater into plant irrigation
- Station 51: reuse existing stormwater detention system + flow control, bio-retention and pervious paving.
- Station 52 (assuming City Hall campus site): Upgrade and expand the current on-site detention system and evaluate the soils for appropriateness of other strategies

- Native, site-specific plants.

B.

- Permeable paving at vehicle parking, sidewalks, patios, etc (paving for non-apparatus use)
- Use of salvaged and reclaimed materials in the landscape.

C.

- Evaluate green roof for Stations 52/54, which may have limited site area for alternate stormwater control systems.

GOAL: Resiliency

A. Fire-safe landscape design (Station 51)

Site Analysis

The following is an outline of future inventory and analysis in order to identity Opportunities and Constraints.

1. Urban Context
    - Neighborhood identity/character
    - Connectivity to the surrounding urban fabric
    - Adjacencies
    - Views
2. Existing Vegetation and Soils
    - Vegetative Health
        - Existing trees to remain
        - Existing vegetation to remain
    - Existing soil health
3. Existing Climate/Exposure
    - Solar orientation
    - Wind exposure
4. Existing Site Drainage
5. Pedestrian and Vehicular Circulation
    - Existing Site Entries
    - New Site Entries

Applicable Codes and Design Standards
The new Tukwila Fire Stations will be designed and constructed to comply with - or exceed - the following codes and design standards:

2015 International Building Code, as amended and adopted by WA State
2015 International Fire Code
WA State Energy Code, 2015 Edition
City of Tukwila Municipal Code
City of Tukwila Comprehensive Plan, 2015
Puget Sound Clean Air Agency Regulations
ICC/ANSI A117.1-2009 Accessible and Usable Buildings and Facilities, with statewide amendments
WAC Chapter 296-305 Safety Standard for Firefighters
NFPA 1581 Standard on Fire Department Infection Control Program
ASCE/SEI 7-05 Minimum Design Loads for Buildings and Other Structures

Siting / Massing / Civic Design Strategies
The new stations will be designed to have a strong civic presence in the community and will represent a sense of permanence, safety, reliability, and protection. While the exterior operations and equipment at each station will be shielded from public view and protected from theft and vandalism, the public face of each station will be welcoming in character and include adjacent outdoor public gathering space, as the sites allow.

As desired by the TFD, stations will be single-story where possible to reduce turnout times. Initial analysis of the site for Station 51 shows that it can accommodate a single-story station, whereas if Station 52 is located on the City Hall campus, it will most likely be two-stories due to tight site constraints. A drive-through configuration is desirable for improved safety and ease of maneuverability - assuming the selected sites permit, the Apparatus Bays of all three stations will include drive-through access. The Apparatus Bay will be a taller volume than the living quarters and will include two or three bays, as dictated by the program. Each station will include one bay long enough to fit a ladder truck, while the other bay(s) may be shorter.

The sites will include secure parking for on-duty firefighters and staff, visitor parking, and an exterior courtyard for firefighter and staff use. The location and arrangement of the buildings will allow for possible future expansion, for programmatic needs such as the addition of an equipment barn, training tower, and an additional truck bay and bunk room wing, at FS51.

Building Envelope
The building envelope must meet the performance goals and aesthetic ambitions for these civic projects. Given the long-term life of the proposed buildings, the design team recommends the building envelope be designed to perform above code minimum levels to reduce energy loads on the mechanical and electrical systems, as the budget allows. The envelope will, at a minimum, meet WSEC requirements. The design team will endeavor to balance the insulation performance with the mechanical system.

Exterior wall cladding will be made up of low maintenance, durable materials. Rainscreen assemblies will be considered the base level cladding design. Specific cladding materials that will be studied in the Schematic Design and Design Development phases include masonry, metal panels, and high-quality cement panels with integral color. The design team will explore roof options in the Schematic Design and Design Development phases. Roof design will focus on achieving a durable, easily maintainable system that does not contribute to a heat island effect across the top of the building. Green roofs may be evaluated at sites where there is not adequate space on the ground for required storm water retention and water quality facilities.

Glazing will be used strategically throughout the station. In the Operations areas, glazing will provide adequate daylighting for working, but be minimized or excluded where UV-sensitive fire gear and equipment are stored, such as the Bunk Gear Storage Room. Operable windows increase ventilation, give the occupants greater thermal comfort control, and provide a connection to the outdoors. They will be provided where increased ventilation is needed or desirable, such as the Physical Fitness Room, Great Room and Station Office. Sleeping Room windows will be operable and will be sized for required egress. High-performance windows will be evaluated for the Bunk Rooms, where acoustic separation is especially important. All exterior glazing will have a laminated glass inner lite to maintain the building enclosure during a seismic event, reduce noise transmittance and which will also reduce UV light penetration, thereby protecting interior finishes and equipment.

Doors throughout the station will be specified for durability, aesthetics and ease of maintenance, in addition to fire resistance, where required. In the Apparatus Bay, the use of side-acting, bi-folding doors are recommended by the design team in lieu of overhead sectional doors for frontline apparatus. These doors operate at 2.5+ times the speed improving response time and

security, perform considerable better during a seismic event, require considerably less maintenance, are always in the drivers site lines (minimizing the risk of apparatus and equipment damage), have safer manual overrides and functionality in the event of a power outage, and are more energy efficient than standard overhead sectional doors. Due to the increased cost of these doors, standard overhead doors should be considered at the back of the bays, as they are not critical to response times.

Structure / Seismic Design
Structural and architectural design will be carefully integrated in order to maximize the budget by simplifying massing and minimizing material connections. Where sensible, the structure will be left exposed and utilized as the interior finish. This approach allows for a quick and thorough inspection following a seismic event, while providing a durable finish. In the Schematic Design phase, the Team will explore non-combustible construction methods including steel, concrete, and heavy timber. Further analysis by the Geotechnical and Structural engineers is required, but the buildings will most likely have a concrete slab-on-grade with spread footing foundations.

Fire Stations are classified as essential facilities and need to perform to a higher seismic level than typical structures. Architecturally, the building will be designed to maintain building enclosure and weather resistance after a design-level seismic event. The building structure will be designed to meet "immediate occupancy" performance level described in FEMA 389. Performance requirements of non-structural components of the building will be evaluated with the City of Tukwila and the Tukwila Fire Department during Schematic Design, utilizing ASCE/SEI 7-05 with the goal of both identifying and communicating an appropriate level of performance.

Interior Construction / Quality
Interior space configurations will be designed with flexibility in mind, leaving opportunities for future reconfiguration and/or expansion as station needs evolve. The design team will attempt to control the layout of utilities and systems into consolidated areas, allowing partitions to be more easily modified over time.

Interior partitions will be metal stud with 5/8" GWB, typical throughout. The walls of rooms with acoustic separation needs, such as at the Bunk Rooms, Restrooms, Offices with privacy needs, the Physical Training Room, and the back-up EOC, will be provided with additional layers of GWB and/or acoustic insulation. All interior partitions will accommodate seismic movement and imposed loads (electrical panels, cabinets, etc.). Interior glazing will be laminated glass for seismic safety. Doors and hardware will be coordinated with the City, with access control systems at the perimeter and between publicly accessible spaces and the rest of the station. Flooring will be exposed, ground concrete in the majority of the station, with tile or monolithic coatings in wet areas. Carpet is deemed undesirable due to its ability to retain contaminants. Ceiling finishes will be exposed, painted structure in the Apparatus Bay, support and active living areas, and painted GWB in wet areas and sleep rooms. Accent finishes, such as a linear wood acoustic ceiling, will be considered as budget allows. Opportunities to include training features such as tie-offs or floor access doors throughout the building will be evaluated for their relative utility and budget implications.

All materials will be durable and long-lasting, chosen to withstand rigorous, frequent cleaning by the staff. The Architects will balance the durability needs with a desire to create comfortable, attractive spaces that are warm in character.

Interior Environmental Quality
The building interior will be designed with careful concern for the health, safety, and well-being of the firefighters in terms of its layout, the materials and finishes, and the air quality. Special attention will be paid to designating and separating hot/cold zones based on level of contamination.

Interior finishes will be selected to limit Persistent Biological Toxins (PBT), Volatile Organic Compounds (VOCs), and added Urea-Formaldehydes. Low maintenance finishes that do not require chemical cleaning, waxing or stripping will be recommended, such as ground concrete floors and minimized use of paints and coatings. Increased outside air ventilation and added filtration will be included in the mechanical design where required in order to contribute to a healthier indoor environment. A pre-occupancy flush-out period will help mitigate possible off-gassing of new materials and furnishings.

The use of natural light and daylighting controls for interior lighting creates a healthy work environment. Daylighting will be provided in spaces where the firefighters regularly spend their time. Where program allows, views to the outside from interior spaces will provide a connection to nature and improve mental wellbeing. Sightlines between spaces will be carefully considered, such as locating the Station Office so that there are "eyes on the street" out to the building entrance, or visually linking interior spaces where on-duty staff spend the majority of their day.

Acoustics will be considered both inside and outside the buildings. Noise will be minimized at the property lines as to avoid disturbing the neighbors, particularly at Station 54, which will likely be located in or near a residential neighborhood. Within the

building, sound transmission will be minimized between spaces.

Firefighter Exposure Within the Stations
One of the critical elements in design of the Tukwila fire stations will be to develop a system to manage firefighter exposure to carcinogens, infectious diseases and associated liabilities. Without clear management and control of exposure potentials, there are potential short- and long-term impacts on the fire department and therefore the community it serves. The framework used to evaluate the design as it moves forward will consist of organizing the operational areas into distinct categories by exposure risk and effectively managing each area.

Hot Zone (red): highest hazard
Transition Zone (yellow): moderate hazard
Cold Zone (green): low hazard

Taking a systems-based approach, the goal is to identify the critical areas of operational use which contribute to potential exposure concern and make the "unpredictable" manageable. An effective system for Tukwila will be one that is structured, but also flexible enough to adapt to changing circumstances and/or future information.

Best Practices

Passive:

- Multi-level scraper walk-off mats at transition areas
- Visual awareness cues
- Facility zoning and transition areas, isolation of EMS and ALS supplies, dissemination of path of travel activities
- Furnishing system selection awareness
- Hard cleanable surfaces - ability to disinfect without degrading finishes

Active:

- Boot scrubbers
- Hand wash stations
- Source capture exhaust collection systems (and ventilation strategies)
- Hands free sinks and dispensers
- Wash station ventilation and isolation
- Facility review of areas of positive and negative pressure and isolated ventilation
- Individual sleeping rooms with independent HVAC
- Assessing the handling of turnout gear in the facility – current procedures for cleaning, storage, etc. – and opportunities for improvement

Operational Evaluation and Criteria
Exposures identified by National Institution for Occupational Safety and Health (NIOSH), Environmental Protection Agency (EPA), the International Association of Firefighters (IAFF) and the University of Washington (UW) include: diesel exhaust and other carcinogenic/chemical hazards, dangers of exposure to many infectious diseases and higher risks or methicillin-resistant Staphylococcus aureus (MRSA). During each design phase, the design team will continue to evaluate the strengths and weakness of an effective exposure-prevention system with the department, and consider weak points which require further consideration. Using the identified risk categories, the design approach will focus on:

- Containing the contaminates
- Separating the occupants from the contaminates
- Controlling the contaminates
- Limiting crossover of contaminates
- Paying attention to detail at the transition points
- Focusing first on the highest hazards
- Providing decontamination pathways at each zone

Documentation of both the process and decision points will allow for long-term ongoing user education, facility maintenance and contaminant management, which may evolve over time as future technology and resources become available.

Recommended Owner / Operator strategies
After the fire stations are constructed, the design team recommends certain operational strategies that will maximize the health of station occupants and minimize the buildings' impact on the environment. First and foremost, the building must be commissioned by an experienced commissioning agent to ensure that all systems are running as designed. This agent should then train the maintenance and user groups in the proper operation of the fire stations, especially since they will represent such a striking departure from the existing facilities. It will be important to develop ongoing educational initiatives on the proper use and care of the buildings to maintain institutional knowledge as staff changes over the years. Some information can be easily disseminated in perpetuity in the form of integrated signage throughout the stations, which would have the added benefit of educating visitors about the building functions, as well as the staff.

There are a few strategies that the Owner Team can take to maintain and operate their buildings in the most sustainable manner possible, without adding much operational cost. Due to the ubiquity of green electrical power sources in Washington State, the Owner could opt to purchase electricity generated solely from renewable sources such as hydroelectric and wind power. They can also initiate a Green Housekeeping Plan, which would use only sustainable, low-emitting cleaning agents and proper material disposal methods. Integrated Pest Management procedures can manage undesirable pests and invasive species throughout the site without the use of damaging chemicals.

Project Description

The project involves design and construction of new Fire Stations for the City of Tukwila to replace the existing Fire Stations 51, 52 and 54. Existing Fire Station 51 is located at 444 Andover Park East, in Tukwila, WA. Existing Fire Station 52 is located at 5900 S 147th St, and existing Fire Station 54 I located at 4237 S 144th St. The existing Fire Station structures are deemed inadequate to accommodate modern emergency response equipment and staffing requirements and renovating the existing structures would be economically unfeasible. The new fire stations will be constructed at new sites to improve response times in the neighborhoods served by the stations. The site of the proposed new Fire Station 51 is located near the intersection of Southcenter Parkway and South 180th Street in Tukwila. The sites for Fire Station 52 and 54 have not been determined. The project design team will work with the City of Tukwila to vet proposed building sites for Stations 52 and 54.

The City of Tukwila has identified program requirements for the year 2040, 2060 and 2080. The current project goal is to meet the year 2040 requirements. Based on the year 2040 program requirements for the stations, the proposed new Fire Station 51 will be approximately 9,426 square feet, Station 52 will be approximately 15,068 square feet and station 54 will be approximately 9,287 square feet. At this time, it is not known whether the fire station structures will be single-story or two-story buildings. Site and program constraints will likely determine the building layout and number of stories. At this time, the stations are not anticipated to have hose towers. While the buildings will not be designed specifically to achieve LEED rating, the buildings will be designed for efficient energy and water use.

Structural Design Criteria for the Fire Station

In current building code documents such as the International Building Code and ASCE 7-10, *Minimum Design Loads for Buildings and Other Structures*, Fire Stations are considered be "Essential" Facilities. An essential facility is defined in the building code as a building or other structure that is intended to remain operational in the event of extreme environmental loading from flood, wind, snow or earthquakes. From a building structure standpoint, this means that after an extreme event, the building substantially retains its original strength and stiffness. There will likely be some minor cracking of facades, partitions and ceilings and potentially minor cracking of structural elements however the overall building damage is very light. All systems important to normal operation are functional. Nonstructural components sustain negligible damage and power and other utilities are available though possibly from standby sources.

Essential facilities are intended to be more resilient than typical buildings. Therefore, structural design for essential facilities involves using amplified forces for design of gravity, wind and seismic

load resisting systems as well as more stringent design requirements to limit building drift and deformation. Building drift and deformation limits are intended to ensure that the building structural elements retain their strength and stiffness and to help ensure that the building is accessible and operational, i.e. doors are operational and glazing is substantially intact. Drift and deformation limits also help limit damage to non-structural components as well as mechanical, electrical and plumbing systems. See the structural design criteria summary at the end of this narrative for more detailed criteria.

Description of Potential Structural Systems for the Fire Stations

At this time, the building concepts have not been established for the individual fire stations. One-story or two-story configurations are possible. All configurations would have a high roof apparatus bay with either 2 or 3 bays. Apparatus bays would all be configured as drive-through. All stations will also have EMS storage area, Apparatus bay storage and other response equipment storage likely adjacent to the apparatus bay.

Each station will have sleeping, physical training, toilet/shower and great room spaces as well as Station office, and Captain's office spaces. Station 52 is also anticipated to have Fire Department Administration space with Chief's office, administration office, conference room and back-up EOC/Training room.

Only preliminary discussions have been had regarding the building materials for the new stations. The buildings must be durable and resilient. Also, a degree of flexibility is required for future interior space reconfiguration as station programming needs change. Based on initial discussions regarding the buildings, potential structural materials include steel, masonry, concrete and heavy timber such as glued laminated beams (glulam) or cross-laminated timber (CLT). The likely scenario is that the buildings will incorporate several material types. The main roof structure over the apparatus bay will likely involve longer-span framing. Steel wide flange beams or open-web steel joists with steel roof deck or glulam beams with standard lumber purlins and plywood sheathing are options. In anticipation of future needs, the roof structure would be designed to accommodate loads from photovoltaic panels installed over much of the roof. The roof over the living, office and training spaces would likely involve shorter framing spans but in order to allow flexibility with interior partitioning, clear-span framing may be desired. Therefore, steel or heavy timber framing would be options for the main building roof framing. A typical steel framed roof would consist of wide flange beams or K-series open web joists at roughly 8' spacing with 1-1/2" 18-gauge metal deck. Steel framing would be supported on steel girders and steel columns at the perimeter of the apparatus bay. A typical timber framed roof would consist of glulam spaced at 8' with 2x dimensional lumber purlins at 24" o.c. and sheathed with 5/8" APA rated plywood. Glulam beams and girders would be supported on steel or wood columns.

If site or programming constraints dictate a two-story main building structure, the upper level floor framing would likely be similar to the overlying roof structure: steel framing or timber/glulam

framing. A typical steel framed floor structure would consist of composite floor deck (1½" metal floor deck with 2½" concrete topping) supported on steel wide flange beam or steel open-web joist framing. The steel framing will consist of steel wide flange beams and girders which will be supported on tube steel columns. The steel beams will typically have a number of ¾" diameter headed studs welded to the beam top flange along the length of the beam in order to have composite action of the steel beam with the concrete topping slab. Composite floor deck with steel framing is an efficient and economical floor system and provides good long-term performance.

A typical timber framed floor system might consist of glulam beams spaced at 8' with 2x dimensional lumber purlins at 16" o.c. and sheathed with minimum ¾" APA rated plywood. If a gypcrete or lightweight concrete topping is used, plywood thickness would likely be 1-1/8". Glulam beams and girders would be supported on steel or wood columns.

CLT panels could be used in lieu of plywood and dimensional lumber purlins for roof or floor construction. The CLT panels would be supported on glulam, steel wide flange beams or bearing walls. For typical roof spans of 15', 4-1/8" panels (3 lams) could be used. For typical floor spans of 12'-15', 6-7/8" panels (5 lams) could be used. CLT panels could also be used for walls depending on the structural demands on the wall.

The exterior walls of the main building areas will likely consist of a mix of reinforced concrete or masonry walls, light gauge metal framing and glazing. Areas of brick veneer may also be a possibility. Wall extents and type will likely vary between stations. The walls at the apparatus bay will likely be tall requiring steel framed (light gauge steel studs). Steel framework or steel moment frames may be required at the apparatus bay entry and exit for strength and stability in the event of a wind or seismic event.

The apparatus bay floor will likely be a 6" reinforced concrete slab on grade. The slab will be designed for fire equipment vehicle loads including concentrated loads from tiller truck support struts. Ground floor office areas will have 4" thick lightly reinforced slab on grade. Radiant heating and cooling may be utilized in both the apparatus bay and office and living areas.

Foundations

Only preliminary geotechnical information is available for the Station 51 site. The December 2012 GeoEngineers Geotechnical Siting Evaluation indicates that the site is generally suitable for the new fire station. The report indicates that high allowable soil bearing capacity is anticipated and that there is low risk of soil liquefaction and associated settlement. At this it is anticipated that foundations would likely consist of conventional reinforced concrete strip footings under walls and reinforced concrete spread footings under concentrated loads such as isolated columns.
Further geotechnical studies of the Station 51 site as well as studies at the selected Station 52 and Station 54 sites are required to determine site conditions and foundation design parameters.

We anticipate that as part of site selection process, sites that have the potential for problematic soils conditions or liquefaction potential will be eliminated. Therefore, at this we believe that typical shallow foundations will be used at each of the stations.

Fire Station Building Lateral Loads Resisting Systems

At this it is anticipated that the lateral load resisting systems of the Fire Station buildings for wind and seismic forces have not been determined and will largely be a dictated by the overall building construction type. As indicated earlier, the station buildings will be designed as essential facilities with amplified design lateral loads and more stringent drift and deformation limitations. Typical lateral load resisting systems include steel braced frames, steel moment resisting frames and reinforced concrete or masonry shear walls. Light-gauge steel framed walls with plywood sheathing may be used where lateral loads are light. Concrete or masonry shear walls may be used below elevated composite floor systems while steel moment frames or braced frames may be used at apparatus bay areas. As a structural system, the inertia forces generated from wind or ground motions are transferred to the frames or shearwalls via the roof and floor diaphragms and drag elements. The forces are transferred by the concrete foundation walls to the surrounding soil through passive pressure of the footings against the soil, and friction against the slab and foundation surfaces with the soil below.

In order for an essential facility to remain operational after a severe event such as an earthquake or major wind storm, various mechanical, electrical and plumbing systems must be designed to withstand vibrations and displacements caused by building movements during the severe event. Mechanical units must be properly anchored to structure and ducting, piping and electrical raceways must also be properly braced and anchored to structure to prevent damage to them. Therefore, seismic bracing and anchorage of these non-structural elements are an important part of the overall building design and also require coordination between all design disciplines. It is anticipated that a detailed specification for mechanical anchorage of non-structural components will be developed to ensure adequate performance of these components.

Baseline Resiliency and Sustainability Strategies

Baseline strategies have been discussed for the Fire Station Buildings and site locations to improve the station resiliency and environmental sustainability. From the structural design standpoint, a number of strategies have been identified.

Location:

Avoid develop sites that have the potential to limit the ability of respond after an environmental event. Sites with liquefaction potential or falling hazards from tall trees should be avoided

Sustainable site:

Avoid sites with very high fill content that would require special foundations.

Energy:

Design roof structures to accommodate future PV panel installation

Materials and Resources:

Use materials with high recycled content. This includes steel and concrete. The majority of structural steel, steel concrete reinforcing and light gauge steel framing is produced with recycled metals. Concrete mix design should include fly ash or slag recycled from electricity production or steel production.

As the project design process proceeds other strategies may be identified.

Structural Design Criteria Summary

Common to all stations:

2015 International Building Code (IBC) with City of Tukwila amendments
ASCE 7-10 Minimum Design Loads for Buildings and Other Structures

IBC Chapter 16 Structural Design
Risk Category IV (IBC Table 1604.5)

IBC Section 1607 Live Loads
Roof Live Load 25 psf (snow)
Snow Load Design Importance Factor 1.2 (ASCE 7-10 Table 1.5-2)
Elevated Floor Live Load 50 psf (office)
Assembly Area Live Load 100 psf
Corridor Live Load 100 psf first floor, 80 psf corridors above first floor
Stair Live Load 100 psf
Specialized Loads as required by City of Tukwila Fire Department for fleet equipment

May vary by site:

IBC Section 1609 Wind Loads
Basic Wind Speed 115 mph (Risk Category IV)
Exposure B

IBC Section 1613 Earthquake Loads

Note: Site Classification may vary depending on the location of the building site. Geotechnical investigations are necessary to determine the site classification as well as other site soil conditions. We expect that the USGS site specific mapped values below will be similar at the selected station sites due to the proximity of the sites.

Proposed Fire Station 51 site

Site Class C (from GeoEngineers preliminary Geotechnical Report)

USGS site-specific Seismic Design Mapped spectral accelerations
Short Period Spectral Acceleration (S_s) 1.435 g
1-Second Period Spectral Acceleration (S_1) 0.535g
Design Short Period Spectral Acceleration (S_{DS}) 0.956 g
Design 1-Second Period Spectral Acceleration (S_{D1}) 0.464 g
Seismic Design Category D
Seismic Design Importance Factor 1.5 (ASCE 7-10 Table 1.5-2)

The following narrative documents our proposed basis of the mechanical design for the Tukwila Fire Stations project. The basis of design proposal is based on our study of the design information produced to date, conversations with stakeholders, our review of the original project program, subsequent communications and meetings.

Design Criteria

Applicable Codes and Standards: Current operative versions of the Washington State Building Code, Washington State Mechanical Code, Uniform Plumbing Code, Washington State Energy Code, Washington State Fire Code and Salmon Safe Urban Standards.

Outdoor Design Conditions:

Heating: 20 degrees F, 25 mile per hour wind velocity.
Cooling: 85 degrees F, 35% relative humidity.

Indoor Design Goals:

Location: Administration Areas, Bunk Rooms Crew Quarters, Kitchen, Physical Training, and similar.
Heating; 72 F
Cooling (w/AC): 75 F, 55% relative humidity (targeted, not controlled).
Deviation: +/- 2F

Location: App Bay, Mechanical and Electrical Rooms, Storage, Shop, etc.
Heating; 66 F
Cooling: No mechanical cooling, these spaces will be ventilated.
Deviation: +/- 2F

Interior design goals will be refined with the Owner as the project is developed.

Sustainability Protocols:
Not seeking certification, objectives are noted under Sustainability section below.

Fire Sprinkler System

The facility will be protected by a fire sprinkler system throughout. Fire sprinkler service requirements are estimated in the range of 4 to 6", depending on service pressure and flow. We will be able to estimate the service size when we receive a flow calculation or test characterizing the capability of the water supply system. Conditioned areas will be protected by a wet system. Unconditioned areas, canopies, etc. will be protected by dry pendant heads or a dry system where required.

The dry sprinkler system compressor (if required) will need to be on the emergency generator circuit.

The system will be designed to conform to NFPA 13, and use steel piping throughout. Schedule 40 piping will be used for pipes 1-1/4" and smaller, Schedule 10 for larger piping. Providing the sprinkler riser room with a direct exterior access door should allow us to avoid needing a Post Indicator Valve on the building or site.

Critical data and electronic rooms may require a clean agent gas system. These systems can be expensive so their application should be limited to necessary applications.

Plumbing

The domestic water service meter requirement is estimated to be in the range of 1-1/2” to 2”, depending on service pressure. The water service will be protected by a backflow preventer and pressure reducing valve after the service enters the building and prior to distribution to the rest of the building fixtures.

Domestic water will be heated by multiple high efficiency natural gas fired water heaters, as may be required by the demand of building domestic water fixtures and kitchen fixtures. Shower and changing facilities require quick response to demands for hot water, as does wash up of protective gear. The water heater(s) will be high efficiency condensing types.

Domestic water will be piped in copper pipe and fittings, Type K or L. Fittings will be brazed or mechanical joint “Pro-press” type depending on the preference of the Owner. Domestic hot water piping will be insulated as required by the Washington State Energy Code.

Drain, waste and vent piping will be specified to be installed in cast iron, with no-hub fittings.

Domestic, sanitary and vent piping will be routed to serve plumbing fixtures as required.

Internal roof drains will be piped in cast iron as well, if necessary.

Comfort plumbing fixtures will be provided as indicated by the Architectural plan. Urinals and water closets will be wall mounted, vitreous china type. Lavatories will be enameled cast iron, under mount, self-rimming or wall-hanging type. Sinks will be stainless steel self rimming type. Faucets will be specified around manufacturers consistent with those currently in service with the Fire Department. Hose bibs will be located near each exit and deck to facilitate washing them down.

The Kitchen appliances will determine the arrangement and requirements of Kitchen plumbing systems. We anticipate that the Kitchen will feature a double compartment sink, dishwasher, and refrigerator with icemaker/water dispenser that will require water supply.

Changing and gear washing areas will be plumbed for additional water and drainage for rinse and wash down.

The App Bay will be will be provided with plumbing fixtures and systems for maintenance. A drench shower/eyewash will be provided in the App Bay Cleanup Room. We will make water available for maintenance and minor clean up from hose bibs arranged at the perimeter of the App Bay. Hose racks/reels will be provided as directed. Drainage from the bay will be by trench drains. Drainage will be routed through a sediment/oil separator prior to draining to the sanitary system.

Compressed air will be piped to work bench(s) and also delivered from air chucks around the perimeter of the App Bay.

Storm Water reclaim may be considered to supplement wash water for trucks or other uses. Generally reclaimed water is used for the primary wash and fresh water used for rinse. Reclaimed water needs to be stored, filtered, treated and pumped to be used for wash water. Storage tanks are generally in the 5,000 gallon or greater range. Filtration is by micron filters and UV treatment, and a pump will raise the pressure sufficiently to dispense

the water through piping and hoses. It might be possible to devise a simple system with two hose bibs, one for wash water connected to the reclaim described and one for fresh water for rinse which would be less expensive and more practical to use.

Heating, Ventilation and Air Conditioning

The buildings will be heated, ventilated and air conditioned. We will explore combinations and options for scope, scale and type of systems with the Owner and Design Team.

We are considering the following prospective systems based on features and cost.

We believe the building is a good candidate for a VRF system. These systems are manufactured by Daiken, Mitsubishi, and others, offer the advantages of good zone temperature control and are capable of simultaneous cooling in one zone, while heating in another.

Discrete zone control is especially an advantage for the crew sleeping areas where each bunk room occupant may favor slightly different temperatures.

They also integrate heat recovery systems very readily which is an advantage.

Our experience with VRF systems as applied to sustainable projects has been good. We are able to demonstrate fairly consistently that these systems are 10 to 12 percent more efficient than code baseline HVAC systems and would expect similar results for this project.

An alternative to the VRF system would be high efficiency gas/electric airhandlers or electric heatpumps to address heating and cooling needs. The building would be configured into 4 or 5 discrete zones; each zone served by a dedicated HVAC unit, rooftop unit or split system.

The air handler/heatpump system is less expensive than the VRF system and will provide satisfactory conditioning. It is not as efficient and does not allow as much discretion with controlling temperatures between occupied spaces, and the crew sleeping area would be one zone.

In-floor radiant will be considered as well, as a primary or supplemental system to airside conditioning. Radiant conditioning will require a boiler or heatpump system circulates hot/cool water through tubing embedded in the floor. The systems have an excellent reputation for comfort.

HVAC and Ventilation fans throughout will be provided with ECM or variable speed motors that will be designed to reduce air volume when possible.

Ventilation has been noted as an important aspect of maintaining the fire fighter's health and sense of well-being. Insuring that the HVAC system provides adequate ventilation, without over-ventilating and increasing energy use is important.

We will incorporate switches in exterior glazing units to shut of air conditioning when windows are open. We can also incorporate an AC Off/AC-On indicator lamp by the thermostat to indicate if the window is open and the conditioning unit is off.

Fan powered electric unit heat will be provided for supplemental heating near areas of high heat loss and infiltration, such as vestibules, doorways and areas featuring a high concentration of glazing.

The App Bay will be heated but not air conditioned. The system of tubular gas-fired radiant heat present in the current App Bay seems to be well received and so we intend to specify a similar system for the new App Bay. Fan powered gas fired heaters (Reznor's) are an alternative but tend to be somewhat less efficient. App Bay heating systems will be disabled when the roll up doors are raised by door switches.

Exhaust systems are critical to remove moisture, odor and humidity, dry clothing and maintain comfort. We will integrate exhaust systems with heat recovery wherever feasible. We will evaluate if a hood is required in the Training Room.

Kitchen ventilation will most likely consist of high capacity residential style kitchen exhaust hood and a separate smaller (quieter) ventilation exhaust fan that can operate continuously and provide additional ventilation without being too noisy.

Supplemental ventilation will be provided for restrooms, App Bay, gear changing and drying areas, decontamination areas, lockers, wash areas, shop areas, copier and printer rooms and mechanical spaces by dedicated exhaust fans.

The App Bay will feature a general exhaust fan and a dedicated vehicle exhaust system such as a Neederman or similar type of system. The dedicated vehicle exhaust system will be activated by vehicle operation, and the App Bay general exhaust system will be activated by NO/CO sensors or manually at a wall switch.

Common to all systems, air will be ducted through galvanized steel ductwork to a system of ceiling diffusers and grilles.

Controls

The VRF systems are provided with their manufacturer's controls that are integrated with their system.

The gas/electric or heatpump systems and miscellaneous exhaust fans, radiant heaters, etc. will use 2nd party controls.

We envision that the airhandler/heatpump system option and any miscellaneous equipment would be controlled by a digital control system. We will coordinate with the Fire Department to determine if they have any of these systems in place and if there are vendors that they would like us to work with. We favor open control protocols such as the Tridium system and will follow up with the Fire Department on their preferences.

Commissioning

The Washington State Energy Code requires building commissioning to be performed, we will provide commissioning specifications with our documents for the contractor to provide support for this service.

Sustainability

Sustainability objectives and strategies were identified during the Performance and Value Workshop administrated by Weinstein AU. The project will not be registered or formally certified, however the following strategies will be pursued to enhance the sustainability of the buildings and systems.

We recommend enhancing the building insulation envelope as it will be in place for the foreseeable useful life of the facility (50 years). An efficient envelope will leverage the efficiency of all energy systems and enhance their performance. We target a minimum of a 10% improvement over the energy code minimum and endeavor to push to 15% over code if possible. East, West and South facing glazing areas will be evaluated for contribution to the overall load and we will provide recommendations for adjustments.

Domestic water heating equipment will exceed minimum code requirements for efficiency. We will specify ferrous sanitary and copper domestic water piping for good durability and higher potential for material recycling and reuse.

The design will be based on water conserving fixtures, such as waterless or 1 pint/flush urinals, dual flush water closets, low flow sink faucets, etc. Our target will be for each domestic fixture to exceed the base water conservation standards. We will specify a water bottle filler to facilitate reusable water bottles.

We endorse using waterless urinals where there is an interest in maximizing water conservation. We frequently encounter pushback from facilities staff regarding these fixtures. We acknowledge that they require some maintenance, but at the same time, reduce water consumption by up to an additional 10 percent when combined with other low-demand fixtures.

Storm water reclaim will be evaluated for opportunities to reduce water utilization.

HVAC systems are being evaluated by efficiency as well as durability and cost. Our recent sustainability design experience is that an average fire station Energy Utilization Index (EUI) will range around 150. Establishing an EUI target of around 100 would result with over 30 percent improvement and is a starting place for a design objective until we can determine if more ambitious goals should be within our reach.

We will work with the Owner to establish the scope of AC and heating and ventilation. We will piggyback off of occupancy lighting sensors to limit temperatures and fan operation in unoccupied spaces. Ventilation air volumes will be controlled by CO2 sensors.

No systems using CFC's shall be specified.

Heat recovery exhaust/ventilation systems will be employed wherever possible.

Air filtration will be enhanced. We anticipate specifying MERV 13 filters on all airhandling equipment.

We endorse and specify open protocol building management and control systems whenever there is an opportunity.

We recommend pursuing a comprehensive commissioning scope for the building that would be an equivalent level of service to LEED Enhanced Commissioning.

I. Code Analysis

A. Applicable Codes

1. 2017 National Electrical Code (NEC)
2. 2015 International Fire Code (IFC)
3. 2015 International Building Code (IBC)
4. 2015 Washington State Energy Code

II. Power Systems

A. Electrical Service:

1. 208Y/120V, 3 phase, 4 wire services will be provided for each fire station. Amperage to be determined based on load calculations for each station. Amperage is anticipated to fall in the range of 600 to 1000 amps for each station.
2. Particulars of electrical service will be coordinated with the utility for each site. This will occur after sites are selected. Services will be underground to each building with a pad mounted transformer located on the site. Alternatively, some sites may have the transformers mounted on a utility pole.
3. If a site has existing overhead power lines where rigs will enter or exit the station, the possibility of relocating the lines to underground will be explored. This ensures access to the station will not be blocked by downed power lines.
4. Main Distribution Panel in each station will consist of a main circuit breaker and molded case group mounted circuit breakers.

B. Power Distribution and Metering

1. Branch panelboards with bolt in breakers will be used.
2. Branch panelboards will have door in door style hinged doors.
3. Surge protectors to be provided for all branch panelboards.

C. Branch Circuitry

1. Branch circuitry will be provided as required for lighting, receptacles, equipment, mechanical units and appliances.
2. Branch circuitry will be routed in conduit (typically EMT). MC cable not allowed.
3. Controlled receptacles will be located as required by Energy Code.

III. Emergency Power System

A. Service

1. Each station will have a diesel generator with a base tank sized to provide 72 hours run time at full load. Generators will be 208Y/120V, 3 phase, 4 wire. Size in KW will be determined per load calculations for each station. It is anticipated generators will be sized in the 150KW to 250KW range.

2. Generators will be sized for the full building load except for the elevator. If necessary to reduce generator sizes for cost purposes, the generators will instead be sized for only the loads determined to be critical.

3. Generators will be located in sound attenuated, weatherproof enclosures located outside the building.

4. Generator system will have one automatic transfer switch. Emergency egress lighting will be addressed with battery units to avoid a code requirement for a second transfer switch.

IV. Lighting

A. Equipment

1. LED lighting will be provided. Fixture types to be selected per ceiling conditions, room types and architectural considerations.

2. Automatic control of lighting fixtures will be provided per requirements of Energy Code. This will include occupancy sensors in most rooms and automatic dimming of fixtures in daylight zones (as defined by Energy Code). Occupancy sensors will be set in vacancy mode for auto off and manual on function. Wall switches will be provided for all rooms. In bunk rooms, there will be no automatic controls – light fixtures will be controlled by wall switches only.

3. Emergency egress lighting to be provided using battery backup integral to LED fixtures. Fixtures with battery backup to be located as required to achieve code lighting levels for emergency egress lighting.

4. LED exit signs with battery backup to be located as required by code.

5. Exterior lighting will generally be located on building walls or under soffits. All exterior fixtures will have sharp cutoff optics for glare control. Pole lights will be provided as necessary for parking areas.

V. Communications Systems Analysis

A. Telephone/Data

1. Fiber optic, telephone and TV services will be delivered to the building underground from existing utility infrastructure. Conduits will be provided as required for services. Details to be determined based on site selection and coordination with applicable utilities.

2. Services will be routed to the main comm room for the building.

3. Main comm room will be provided for each building. Data and voice cables will be homerun from workstation locations to main comm room.

4. Data/voice outlets will be located as required by program. Cabling and jacks will be Cat 6. Cables will be routed in conduit (1” EMT minimum) where in walls or above non-accessible ceilings. Open cabling methods or cable tray will be used above accessible ceilings. In open

to structure ceiling areas, cables will be routed in conduit or cable tray. Specific methods for each station and each area within a station are to be determined on a case by case basis in coordination with architectural conditions. Intent is to provide an accessible and flexible infrastructure for cable routing.

VI. Fire Alarm System

A. Equipment

1. Addressable fire alarm system will be provided.
2. Smoke detectors will be located in egress corridors, at elevator lobbies, and in elevator machine room. Elevator lobby and elevator machine room smoke detectors will be used for elevator recall function.
3. Notification devices (horn/strobes and strobes) will be located throughout to achieve code prescribed audibility and visibility levels in an alarm condition.
4. Duct detectors will be provided as required for mechanical units and fire smoke tampers.
5. Sprinkler system flow and tamper switches will be connected to fire alarm system.
6. LCD annunciator to be located at main entry.
7. Fire alarm control panel to be located in or near station office.

B. Bunk Rooms

1. Combined smoke/CO detectors to be located in bunk rooms.
2. CO detectors to be located outside each bunk room.

VII. Other Systems

A. Cable TV

1. TV jacks to be located in Day Room, Beanery, Station Office, and Physical Training.
2. Coax cabling and F-style connectors.
3. TV cabling will be routed in raceways (1" EMT minimum) where in walls or above non-accessible ceilings. Open cabling methods used where above accessible ceilings.

B. Entry Bell

1. An entry bell system will be provided.
2. Doorbell will be tied into the paging system for distribution of tone throughout the facility.

C. Access Control System

1. Access control card readers will be provided at selected exterior doors along with the door from the lobby into the remainder of the station.

2. Card readers and accessory devices will be wired back to access control panel in main comm room.

3. Access control doors will include door switches, electric locks and request to exit devices.

VIII. Sustainability

A. Baseline Strategies (Priority Rank A)

1. Health & Safety
    a. Vacancy Sensors (manual on, auto off) to reduce firefighter stress response
2. Low Operations & Maintenance Costs
    a. LED lighting
    b. Vacancy sensors and daylight sensors
    c. Commissioning of lighting
3. Resiliency
    a. PV ready design. Conduit from main distribution panel to roof. Space allocated in main elec room for inverters, AC disconnect, and production meters. Space allowed for PV panels on roof with adequate structure to support system.

B. Next Level Strategies (Priority Rank B)

1. Health & Safety
    a. Tunable LED lighting with color spectrum shifting to simulate circadian rhythms
2. Resiliency
    a. Entire building on generator except elevator
    b. Load shedding considered as a means to power the entire building on generator but with a smaller generator

C. Lower Priority Strategies (Priority Rank C)

1. Resiliency
    a. Electric vehicle charging stations
    b. PV system

SUSTAINABILITY DESIGN CRITERIA

Tukwila Fire Stations: Baseline Green Strategies

Process

- Develop an Owner's Performance and Value Requirements (OPR) document with clear performance targets.
- Hire a commissioning professional for enhanced commissioning (as defined by LEED) and maintenance staff training, and to verify performance targets are met.
- Set up Energy Star Portfolio to track energy and water performance.

Location and Transportation

- Avoid developing on sensitive land - i.e., previously undeveloped, floodplains, farmland, parkland, wetlands, threatened or endangered habitat.
- Avoid developing sites that have the potential to limit the ability to respond after an environmental event (liquefaction prone sites, tall tree hazards from windstorms, etc.)
- Provide adequate bicycle storage in a secure location. Provide showers for employees.
- Provide on-site amenities that support physical activity and community gathering.
- Provide secure parking for on-duty firefighter vehicles.

Sustainable Sites

- Create an erosion and sedimentation control plan for construction.
- Conduct an Environmental Site Assessment.
- Remediate contaminated soils. Conduct asbestos abatement.
- Design to reduce rainwater runoff. Install permeable pavement at non-apparatus drive areas (parking stalls, pedestrian and patio areas), use LID techniques, and retain natural areas of site.
- Storm water detention – code required
- Water quality treatment – code required
- Flow Control BMP – code required. BMP includes:
    - Place permeable pavement to the maximum extent feasible/affordable, per code. Include sidewalks, walkways. Effectiveness is site specific.
    - Full or limited infiltration of roof runoff and / or pavement runoff. Site and soil condition specific.
    - Use biorentention / rain garden for pavement runoff. Site specific.
    - Compost amended soils - code required.
- Reduce the heat island effect by using light/white roofing and hardscape material.
- Use capped exterior lighting fixtures to reduce light pollution.
- Retain existing trees and their related ecological functions. Replace any existing trees that cannot be retained. See Tukwila Municipal Code Section 18.54
- Protect existing vegetation and healthy soils.
- Use native plantings in landscape. Consider creating open natural spaces for employees or public to enjoy.
- Control and manage invasive plants.
- Utilize fire-safe landscape design at Station 51

Water Efficiency

- Manage all precipitation on-site. See Tukwila Municipal Code 14.30
- Use native and adapted plantings and specify appropriate soils.
- Consider storm water facilities that support planting areas with little or no irrigation (swales, etc.)

- Use high-efficiency irrigation systems where required
- Do not install permanent irrigation and discontinue irrigation after establishment.
- Install low flow fixtures; 1.28gpf toilets, 0.8 gpf urinals,1.5 gpm bathroom lavs, 1.5 gpm kitchen faucets, 1.75 showerheads.
- Exceed minimum requirements; specify "lower" flow fixtures where feasible
- Use Energy Star rated clothes and dishwashers.
- Provide water bottle filler in fitness room to encourage use of reusable containers

Energy and Atmosphere

- Orient building along an E-W axis, if possible, to optimize solar access
- Reduce glazing at east and west facades and maximize at north and south to reduce heating and cooling loads.
- Utilize simple building massing that minimizes material transitions and connections
- Provide high ceilings and shallow floor plates where possible to optimize perimeter daylighting
- Install skylights and Solatubes as the budget allows for daylighting pertinent interior spaces
- Provide high operable windows to provide for passive cooling opportunities, balanced with security concerns
- Use vegetation, including trees, to minimize building energy use.
- Conduct an energy model – target Energy Use Intensity (EUI) of 100
- Don't use CFCs in any refrigerant-based systems.
- Use all LED lights.
- No mercury vapor or halide metal fixtures
- Use occupancy sensors and daylight sensors.
- Install occupancy sensors on outlets to reduce plug loads, where feasible
- Purchase Energy Star rated appliances where applicable.
- Specify control systems that are easy to install and maintain, with open-source code that can be serviced by multiple vendors
- Zone the heating and cooling system and consider limiting the cooled areas.
- Consider using fluid/refrigerant based systems (VRV) instead of all-air systems to reduce mechanical power requirements
- Use radiant heating for App Bay instead of fan-forced heat to reduce energy
- Introduce all outside air through heat recovery ventilators. Control air volume by CO2 sensors.
- Install an air barrier and conduct air leakage test per WA code; incorporate into commissioning process
- Hire a commissioning agent to prepare and implement a plan to test building systems, to train the maintenance department, and to provide educational materials for the buildings future users/occupants.
- Design roof structure to accommodate future PV panel installation.

Materials and Resources

- Develop a construction waste management plan. Local projects are able to recycle up to 75% of their construction waste through local haulers.
- Use products/manufacturers that disclose their environmental impact- i.e. manufacturing carbon emissions. Look for Environmental Product Declarations (EPDs) or Corporate Sustainability Reports (CSRs). Carpets, ceiling tiles, and gypsum wallboard commonly have these declarations.
- Use FSC or SFI certified wood and paper products.
- Use products/manufacturers that disclose material ingredients/health impacts. Look for labels such as Cradle to Cradle, FloorScore, GreenScreen, Declare, and Health Product Declarations (HPDs).

- Look for products with high recycled content. This includes steel, concrete, carpet, office supplies, etc, and high fly ash / slag content concrete mixes.
- Possible use of reclaimed concrete material from existing buildings as base material for pavements and slabs, and potential use as aggregate in concrete mixes for concrete pavements.
- Use regional materials where possible. Steel, concrete, and bike racks are some of the most common regionally sourced materials.
- All new building materials will be free of asbestos and lead
- Specify durable, low-maintenance finishes that will not need to be replaced or refinished in the short term and will hold up to frequent cleaning/disinfecting
- Minimize ceiling finishes wherever possible, to lower first and maintenance costs and enable structural inspection after a seismic event
- Use salvaged materials where possible, both from the site and/or the wider region (reclaimed timbers etc.)
- Work with owner team to identify furnishings and equipment for reuse.
- Identify spaces to keep recyclables: including large hauling containers, interior collection, and personal bins.

Indoor Environmental Quality

- Create a construction Indoor Air Quality plan - don't operate air handling units during construction, minimize dust creation, avoid moisture accumulation, etc.
- Conduct a building flush-out after construction, to LEED standards, if possible
- Prohibit smoking on-site, during construction and post occupancy.
- Indoor smoking ban per state code
- Design ventilation systems to meet ASHRAE Standard 62.1-2010.
- Use MERV 13 filters.
- Include walk off mats inside main entrances.
- Include multi-level scraper walk-off mats in transition areas.
- Include visual awareness clues regarding facility hot/cold zoning and transition areas.
- Isolate EMS/ALS supplies from "hot" zones
- Provide hand wash stations at all transition areas
- Specify low emitting/low VOC paints, coatings, adhesives, sealants, and flooring products. Don't allow urea-formaldehyde glue in any wood based product.
- Perform daylight modeling for high quality, well-distributed and low-glare daylighting
- Design the floor plate to allow the most consistently used spaces to have the most access to windows and daylight. Put bathrooms, mechanical spaces, smaller conference or quiet rooms in the core of the building.
- Encourage staff healthy eating habits with a great space for eating and food prep
- Create interior and exterior environments that support mental restoration and visual connection to nature.
- Allow employees access to thermostats, controllable windows, lighting fixtures, etc.
- Lighting vacancy sensors to be auto off / manual on, to reduce FF stress response
- Use plants to increase occupant comfort.

Owner / Operator Initiatives

- Go above and beyond on a few key sustainable aspects above that are important to the Owner, as the budget allows.
- Recommend that the owner purchase green power or carbon offsets for energy use.
- Encourage the Owner to create a Green Housekeeping Plan: use sustainable, low-emitting cleaning agents, and train staff in green cleaning methods and proper disposal.
- Encourage the Owner to use Integrative Pest Management procedures.
- Green education: Post signs for employees or visitors regarding sustainable features around the building.

GOAL: Health & Safety

- Promote firefighter well-being: fitness, social connectedness, mental health, rehabilitation, etc.
- High indoor air quality
- Reduction/ elimination of environmental toxins
- Top of the line safety features, including safe access for maintenance of building equipment and safe circulation into and around the sites
- Reduction/elimination of environmental toxins
    - Separation of hot/cold (contamination levels) zones

Metrics

- WELL Sites
- Crime Prevention Through Environmental Design (CPTED)
- Eliminate cross-contamination opportunities across station zones
- Reduce environmental toxin exposure to less than or equal to background conditions

Priority Rank	Strategy
A	• Exterior open spaces that are flexible for different uses: gathering, fitness, etc. • Visual and physical connectivity to nature/ restorative spaces • Secure parking for on-duty firefighters' vehicles • Vacancy sensors: manual on, auto off, to reduce firefighter stress response • Use of hard, durable surfaces that are easy to clean and disinfect • Inclusion of visual awareness clues regarding facility zoning and transition areas • Isolation of EMS/ALS supplies from "hot" zones • Hand wash stations • Multi-level scraper walk-off mats in transition areas
B	• Hands-free sinks and dispensers in hot zones • Boot scrubbers in transition areas • Heat recovery ventilation (HRV) system controlled by CO2 sensors • Facility-wide review of positive/negative air pressure and isolated ventilation • Access to daylight, such as skylights and Solatubes, where appropriate to the function of the spaces • LED lights that incorporate spectrum-shifting/ circadian rhythm controls • Japanese forest bathing concepts
C	• Wash station ventilation and isolation • Urban agriculture, garden space for edible plants: low capital cost, high value. (Note: There seemed to be minimal interest from TFD)

GOAL: Low Operations & Maintenance Costs

- Passive, easy-to-operate building systems
- Lowest life-cycle cost systems – within budget
- 50 year core and shell with flexible interiors – within budget
- Exterior materials that will continue to look good and perform well with little or no maintenance
- Flexible, scalable systems, interiors, and site planning
- Durable and easy-to-clean; won't be damaged by harsh, frequent cleaning

Metrics

- 2016 King County Drainage Manual
- 100 EUI Target (code is 129)
- Higher-than-code water savings; exact goal TBD
- 2015 Energy Code
- 2015 Electrical Code and design to 75% below code-required lighting

Priority Rank	Strategy
A	• Simple building design: minimize materials and connections • Evaluate life-cycle cost of LED lighting • Daylight and occupancy sensors • Easy to install and maintain control systems • Commissioning of lighting • Ongoing occupant education regarding building systems • Integrate stormwater into plant irrigation • Station 51: reuse existing stormwater detention system + flow control, bio-retention and pervious paving • Station 52 (assuming City Hall campus site): Upgrade and expand the current on-site detention system and evaluate the soils for appropriateness of other strategies • Native, site-specific plants
B	• Exterior shading devices • High-performance glazing (10-15% above code minimums) • Over-insulate building envelope to optimize mechanical system operation by controlling heat gain, loss (10-15% above code minimums) • Evaluate cost/benefits of structural system: Steel vs. Concrete vs. Heavy timber (Tukwila has a relationship with Forterra, which is incentivizing use of Cross Laminated Timber) • Very low-flow plumbing fixtures; showers to be evaluated for efficacy for FFs • Permeable paving at vehicle parking, sidewalks, patios, etc (paving for non-apparatus use) • Use of salvaged and reclaimed materials in the landscape
C	• Waterless urinals (lowest flow) • Evaluate green roof for Stations 52/54, which may have limited site area for alternate stormwater control systems

GOAL: Resiliency

- Resilient buildings that support first-responder use and EOC "shelter" after a natural disaster
- Passive building systems, where applicable
- Redundant systems, if possible
- Minimal energy use required to run building in order to maximize full (or limited) operation on generator
- Design building for safe occupancy in "off" condition (i.e., no building power)
- Energy source flexibility
- Resiliency in the face of climate change: design for "what's next," including changing temperature, precipitation levels, etc.

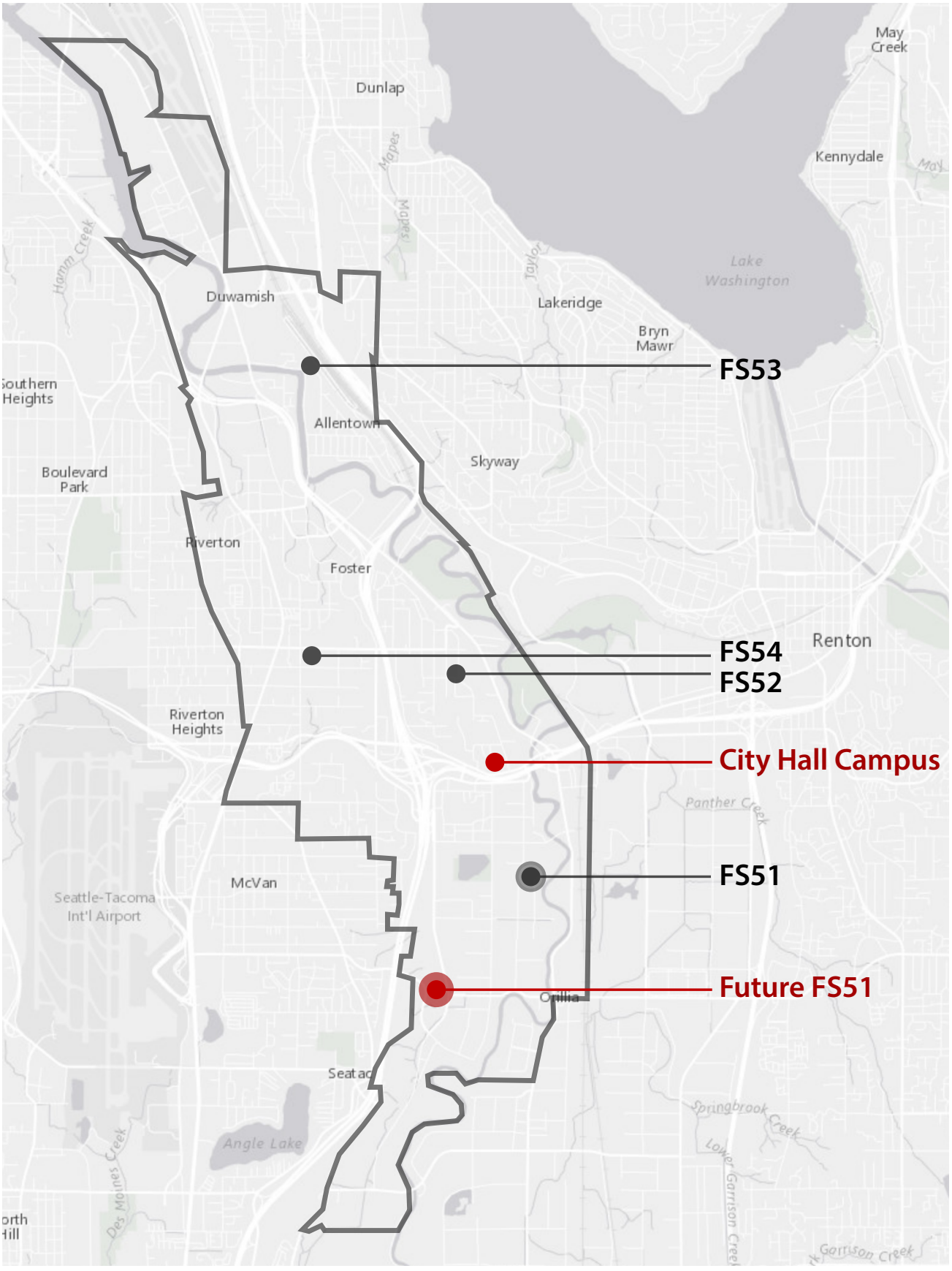
Metrics

- Building Code requirements for the design of an Essential Facility, including structural systems
- Building to run at least 72 hours on generator power (fuel tank should power building, critical equipment, AND provide fuel for trucks – will likely be diesel)

Priority Rank	Strategy
A	• Fire-safe landscape design (Station 51) • Open digital control systems that can be serviced by multiple vendors • Design to be PV-ready, including structural loads • Architectural and structural coordination to optimize design cost
B	• All equipment except elevator able to be generator-powered o Could end up being cheaper that selective generator use because it would eliminate an additional level of controls and separate circuits • Load-shedding • Durable materials for sprinkler system to lengthen system lifespan
C	• Rainwater reuse: toilet-flushing and truck-washing • Greywater reclamation for truck washing • Evaluate electric vehicle charging stations • Evaluate feasibility of including PVs at this time o Look into alternative funding sources

These meeting notes record our understanding of the event, discussion, comments, and conclusions reached by the attendees. We will proceed with the project based on decision and comments listed above. Please notify Weinstein A+U in writing of any discrepancies within 3 days of receipt of these notes or these shall stand as correct for the record.

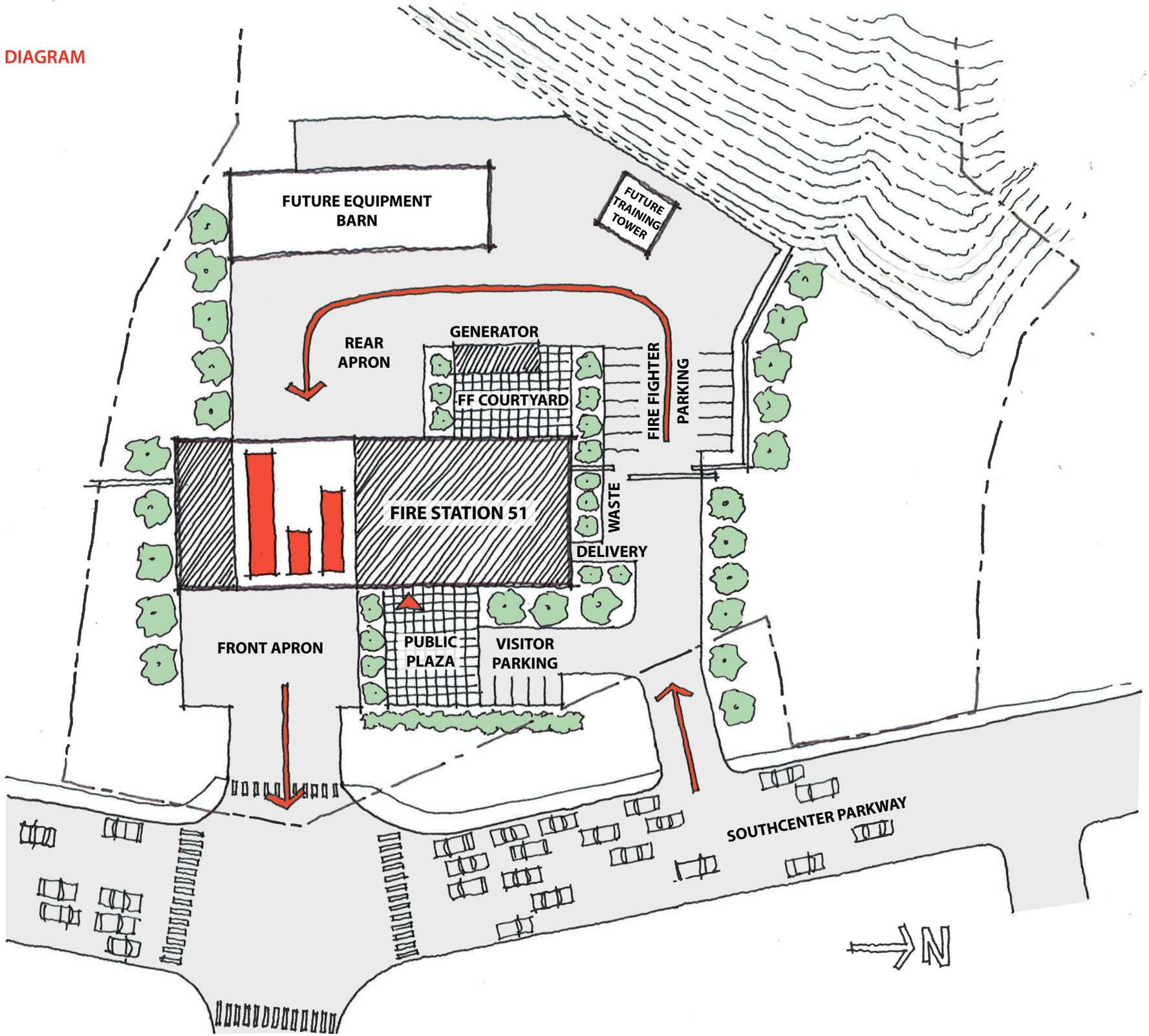
TUKWILA FIRE STATION LOCATIONS



1 Intersection of Southcenter Pkwy and S 180th St facing east // 2 Existing detention pond // 3 View of detention pond and regraded hillside facing northwest // 4 View of regraded hillside facing northwest // 5 View of site facing east from S 178th St.

FIRE STATION 51 SITE SURVEY

FIRE STATION 51 SITE PLAN DIAGRAM



	FS51 – SEGALE SITE	
LAND USE CODE	**DESCRIPTION**	**COMMENT**
Use District (per Zoning Map, Fig. 18-10)	Mixed Use Office, Tukwila South Overlay District	
Land Use Allowed by District 18.09.010 (per Table 18-6)	Permitted outright	
Design Review 18.16.070	Required for commercial structures larger than 1,500sf; those between 1,500 and 5,000sf will be reviewed administratively.	[does a fire station qualify as a commercial structure?]
Basic Development Standards 18.16.080	Minimum yard setbacks: Front = 25 ft Second front = 12.5 ft Sides = 10 ft Rear = 10 ft Max height: 4 stories or 45 ft Landscape requirements: Front = 15 ft Second Front = 12.5 Sides = 5 ft Rear = 5 ft Off-street Parking: Per TMC 18.56	
Design Review 18.18.070		
Basic Development Standards 18.18.080		
Design Review 18.41.080	Required for all non-exempt development within the TSO district. Applications for design review shall be processed as Type 2 decisions per TMC 18.60. Applicants encouraged to schedule a pre-app conference per 18.104.050 prior to submitting design review application. "Design review includes an examination of the following elements: placement and scale of structures, design, height, form, parking, access, signage, vehicular and pedestrian connections and circulation, environmental considerations, open space, landscaping, and infrastructure needs as described in the Tukwila South Master Plan or any applicable development agreement…" [See 18.41.080 for additional detail of review process]	
Basic Development Standards 18.41.090	Setbacks: Front, adjacent to public street = 15 ft Second front, adjacent to public street = 15 ft Sides = none; 10ft if adjacent to non-TSO or residential property Rear = none; 10ft if adjacent to non-TSO or residential property Landscape requirements: Per 18.xx.xxx	

	FS51 – SEGALE SITE	
LAND USE CODE	**DESCRIPTION**	**COMMENT**
	Off-street parking: Per TMC 18.56	
Exemption of Rooftop Appurtenances 18.50.080	"The height limitations specified in this chapter shall not apply to church spires, monuments, chimneys, water towers, elevator towers, mechanical equipment, and other similar rooftop appurtenances usually required to be placed above the roof level and not intended for human occupancy or the provision of additional floor area; provided, that mechanical equipment rooms or attic spaces are set back at least 10 feet from the edge of the roof and do not exceed 20 feet in height. "	
Maximum Building Length 18.50.083		
Max % Development Area Coverage 18.50.085		
Charging Station Locations 18.50.140	"Level 1 and Level 2 charging stations are allowed as an accessory use in the predominantly residential zones LDR, MDR and HDR. Level 1 and Level 2 charging stations are allowed as a permitted use in all other zones. Level 3 charging stations, battery exchange stations, and rapid charging stations are allowed as a permitted use in all zones that allow other automotive services such as gas stations, and are allowed as an accessory use in all other zones."	
Perimeter Landscaping Requirements by Zone District 18.52.020	[See Landscape Analysis]	
Perimeter Landscape Types 18.52.030	[See Landscape Analysis]	
Interior Parking Lot Landscaping Requirements 18.52.035	[See Landscape Analysis]	
General Landscape and Screening Requirements 18.52.040	[See Landscape Analysis]	
Landscape Plan Requirements 18.52.050	[See Landscape Analysis]	
Lighting 18.52.065	Parking and loading areas shall include lighting capable of providing adequate illumination for security and safety. Lighting standards shall be in scale with the height and use of the associated structure. Any illumination, including security lighting, shall be directed away from adjoining properties and public rights-of-way.	

	FS51 – SEGALE SITE	
LAND USE CODE	**DESCRIPTION**	**COMMENT**
Recycling Storage Space for Non-Residential Uses 18.52.080	A. Recycling storage space for non-residential uses shall be provided at the rate of at least two square feet per every 1,000 square feet of building gross floor area in office, medical, professional, public facility, school and institutional developments. B. Outdoor collection points shall not be located in any required setback or landscape area. C. Collection points shall be located in a manner so that hauling trucks do not obstruct pedestrian or vehicle traffic on-site, or project into any public right-of-way.	
Design of Collection Points for Garbage and Recycling Containers 18.52.090	Residential and non-residential collection points shall be designed as follows: 1. An opaque wall or fence of sufficient size and height to provide complete screening shall enclose any outside collection point. Architectural design shall be consistent with the design of the primary structure(s) on the site. 2. Collection points shall be identified by signs not to exceed two square feet. 3. Weather protection of recyclables and garbage shall be ensured by using weather-proof containers or by providing a roof over the storage area.	
Tree Regulations 18.54	[See Landscape Analysis]	
Off-Street Parking and Loading General Requirements 18.56.040	Minimum parking area dimensions: [As shown in TMC Figure 18-6] • Standard and compact stalls may include a 2ft landscape overhang in their required length • Parking space slope shall not exceed 5% • Slope of entrance and exit drives and internal driveway aisles without stalls shall not exceed 15% • Ingress and egress shall not require moving another vehicle or backing more than 50ft • Turning and maneuvering space shall be located entirely on private property • All parking spaces shall be internally accessible to one another • Driveways to access parking in rear of buildings shall be no less than 12ft wide with a 3ft wide sidewalk, curbed or raised 6in above the driving surface • Ingress and egress to any off-street parking	

	FS51 – SEGALE SITE	
LAND USE CODE	**DESCRIPTION**	**COMMENT**
	lot shall not be located closer than 20ft from point of tangent to an intersection • Public Works or Community Development Directors may require ingress separate from egress for better flow of traffic • Director may require areas not approved for parking to be marked or signed to prevent parking • Surface of any required off-street parking or loading facility shall be paved with asphalt, concrete or other similar approved material(s) and shall be graded and drained as to dispose of all surface water, but not across sidewalks • All traffic control devices shall be installed and completed as shown on the approved plans • Paved parking areas shall use paint or similar devices to delineate car stalls and direction of traffic • Where pedestrian walks are used in parking lots for the use of foot traffic only, they shall be curbed or raised 6in above the lot surface • Wheel stops shall be required on the periphery of parking lots so cars will no protrude into the public right of way, walkways, off the parking lot or strike buildings. Wheel stops shall be two feet from the end of the stall of head-in parking • No obstruction that would restrict car door opening shall be permitted within five feet of the centerline of a parking space • Any lighting on a parking lot shall illuminate only the parking lot, designed to avoid undue glare or reflection on adjoining premises • All parking areas shall have specific entrance and/or exit areas to the street. The width of access raids and curb-cuts shall be determined by the Public Works Director. The edge of the curb-cut or access road shall be as required by the Public Works Director. Curb-cuts in single family districts shall be limited to a maximum of 20 ft in width and the location shall be approved by the Public Works Director. • Parking stalls shall not be used for permanent or semi-permanent parking or storage of trucks or materials	
Required Number of Parking	No minimum number of spaces required per	

	FS51 – SEGALE SITE	
LAND USE CODE	**DESCRIPTION**	**COMMENT**
Spaces 18.56.050	TMC, Figure 18-7	
Loading Space Requirements 18.56.060	Off-street space for standing, loading and unloading services shall be provided in such a manner as not to obstruct freedom of traffic movement on streets or alleys. For all office, commercial, and industrial uses, each loading space shall consist of at least a 10ft by 30ft loading space with 14ft height clearance for small trucks or a 12ft by 65ft loading space with 14ft height clearance for large trucks, including tractor-trailer.	
Parking for the Handicapped 18.56.080	All parking provided for the handicapped, or others meeting the definitions of the ADA, shall meet requirements of the Chapter 11 of the 1994 UBC as amended by the WAU, section 51.30, et seq.	
Compact Car Allowance 18.56.090	A. A maximum of 30% of the total off-street parking stalls may be permitted and designated for compact cars. B. Each compact stall shall be designated as such, with the word COMPACT printed onto the stall, in a minimum of eight -inch letters and maintained as such over the life of the use of both the space and the adjacent structure it serves. C. Dimensions of compact parking stalls shall conform to the standards as depicted in Figure 18-6 of this chapter. D. Compact spaces shall be reasonably dispersed throughout the parking lot.	
Uses Not Specified 18.56.100	In the case of a use not specifically mentioned in this chapter, the requirements for off-street parking facilities shall be determined by the Director.	
Development Standards for Bicycle Parking 18.56.130	A. Required number of bicycle parking spaces: The required number of parking spaces for bicycles are included in TMC 18.56.050, Figure 18-7. [Use not listed; requirement shall be determined by the Director] B. Location: 1. Required bicycle parking must be located within 50 feet of an entrance to the building or use 2. Bicycle parking may be provided within a building, but the location must be accessible for bicycles C. Safety and Security: 1. Legitimate bicycle spaces are individual units within ribbon racks, inverted 'U'	

	FS51 – SEGALE SITE	
LAND USE CODE	**DESCRIPTION**	**COMMENT**
	racks, locking wheel racks, lockers, or other similar permanent structures. 2. If bicycle lockers are used, windows and/or view holes must be included to discourage improper uses. 3. If bicycle parking is not visible from the street, a sign must be posted indicating the location of the bicycle parking spaces. 4. All bicycle parking must be separated from motor vehicle traffic by a barrier, curb, post, bollard or other similar device.	

	FS52 – CITY HALL SITE	
LAND USE CODE	**DESCRIPTION**	**COMMENT**
Use District (per Zoning Map, Fig. 18-10)	Office	
Land Use Allowed by District 18.09.010 (per Table 18-6)	Conditional use, subject to TMC 18.64	
Design Review 18.16.070		
Basic Development Standards 18.16.080		
Design Review 18.18.070	Required for commercial structures larger than 1,500sf; those between 1,500 and 5,000sf will be reviewed administratively.	[does a fire station qualify as a commercial structure?]
Basic Development Standards 18.18.080	Minimum yard setbacks: Front = 25 ft Second front = 12.5 ft Sides = 10 ft IF within 50ft of R: 1st fl = 10 ft 2nd fl = 20 ft 3rd fl = 30 ft Rear = 10 ft IF within 50ft of R: 1st fl = 10 ft 2nd fl = 20 ft 3rd fl = 30 ft Max height: 3 stories or 35 ft Landscape requirements: Front = 15 ft Second Front = 12.5 Sides = 5 ft IF within 50ft of R = 10 ft Rear = 5 ft IF within 50ft of R = 10 ft Off-street Parking: Per TMC 18.56	
Design Review 18.41.080		
Basic Development Standards 18.41.090		
Exemption of Rooftop Appurtenances 18.50.080		
Maximum Building Length 18.50.083		
Max % Development Area Coverage 18.50.085		
Charging Station Locations 18.50.140	"Level 1 and Level 2 charging stations are allowed as an accessory use in the predominantly residential zones LDR, MDR and HDR. Level 1 and Level 2 charging stations	

	FS52 – CITY HALL SITE	
LAND USE CODE	**DESCRIPTION**	**COMMENT**
	are allowed as a permitted use in all other zones. Level 3 charging stations, battery exchange stations, and rapid charging stations are allowed as a permitted use in all zones that allow other automotive services such as gas stations, and are allowed as an accessory use in all other zones."	
Perimeter Landscaping Requirements by Zone District 18.52.020	[See Landscape Analysis]	
Perimeter Landscape Types 18.52.030	[See Landscape Analysis]	
Interior Parking Lot Landscaping Requirements 18.52.035	[See Landscape Analysis]	
General Landscape and Screening Requirements 18.52.040	[See Landscape Analysis]	
Landscape Plan Requirements 18.52.050	[See Landscape Analysis]	
Lighting 18.52.065	Parking and loading areas shall include lighting capable of providing adequate illumination for security and safety. Lighting standards shall be in scale with the height and use of the associated structure. Any illumination, including security lighting, shall be directed away from adjoining properties and public rights-of-way.	
Recycling Storage Space for Non-Residential Uses 18.52.080	A. Recycling storage space for non-residential uses shall be provided at the rate of at least two square feet per every 1,000 square feet of building gross floor area in office, medical, professional, public facility, school and institutional developments. B. Outdoor collection points shall not be located in any required setback or landscape area. C. Collection points shall be located in a manner so that hauling trucks do not obstruct pedestrian or vehicle traffic on-site, or project into any public right-of-way.	
Design of Collection Points for Garbage and Recycling Containers 18.52.090	Residential and non-residential collection points shall be designed as follows: 1. An opaque wall or fence of sufficient size and height to provide complete screening shall enclose any outside collection point. Architectural design shall be consistent with the design of the primary structure(s) on the site.	

	FS52 – CITY HALL SITE	
LAND USE CODE	**DESCRIPTION**	**COMMENT**
	2. Collection points shall be identified by signs not to exceed two square feet. 3. Weather protection of recyclables and garbage shall be ensured by using weather-proof containers or by providing a roof over the storage area.	
Tree Regulations 18.54	[See Landscape Analysis]	
Off-Street Parking and Loading General Requirements 18.56.040	Minimum parking area dimensions: [As shown in TMC Figure 18-6] • Standard and compact stalls may include a 2ft landscape overhang in their required length • Parking space slope shall not exceed 5% • Slope of entrance and exit drives and internal driveway aisles without stalls shall not exceed 15% • Ingress and egress shall not require moving another vehicle or backing more than 50ft • Turning and maneuvering space shall be located entirely on private property • All parking spaces shall be internally accessible to one another • Driveways to access parking in rear of buildings shall be no less than 12ft wide with a 3ft wide sidewalk, curbed or raised 6in above the driving surface • Ingress and egress to any off-street parking lot shall not be located closer than 20ft from point of tangent to an intersection • Public Works or Community Development Directors may require ingress separate from egress for better flow of traffic • Director may require areas not approved for parking to be marked or signed to prevent parking • Surface of any required off-street parking or loading facility shall be paved with asphalt, concrete or other similar approved material(s) and shall be graded and drained as to dispose of all surface water, but not across sidewalks • All traffic control devices shall be installed and completed as shown on the approved plans • Paved parking areas shall use paint or similar devices to delineate car stalls and direction of traffic • Where pedestrian walks are used in parking	

	FS52 – CITY HALL SITE	
LAND USE CODE	**DESCRIPTION**	**COMMENT**
	lots for the use of foot traffic only, they shall be curbed or raised 6in above the lot surface • Wheel stops shall be required on the periphery of parking lots so cars will no protrude into the public right of way, walkways, off the parking lot or strike buildings. Wheel stops shall be two feet from the end of the stall of head-in parking • No obstruction that would restrict car door opening shall be permitted within five feet of the centerline of a parking space • Any lighting on a parking lot shall illuminate only the parking lot, designed to avoid undue glare or reflection on adjoining premises • All parking areas shall have specific entrance and/or exit areas to the street. The width of access raids and curb-cuts shall be determined by the Public Works Director. The edge of the curb-cut or access road shall be as required by the Public Works Director. Curb-cuts in single family districts shall be limited to a maximum of 20 ft in width and the location shall be approved by the Public Works Director. Parking stalls shall not be used for permanent or semi-permanent parking or storage of trucks or materials	
Required Number of Parking Spaces 18.56.050	No minimum number of spaces required per TMC, Figure 18-7	
Loading Space Requirements 18.56.060	Off-street space for standing, loading and unloading services shall be provided in such a manner as not to obstruct freedom of traffic movement on streets or alleys. For all office, commercial, and industrial uses, each loading space shall consist of at least a 10ft by 30ft loading space with 14ft height clearance for small trucks or a 12ft by 65ft loading space with 14ft height clearance for large trucks, including tractor-trailer.	
Parking for the Handicapped 18.56.080	All parking provided for the handicapped, or others meeting the definitions of the ADA, shall meet requirements of the Chapter 11 of the 1994 UBC as amended by the WAU, section 51.30, et seq.	
Compact Car Allowance 18.56.090	A. A maximum of 30% of the total off-street parking stalls may be permitted and designated for compact cars. B. Each compact stall shall be designated as	

	FS52 – CITY HALL SITE	
LAND USE CODE	**DESCRIPTION**	**COMMENT**
	such, with the word COMPACT printed onto the stall, in a minimum of eight -inch letters and maintained as such over the life of the use of both the space and the adjacent structure it serves. C. Dimensions of compact parking stalls shall conform to the standards as depicted in Figure 18-6 of this chapter. D. Compact spaces shall be reasonably dispersed throughout the parking lot.	
Uses Not Specified 18.56.100	In the case of a use not specifically mentioned in this chapter, the requirements for off-street parking facilities shall be determined by the Director.	
Development Standards for Bicycle Parking 18.56.130	A. Required number of bicycle parking spaces: The required number of parking spaces for bicycles are included in TMC 18.56.050, Figure 18-7. [Use not listed; requirement shall be determined by the Director] B. Location: 1. Required bicycle parking must be located within 50 feet of an entrance to the building or use 2. Bicycle parking may be provided within a building, but the location must be accessible for bicycles C. Safety and Security: 1. Legitimate bicycle spaces are individual units within ribbon racks, inverted 'U' racks, locking wheel racks, lockers, or other similar permanent structures. 2. If bicycle lockers are used, windows and/or view holes must be included to discourage improper uses. 3. If bicycle parking is not visible from the street, a sign must be posted indicating the location of the bicycle parking spaces. 4. All bicycle parking must be separated from motor vehicle traffic by a barrier, curb, post, bollard or other similar device.	

	FS54 – SITE UNKNOWN	
LAND USE CODE	**DESCRIPTION**	**COMMENT**
Use District (per Zoning Map, Fig. 18-10)	TBD	
Land Use Allowed by District 18.09.010 (per Table 18-6)	Conditional use, subject to TMC 18.64 (all districts aside from TSO)	
Design Review 18.16.070		
Basic Development Standards 18.16.080		
Design Review 18.18.070		
Basic Development Standards 18.18.080		
Design Review 18.41.080		
Basic Development Standards 18.41.090		
Exemption of Rooftop Appurtenances 18.50.080		
Maximum Building Length 18.50.083	In MDR/HDR zones, max building length shall be as follows: For all buildings except as described below: — MDR..... 50 ft; HDR ..... 50 ft Maximum building length with bonus for modulating off-sets: • For structures with a maximum building height of 2 stories or 25 ft., whichever is less, and having horizontal modulation or a minimum vertical change in roof profile of 4 feet at least every two units or 50 feet, whichever is less — MDR....100 ft; HDR.....200 ft • For structures with a building height over 2 stories or 25 ft., whichever is less, with a horizontal & vertical modulation of 4 ft. or an 8 ft. modulation in either direction — MDR....100 ft; HDR....200 ft	Applicable if FS54 is in MDR or HDR zone

	FS54 – SITE UNKNOWN	
LAND USE CODE	**DESCRIPTION**	**COMMENT**
Max % Development Area Coverage 18.50.085	In MDR and HDR zones, max % development coverage area shall be 50%. Director shall allow increase from 50% to 75% if applicant uses low-impact development techniques, provided site allows for such measures and drainage design meets all adopted codes.	
Charging Station Locations 18.50.140	"Level 1 and Level 2 charging stations are allowed as an accessory use in the predominantly residential zones LDR, MDR and HDR. Level 1 and Level 2 charging stations are allowed as a permitted use in all other zones. Level 3 charging stations, battery exchange stations, and rapid charging stations are allowed as a permitted use in all zones that allow other automotive services such as gas stations, and are allowed as an accessory use in all other zones."	
Perimeter Landscaping Requirements by Zone District 18.52.020	[See Landscape Analysis]	
Perimeter Landscape Types 18.52.030	[See Landscape Analysis]	
Interior Parking Lot Landscaping Requirements 18.52.035	[See Landscape Analysis]	
General Landscape and Screening Requirements 18.52.040	[See Landscape Analysis]	
Landscape Plan Requirements 18.52.050	[See Landscape Analysis]	
Lighting 18.52.065	A. Parking and loading areas shall include lighting capable of providing adequate illumination for security and safety. Lighting standards shall be in scale with the height and use of the associated structure. Any illumination, including security lighting, shall be directed away from adjoining properties and public rights-of-way. B. In the MDR and HDR zones, porches, alcoves and pedestrian circulation walkways shall be provided with low-level safety lighting. Pedestrian walkways and sidewalks may be lighted with lighting bollards.	
Recycling Storage Space for Non-Residential Uses 18.52.080	A. Recycling storage space for non-residential uses shall be provided at the rate of at least two square feet per every 1,000 square feet of building gross floor area in office, medical, professional, public facility, school and institutional developments. B. Outdoor collection points shall not be	

	FS54 – SITE UNKNOWN	
LAND USE CODE	**DESCRIPTION**	**COMMENT**
	located in any required setback or landscape area. C. Collection points shall be located in a manner so that hauling trucks do not obstruct pedestrian or vehicle traffic on-site, or project into any public right-of-way.	
Design of Collection Points for Garbage and Recycling Containers 18.52.090	Residential and non-residential collection points shall be designed as follows: 1. An opaque wall or fence of sufficient size and height to provide complete screening shall enclose any outside collection point. Architectural design shall be consistent with the design of the primary structure(s) on the site. 2. Collection points shall be identified by signs not to exceed two square feet. 3. Weather protection of recyclables and garbage shall be ensured by using weather-proof containers or by providing a roof over the storage area.	
Tree Regulations 18.54	[See Landscape Analysis]	
Off-Street Parking and Loading General Requirements 18.56.040	Minimum parking area dimensions: [As shown in TMC Figure 18-6] • Standard and compact stalls may include a 2ft landscape overhang in their required length • Parking space slope shall not exceed 5% • Slope of entrance and exit drives and internal driveway aisles without stalls shall not exceed 15% • Ingress and egress shall not require moving another vehicle or backing more than 50ft • Turning and maneuvering space shall be located entirely on private property • All parking spaces shall be internally accessible to one another • Driveways to access parking in rear of buildings shall be no less than 12ft wide with a 3ft wide sidewalk, curbed or raised 6in above the driving surface • Ingress and egress to any off-street parking lot shall not be located closer than 20ft from point of tangent to an intersection • Public Works or Community Development Directors may require ingress separate from egress for better flow of traffic • Director may require areas not approved for parking to be marked or signed to prevent	

	FS54 – SITE UNKNOWN	
LAND USE CODE	**DESCRIPTION**	**COMMENT**
	parking • Surface of any required off-street parking or loading facility shall be paved with asphalt, concrete or other similar approved material(s) and shall be graded and drained as to dispose of all surface water, but not across sidewalks • All traffic control devices shall be installed and completed as shown on the approved plans • Paved parking areas shall use paint or similar devices to delineate car stalls and direction of traffic • Where pedestrian walks are used in parking lots for the use of foot traffic only, they shall be curbed or raised 6in above the lot surface • Wheel stops shall be required on the periphery of parking lots so cars will no protrude into the public right of way, walkways, off the parking lot or strike buildings. Wheel stops shall be two feet from the end of the stall of head-in parking • No obstruction that would restrict car door opening shall be permitted within five feet of the centerline of a parking space • Any lighting on a parking lot shall illuminate only the parking lot, designed to avoid undue glare or reflection on adjoining premises • All parking areas shall have specific entrance and/or exit areas to the street. The width of access raids and curb-cuts shall be determined by the Public Works Director. The edge of the curb-cut or access road shall be as required by the Public Works Director. Curb-cuts in single family districts shall be limited to a maximum of 20 ft in width and the location shall be approved by the Public Works Director. Parking stalls shall not be used for permanent or semi-permanent parking or storage of trucks or materials	
Required Number of Parking Spaces 18.56.050	No minimum number of spaces required per TMC, Figure 18-7	
Loading Space Requirements 18.56.060	Off-street space for standing, loading and unloading services shall be provided in such a manner as not to obstruct freedom of traffic movement on streets or alleys. For all office, commercial, and industrial uses, each loading	

	FS54 – SITE UNKNOWN	
LAND USE CODE	**DESCRIPTION**	**COMMENT**
	space shall consist of at least a 10ft by 30ft loading space with 14ft height clearance for small trucks or a 12ft by 65ft loading space with 14ft height clearance for large trucks, including tractor-trailer.	
Parking for the Handicapped 18.56.080	All parking provided for the handicapped, or others meeting the definitions of the ADA, shall meet requirements of the Chapter 11 of the 1994 UBC as amended by the WAU, section 51.30, et seq.	
Compact Car Allowance 18.56.090	A. A maximum of 30% of the total off-street parking stalls may be permitted and designated for compact cars. B. Each compact stall shall be designated as such, with the word COMPACT printed onto the stall, in a minimum of eight -inch letters and maintained as such over the life of the use of both the space and the adjacent structure it serves. C. Dimensions of compact parking stalls shall conform to the standards as depicted in Figure 18-6 of this chapter. D. Compact spaces shall be reasonably dispersed throughout the parking lot.	
Uses Not Specified 18.56.100	In the case of a use not specifically mentioned in this chapter, the requirements for off-street parking facilities shall be determined by the Director.	
Development Standards for Bicycle Parking 18.56.130	A. Required number of bicycle parking spaces: The required number of parking spaces for bicycles are included in TMC 18.56.050, Figure 18-7. [Use not listed; requirement shall be determined by the Director] B. Location: 1. Required bicycle parking must be located within 50 feet of an entrance to the building or use 2. Bicycle parking may be provided within a building, but the location must be accessible for bicycles C. Safety and Security: 1. Legitimate bicycle spaces are individual units within ribbon racks, inverted 'U' racks, locking wheel racks, lockers, or other similar permanent structures. 2. If bicycle lockers are used, windows and/or view holes must be included to discourage improper uses. 3. If bicycle parking is not visible from the street, a sign must be posted indicating	

	FS54 – SITE UNKNOWN	
LAND USE CODE	**DESCRIPTION**	**COMMENT**
	the location of the bicycle parking spaces. 4. All bicycle parking must be separated from motor vehicle traffic by a barrier, curb, post, bollard or other similar device.	

APPENDIX A

TUKWILA FIRE STATIONS SITE CODE REQUIREMENTS MATRIX			
	FIRE STATION 51	**FIRE STATION 52**	**FIRE STATION 54**
Zoning	Mixed-Use Office 18.16	Office (If sited at City Hall Campus) 18.18	Likely Low Density Residential - TBD
Development Standards for Zone	See 18.16.080 Setbacks to yards (min.) Front: 25 feet Second front: 12.5 feet Sides: 10 feet Rear: 10 feet Landscape requirements: Front: 15 feet Second front: 12.5 feet Sides: 5 feet Rear: 5 feet Off-street Parking requirements: per direction from Owner. * Second front means any yard adjacent to a public street that is not a front yard. ** Front Yard: yard extending between side lot lines across the front of a lot.	See 18.18.080 Setbacks to yards (min.) Front: 25 feet Second front: 12.5 feet Sides: 10 feet Rear: 10 feet Landscape requirements: Front: 15 feet Second front: 12.5 feet Sides: 5 feet Rear: 5 feet Off-street Parking requirements: per direction from Owner.	TBD. If Low Density Residential Setbacks to yards (min): Front: 20 feet Second front: 10 feet Sides: 5 feet Rear: 30 feet Height: max. 30 feet No development standards listed.
Overlay Zone?	N/A Close adjacency to Tukwila Urban Center	N/A Close adjacency to Tukwila Urban Center	No
Corridor Type	Commercial Corridor	Commercial Corridor/Freeway Frontage junction	TBD
Development Standards for Corridor 18-25	18-25 Commercial Corridors: Public Frontage Width: 15 feet Sidewalk Width: 6 feet Landscape Strip: 9 feet wide cont. Street tree Spacing: 20-30 feet Lighting: Vehicular scale decorative street lighting	18-25 Commercial Corridors: (see 51) 18-25 Freeway Frontage: Public Frontage Width: 6 feet Landscaping Strip: 9 feet side cont. Street Tree Spacing: 30-40 ft. Lighting: Vehicular scale decorative street lighting	TBD
Right-of-Way Vegetation 11.20.070	See 11.20.070 No flowers, trees, or shrubs to overhang or prevent free use of the sidewalk/roadway. Trees may extend when trimmed to 8' above walkway and 18' above roadway. No trees to contact telephone, telegraph or electric power wires. Intersection sight distance based on posted speed limits per AASHTO guidelines. If you damage a tree/tree roots within the R.O.W. you must replace it.	See 11.20.070 No flowers, trees, or shrubs to overhang or prevent free use of the sidewalk/roadway. Trees may extend when trimmed to 8' above walkway and 18' above roadway. No trees to contact telephone, telegraph or electric power wires. Intersection sight distance based on posted speed limits per AASHTO guidelines. If you damage a tree/tree roots within the R.O.W. you must replace it.	See 11.20.070 No flowers, trees, or shrubs to be allowed to overhang or prevent free use of the sidewalk/roadway. Trees may extend when trimmed to 8' above walkway and 18' above roadway. No trees to contact telephone, telegraph or electric power wires. Intersection sight distance based on posted speed limits per AASHTO guidelines. If you damage a tree/tree roots within the R.O.W. you must replace it.

APPENDIX A cont'd...

On-Site and Perimeter Landscaping Requirements: **18.52.030** **18.52.040**	Landscape Type for Front, Side and Rear: Type 1 Type 1: One tree for 30 lineal feet of perimeter. One shrub for 7 lineal feet of perimeter. Living groundcover to cover 90% of the landscape area within 3 years (grass may be used as a groundcover where existing or amended soil conditions assure adequate moisture for growth). Evergreen trees shall be a min. of 6 feet in height at time of planting. Deciduous trees = 2" caliper min. Shrubs = 18" high min at planting. New plant materials shall include native/native adaptive species, suited to the planting site.	Landscape Type for Front, Side and Rear: Type 1 Type 1: One tree for 30 lineal feet of perimeter. One shrub for 7 lineal feet of perimeter. Living groundcover to cover 90% of the landscape area within 3 years (grass may be used as a groundcover where existing or amended soil conditions assure adequate moisture for growth). Evergreen trees shall be a min. of 6 feet in height at time of planting. Deciduous trees = 2" caliper min. Shrubs = 18" high min at planting. New plant materials shall include native/native adaptive species, suited to the planting site.	See Station 51 for requirements. In perimeters located adjacent to residential zones, 75% of trees and shrubs shall be evergreen. See 18.52.060 for Recreation Space Requirements (if Station 54 is in MDR or HDR zone).
On-Site Screening Requirements: **18.52.040**	Mix of evergreen trees and shrubs shall screen blank walls. Deciduous trees shall be used to allow visual access to entryways, signage, and pedestrian use areas. Outdoor storage screened from abutting public and private streets and adjacent properties. Screens shall be min. 8' high and not less than 60% of the height of material stored. Ground level mechanical equipment and garbage storage areas shall be screened with evergreen plant materials/fences/masonry walls.	Mix of evergreen trees and shrubs shall screen blank walls. Deciduous trees shall be used to allow visual access to entryways, signage, and pedestrian use areas. Outdoor storage screened from abutting public and private streets and adjacent properties. Screens shall be min. 8' high and not less than 60% of the height of material stored. Ground level mechanical equipment and garbage storage areas shall be screened with evergreen plant materials/fences/masonry walls.	See 18.52.040 E for requirements for MDR, HDR zones (if necessary)
Drainage Requirements:	Per King County Stormwater Code. See Chapters 4, 5 and 6 for requirements related to planting. TBD based on site drainage strategy. See civil analysis	Per King County Stormwater Code. See Chapters 4, 5 and 6 for requirements related to planting. TBD based on site drainage strategy. See civil analysis	Per King County Stormwater Code. See Chapters 4, 5 and 6 for requirements related to planting. TBD based on site drainage strategy. See civil analysis

APPENDIX A cont'd...

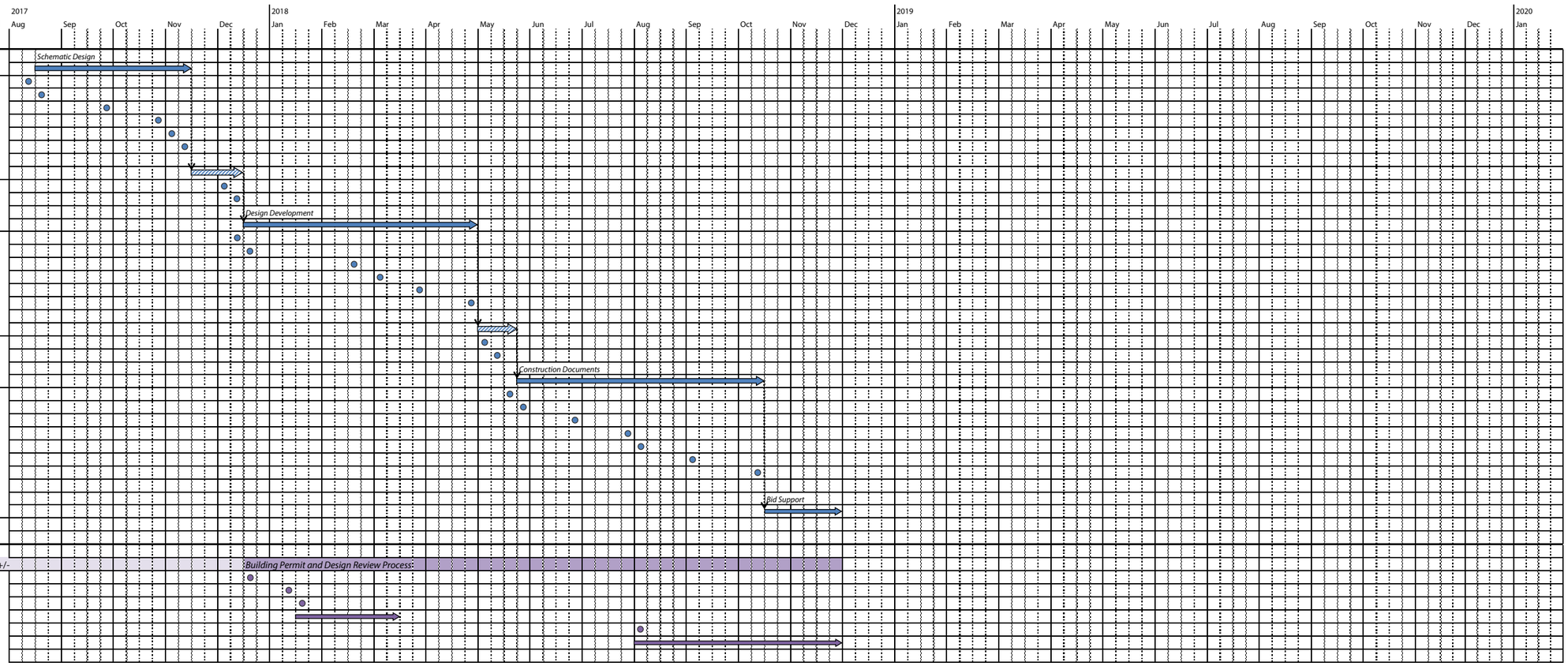
Parking Lot Landscaping Requirements: 18.52.035	0, MUO, RCC, NCC zoning For lots with up to 20 parking stalls, no interior landscaping required For lots with 21 - 40 parking stalls, a minimum of 10 square feet of interior landscape area is required for each parking stall over 20. For lots with more than 40 parking stalls, a min. 200 square feet of interior landscape area + 15 square feet for each parking stall over 40 is required. For areas placed behind buildings or otherwise screened from streets, parks and City trails, the interior landscape requirement is reduced to a minimum of 200 square feet plus 10 square feet for each parking stall over 40.	0, MUO, RCC, NCC zoning For lots with up to 20 parking stalls, no interior landscaping required For lots with 21 - 40 parking stalls, a minimum of 10 square feet of interior landscape area is required for each parking stall over 20. For lots with more than 40 parking stalls, a min. 200 square feet of interior landscape area + 15 square feet for each parking stall over 40 is required. For areas placed behind buildings or otherwise screened from streets, parks and City trails the interior landscape requirement is reduced to a minimum of 200 square feet plus 10 square feet for each parking stall over 40.	Requirements for each distinctly separate parking area within the LDR zone for uses other than dwelling units, and in the MDR and HDR zones: For areas with up to 20 parking stalls, no int. landscaping req'd. For areas with 21 - 40 parking stalls 7 square feet of interior landscape area is required for each stall. For areas with more than 40 stalls, 12 square feet of interior landscape area is required for each parking stall (see Multi-Family Design Guidelines, Site Planning Section, No. 31, for the normal 15 square feet to be provided). All parking areas to have a perimeter landscape strip min. 2' wide/average width 5'.
Irrigation 18.52.040.I	All landscape areas shall be served by an automatic irrigation system. Water conservation features such as moisture sensors with automatic rain shut-off devices, separate irrigation zones, automatic timers, pressure regulating devices, backflow prevention devices, separate irrigation zones for grass and planting beds, and sprinkler heads matched to site and plant conditions shall be installed.	All landscape areas shall be served by an automatic irrigation system. Water conservation features such as moisture sensors with automatic rain shut-off devices, separate irrigation zones, automatic timers, pressure regulating devices, backflow prevention devices, separate irrigation zones for grass and planting beds, and sprinkler heads matched to site and plant conditions shall be installed.	All landscape areas shall be served by an automatic irrigation system. Water conservation features such as moisture sensors with automatic rain shut-off devices, separate irrigation zones, automatic timers, pressure regulating devices, backflow prevention devices, separate irrigation zones for grass and planting beds, and sprinkler heads matched to site and plant conditions shall be installed.
Planting Clearances from Utilities 18.52.040J	In areas of overhead transmission lines, no shrubs or trees over 20 feet at maturity will be allowed. Trees should not be planted within 10 feet of underground water, sewer or storm drainage pipe.	In areas of overhead transmission lines, no shrubs or trees over 20 feet at maturity will be allowed. Trees should not be planted within 10 feet of underground water, sewer or storm drainage pipe.	In areas of overhead transmission lines, no shrubs or trees over 20 feet at maturity will be allowed. Trees should not be planted within 10 feet of underground water, sewer or storm drainage pipe.

Recycling/Garbage Storage **18.52.070**	A. Recycling storage space for non-residential uses shall be provided at the rate of at least: 1. Two square feet per every 1,000 square feet of building gross floor area in office, medical, professional, public facility, school and institutional developments. Do not locate in any required setback or landscape area. Locate so that hauling trucks do not obstruct pedestrian or vehicle traffic on-site, required setback or landscape area. Design: An opaque wall or fence of sufficient size and height to provide complete screening shall enclose any outside collection point. Architectural design shall be consistent with primary structure(s) on the site. Weather protection of recyclables and garbage shall be ensured by using weather-proof containers or with roof.	A. Recycling storage space for non-residential uses shall be provided at the rate of at least: 1. Two square feet per every 1,000 square feet of building gross floor area in office, medical, professional, public facility, school and institutional developments. Do not locate in any required setback or landscape area. Locate so that hauling trucks do not obstruct pedestrian or vehicle traffic on-site, required setback or landscape area. Design: An opaque wall or fence of sufficient size and height to provide complete screening shall enclose any outside collection point. Architectural design shall be consistent with primary structure(s) on the site. Weather protection of recyclables and garbage shall be ensured by using weather-proof containers or with roof.	A. Recycling storage space for non-residential uses shall be provided at the rate of at least: 1. Two square feet per every 1,000 square feet of building gross floor area in office, medical, professional, public facility, school and institutional developments. Do not locate in any required setback or landscape area. Locate so that hauling trucks do not obstruct pedestrian or vehicle traffic on-site, required setback or landscape area. Design: An opaque wall or fence of sufficient size and height to provide complete screening shall enclose any outside collection point. Architectural design shall be consistent with primary structure(s) on the site. Weather protection of recyclables and garbage shall be ensured by using weather-proof containers or with roof.
Tree Requirements: **18.54**	Sites shall be designed and constructed to retain as many existing healthy trees as possible. Priority to existing stands of trees, trees at site perimeter, and healthy mature trees. All understory veg. within the essential root zone of protected trees shall be retained/ removed without damaging the tree, and replaced with veg. that is compatible to the tree See Tree Replacement Table 18.54.130.2.b 1 tree for every 4-8" diameter existing tree removed. 2 trees for every 8-12" diameter existing tree removed. 4 trees for every 12-18" diameter removed. 6 trees for every 18-24" diameter removed. 8 trees for +24" diameter removed. Soil Depth: 36"	Sites shall be designed and constructed to retain as many existing healthy trees as possible. Priority to existing stands of trees, trees at site perimeter, and healthy mature trees. All understory veg. within the essential root zone of protected trees shall be retained/ removed without damaging the tree, and replaced with veg. that is compatible to the tree See Tree Replacement Table 18.54.130.2.b 1 tree for every 4-8" diameter existing tree removed. 2 trees for every 8-12" diameter existing tree removed. 4 trees for every 12-18" diameter removed. 6 trees for every 18-24" diameter removed. 8 trees for +24" diameter removed. Soil Depth: 36"	Sites shall be designed and constructed to retain as many existing healthy trees as possible. Priority to existing stands of trees, trees at site perimeter, and healthy mature trees. All understory veg. within the essential root zone of protected trees shall be retained/ removed without damaging the tree, and replaced with veg. that is compatible to the tree See Tree Replacement Table 18.54.130.2.b 1 tree for every 4-8" diameter existing tree removed. 2 trees for every 8-12" diameter existing tree removed. 4 trees for every 12-18" diameter removed. 6 trees for every 18-24" diameter removed. 8 trees for +24" diameter removed. Soil Depth: 36"

6 | PRELIMINARY PROJECT SCHEDULE

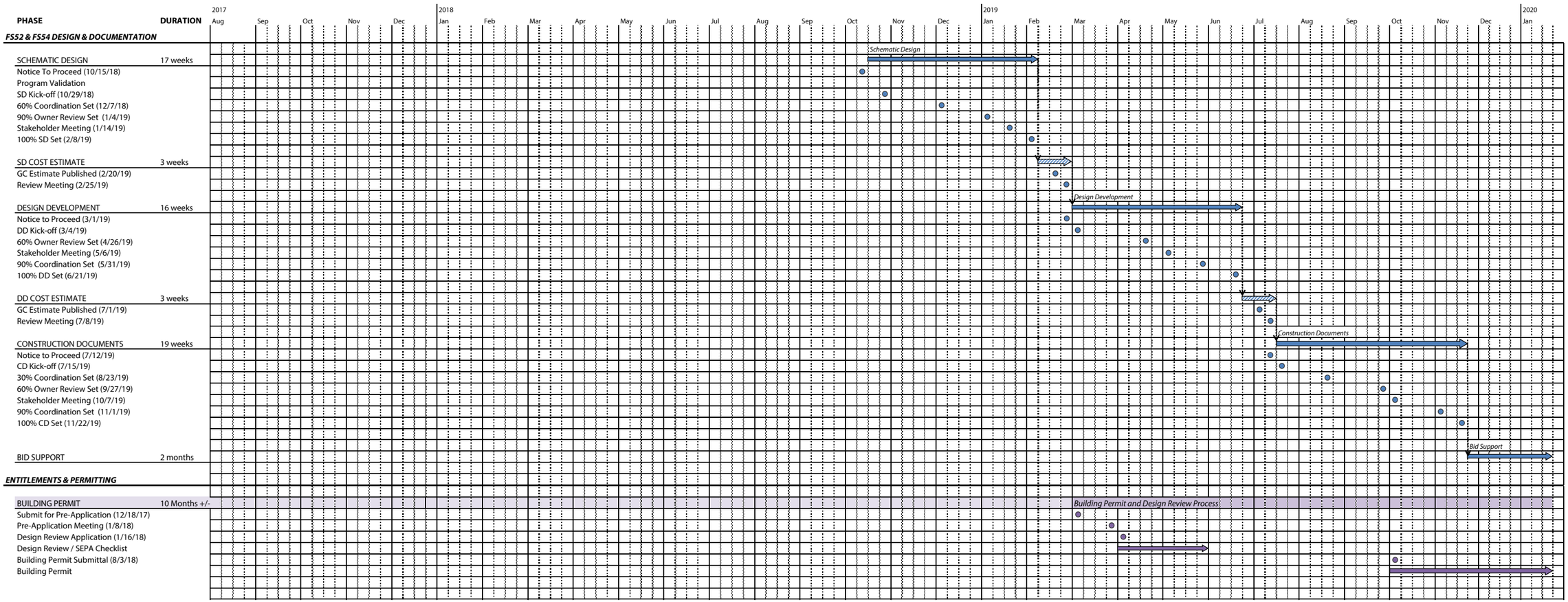
FS51 DESIGN AND PERMITTING SCHEDULE

PHASE	DURATION
FS51 DESIGN & DOCUMENTATION	
SCHEMATIC DESIGN	13 weeks
Notice To Proceed (8/15/17)	
SD Kick-off (8/21/17)	
60% Coordination Set (10/6/17)	
90% Owner Review Set (10/27/17)	
Stakeholder Meeting (11/6/17)	
100% SD Set (11/17/17)	
SD COST ESTIMATE	4 weeks
GC Estimate Published (12/5/17)	
Review Meeting (12/11/17)	
DESIGN DEVELOPMENT	18 weeks
Notice to Proceed (12/15/17)	
DD Kick-off (12/18/17)	
60% Owner Review Set (2/23/18)	
Stakeholder Meeting (3/5/18)	
90% Coordination Set (3/30/18)	
100% DD Set (4/27/18)	
DD COST ESTIMATE	3 weeks
GC Estimate Published (5/9/18)	
Review Meeting (5/14/18)	
CONSTRUCTION DOCUMENTS	21 weeks
Notice to Proceed (5/18/18)	
CD Kick-off (5/21/18)	
30% Coordination Set (6/22/18)	
60% Owner Review Set (7/27/18)	
Stakeholder Meeting (8/6/18)	
90% Coordination Set (9/7/18)	
100% CD Set (10/12/18)	
BID SUPPORT	2 months
ENTITLEMENTS & PERMITTING	
BUILDING PERMIT	10 months +/-
Submit for Pre-Application (12/18/17)	
Pre-Application Meeting (1/8/18)	
Design Review Application (1/16/18)	
Design Review / SEPA Checklist	
Building Permit Submittal (8/3/18)	
Building Permit	



FS52 & FS54 DESIGN AND PERMITTING SCHEDULE

WEINSTEIN A+U
ARCHITECTS + URBAN DESIGNERS



7 | APPENDIX

APRIL 26, 2017

TUKWILA FIRE STATIONS
INITIAL PROGRAMMING QUESTIONNAIRE - COMPILED RESPONSES

Responses have been color coded per the following key:

Tukwila Fire Department – RED

Rachel Bianchi – BLUE

Bob Giberson – GREEN

David Cline - PURPLE

SECTION A: EXCERPTS FROM THE TUKWILA COMPREHENSIVE PLAN 2015 *These statements have been identified by Weinstein A+U as potentially relevant to these projects – bold text represents our emphasis. Please feel free to highlight text that you feel is especially relevant to the new fire stations or to strike text that you feel does not apply at this time.*

UPDATE: Rachel highlighted the following excerpts, which she felt were most relevant to these projects.

> "We seek to create a natural environment, a physical infrastructure, and a community image that prompts people to respect and care for each other and which attracts newcomers to live, do business, shop in, visit and enjoy the special features of the City. People who arrive here want to stay here and invest their time and resources in making the community a better place."
>
> Visually attractive development occurs through the application of design criteria that are functional, attractive and safe."

Goals and Strategies:

- **Capitalize on the potential that public projects have for serving as symbols of the community, and for expressing the identity and special character of the area where they are located.**

- **Foster public life throughout the City by providing neighborhood focal points and open spaces that are well-integrated into the neighborhoods they serve.**

Natural Environment

Goals and Strategies:

- To protect water quality, **promote natural yard care, alternatives to grass lawns**, and proper waste management through educational programs and publicity.

Parks, Recreation and Open Space

Goals and Strategies:

- Support plans, policies, projects and programs to expand and improve the park and open space system in the Southcenter**, Tukwila South** and Tukwila International Boulevard areas, and **seek opportunities to develop new facilities and programs that enhance the overall experience of residents, while also considering the needs of employees, business owners and visitors.**
- **Work with public agencies to incorporate public spaces as an important element of major public transportation, utilities and facilities projects.**
- **Reflect the highest standard of design quality in public developments to enhance neighborhood quality and set a high design standard for private development.**
- Involve the community, including expected users and neighborhood residents, in appropriate aspects of capital project and program planning and implementation.
- **Incorporate designs with green infrastructure, water and energy efficiency, recycling, waste prevention and low-impact design storm water management, that reduce environmental impacts.**

Residential Neighborhoods

Goals and Strategies:

- Mandate, through the Zoning Code and design manuals, **high-quality public facility and private development design for neighborhood quality**.
- **Invest in public facilities and improvements to encourage neighborhood identity and private property improvements**.
- **Employ appropriate design elements to blend in with the character of the residential neighborhood**.
- **Use building construction and siting methods, berming, landscaping, setbacks and tree planting to mitigate noise**.

Capital Facilities

- The City shall recognize and provide for multiple purposes and functions in all City facilities and, where possible, incorporate the needs of the individual within the design.

SECTION B: GENERAL PROGRAM QUESTIONS *If you need more space for your answers, please feel free to type responses in a separate document, referencing the section letter and question numbers*

1. The Owner Team has verbalized a desire for design consistency across all three of the new fire stations, yet there are many references to the importance of differentiating between neighborhoods in the *Comprehensive Plan*. Should the architects strive to provide some neighborhood particularity to each station, while maintaining other aspects of consistency between all three buildings?

   Have unique features that complement the neighborhood, but elements that tie it all together.

   I liked the analogy WAU used in the interview, where the stations would be a "family" but not necessarily identical. I think the idea that there are shared characteristics, but individual stations in each of the three neighborhoods will go over well with the community and councilmembers.

   Yes

   Yes, the buildings should fit into their neighborhood surroundings. It would be good to have some element that connects all the stations together that states they are Tukwila Fire Department. I see it is another way to positively brand Tukwila as part of these stations. I don't think they should be cookie cutter buildings that just expand with size.

2. How do you see the new fire stations representing the City of Tukwila or any particular neighborhood/community? How should the design of these buildings be informed by Tukwila's goals for civic identity?

   51 should complement the central business district and master plan
   52 would be Headquarters and stand out as a prominent feature on the city hall campus
   54 should complement the redevelopment of Tukwila International Blvd & Tukwila village
   They all must tie together as a "family" of buildings

   They should be high-quality buildings that people are proud to have in their community. These buildings should help cement goals one and 5 of our strategic plan – *A Community of Inviting Neighborhoods and Vibrant Business Districts* and *A Positive Community Identity and Image*.

   I see the fire stations as being a meeting place and gathering place as well as fitting into a neighborhood culturally and architecturally. The neighborhood should approve of the design.

   I would see that Fire Station 51 would be focused on retail, manufacturing, business, it could be more modern, even possibly industrial in its look, to fit into the surrounding community. If Fire Station 54 stays near the Boulevard, it could reflect the multicultural theme of the surrounding community. If Fire Station 52 stays on Tukwila Hill, then it could reflect more the historical view of the City, where the City was founded and as a reminder of where the City came from. These three themes, Business, New Multicultural, and Old Town, is a good reflection of some of the ideas that come up in Tukwila's civic identity.

3. Should the new stations relate visually to any existing public buildings within Tukwila? How, if at all, should they relate to Fire Station 53, which is not being replaced?

   Station 53 is 20+ years old and in need of its own face lift. The current 53 does not represent the Allentown community.

   Neither of these issues are a priority for me.

   I don't think any existing public buildings should be used for visual relation, it's more important for new and fresh context sensitive designs. Station 53 should not be considered as an essential benchmark but perhaps there are elements that are worth replicating.

   I am not as concerned of how these building should relate to current buildings. FS 53 is tucked away and is not known or seen by that many residents. Since we are replacing almost all of our major buildings, this is an opportunity to create a fresh vision for the future of the City that will stand the test of time. The most significant new building is the Tukwila Community Center, and that is seen as an icon, often used on our brochures and website images, often covered in snow. The only other building that will remain is City Hall, which is also planned to be renovated in the future.

4. There are many mentions that high-quality materials and design are important for setting the tone for future development in Tukwila – do you think those statements apply to these new stations? If so, what does high-quality mean you?

   Yes, all materials must last the life of the building. Low maintenance exteriors are a must.

   Something that the residents and broader community can be proud of.

   High quality can mean low maintenance (i.e. concrete versus asphalt aprons will last five times as long, but cost twice as much. As such we need to balance high quality elements for essential uses and lower quality (less than high quality – not low quality) for non-essential items.

   High quality means that it will maintain its relevance over time, that it will not look "old" after 10 or 20 years. This should also mean that the building is cost-effective to maintain over the life of the building.

5. Do you foresee opportunities for incorporating public art into the new fire stations?

   Yes, Fire Service related art would be fantastic. We have some history with Fire District 1 – Duwamish and old Tukwila. A museum highlighting our history could foster a sense of pride in our department and our community.

   Yes. We have a burgeoning 1% for art program. I'd like to see us be creative about how we Incorporate the art. Windows and staircases can be art.

   Yes, the City has a relatively new 1% for Arts program and we'll need to meet with the Arts Commission at some point.

   YES, this is a great opportunity to bring art into our public spaces. We are creating a 1% for art program, that these buildings are part of and need to show how we spent it. We are creating a new Art program for the City. A recent branding study talked about the lack of public art as a negative for the community.

Art should be an integral part of the building and not an add on afterward. It should be art that is available for the public to see and interact.

6. What is the expected lifespan of these buildings - 50, 75, 100 years? What is your vision for accommodating the expected lifespan and change over the life of the facility?

   At least 50 yrs. Low Maintenance, High Function, Future Growth.

   Particularly with station 51, but with all of the stations, I'd like us to look at approaching these stations with expansion capability in the out years. We know this community is going to continue to grow. If we can be thoughtful about construction now, we can make an impact on policy makers decades from now. We should also consider how the industry may change over time. Maybe a tough ask, but I don't want us to build simply for the now.

   I believe the facilities study targeted 50 year lifespan

   I think these buildings need to be built to last 50 to 75 years. Our current building are all around 50 years and they all look worn and tired. I would like to see ideas for adding spaces (bays and living quarters) as possible growth occurs. It would also be good to know how would could refresh these buildings over time, so that they stay in good condition.

7. Who currently maintains the fire station facilities? What types of tasks will they expect to perform on a regular basis at these stations and where is maintenance equipment stored?

   The city shops maintain our facilities. However, the current stations have had "deferred" maintenance for years. The new fire stations must be built from materials that last.

   Q for Fire.

   Public Works provides building maintenance while fire staff provides

   The City Public Works department does all major maintenance on these buildings. Firefighters, I believe, do the daily cleaning and general landscape maintenance. Parks and Recreation may do more major outside maintenance. Cleaning supplies are kept on site, other major equipment is brought from Public Works or Parks and Recreation.

8. Should the site design and landscaping of these stations reflect an image of Tukwila, and if so, what should that image be?

   Trees, maybe hazelnut (Tukwila is land of the hazelnuts).

   Yes. Environmentally friendly – i.e. drought tolerant, etc. Welcoming to visitors, both the landscaping and entry ways. The buildings and grounds should reflect the fact that they are the public's buildings.

   Yes – need to fit in neighborhoods

   Yes, these buildings are a great opportunity to reflect the image of Tukwila, both in the building and the landscape. Also, they should be welcome, inviting spaces that the neighborhoods feel that they can visit and be part of. The image of Tukwila is an issue that will take more time to determine

9. Who maintains the landscaping at the stations? Do the firefighters maintain the outdoor vegetation, or are there City grounds crews?

   The City crews, not the fire department

   Q for Fire.

   Parks maintains city facility landscaped

   I believe Parks and Recreation do major landscaping, with the crews doing more limited maintenance.

10. The *Comprehensive Plan* encourages the use of low-maintenance, drought-tolerant, native species and alternatives to grass lawns – are these also the goals for the fire station sites?

    Yes

    Yes.

    We should try

    Yes.

11. Should there be usable outdoor spaces for the on-duty firefighters, such as patios, BBQs, basketball hoops, meditation garden, or planting areas for a kitchen herb garden? If so, should any of these areas be covered, visible or screened from the public view? If possible, please provide estimated numbers of participants and estimated frequency of use that relate to each activity or space.

    A patio with a BBQ and picnic area is a must – separate from the public space.
    Possibly a pickle ball court, Basketball has been banned in our department.
    Plan for future growth, 12 FFs - BBQ would get used most sunny days.

    Join outdoor covered patio area with the gym area via a large door or rollup door, this will expand the work out area for the crews.

    Yes.

    Yes

    At a minimum, there should be some outdoor space for the people who work in the building. I would think it would be best to have this be away from public view for their own privacy. I would think it would be good to have someplace that the public could be invited to on certain occasions.

12. At Fire Station 51, should there be usable outdoor space specifically for the administrative staff (separated from the crew), such as an outdoor lunch area? If possible, please provide estimated numbers of staff that might use these spaces.

    Yes, possibly 10 – 15 admin staff.

    No.

    yes

    I don't think there should be separate places from the crews and any administrative staff. Station 51 will most likely NOT be where the Administrative staff or headquarters will be housed, it will more likely be at Station 52 in a larger station.

13. Although the city has no official sustainability goals for its public facilities, many strategies that promote long-term resiliency in a building can also double as low-energy, low-operational-cost systems – for example, daylighting, durable materials and natural ventilation. Would Tukwila be interested in exploring those types of approaches to sustainable design? If the budget could accommodate them, would the City be interested in features providing public education about sustainability, such as prominent systems like photo-voltaic panels or solar hot-water, or interpretive signage about systems hidden within the building?

    Yes, it's a great idea. However, it needs to have common sense. Eastside Station 78 has geothermal heating – it's given them a lot of problems and continuing cost.
    We need to set the example for the community – especially in the fire protection systems.

    I would expect we will have direction from the Council to incorporate sustainability goals in the overall Public Safety Plan and would bet we'll be asked to achieve LEED Silver at a minimum. I think the level of public education/signage would be highly dependent on the level that such systems are incorporated into the final project.

    Goals will be discussed at an upcoming Public Safety Committee; Yes; Yes.

    Yes, the city should push for high sustainability goals. It should be a place for the community to see what can be done for sustainability and educate people about the city's sustainability goals. It should be a visionary building for the community.

14. How should the public be able to interact with these buildings? Given the generous site area of Station 51, for instance, could the site accommodate some public outdoor gathering space that would not hinder the daily operations of the station? If the new sites for Stations 52 and 54 are large enough, could they act as neighborhood gathering spots?

    - Public meeting space needs to be at 2 stations. We've identified station 51 for the south end and possibly 54 for the second one.
    - Outdoor community space must be separate from outdoor FF space and attached to the community room.
    - Community space should accommodate 50 people, have its own restroom, storage, kitchenette and audio/ visual capabilities.
    - Community space could double as a large training room.
    - Maybe a FF museum or memorial at the entry could lead into the community space – all separate from Fire Station.

I do believe the public should be invited to use the space, both outside and a space – such as a community room separate from the crew area – inside. I'd like to see mini parklets, a "little free library" or other amenities at the stations to encourage people to use the buildings/grounds.

Yes, yes

I think they should all be accessible to the public and provide opportunities for the public to interact with the buildings.
I like the idea of outdoor gathering places.

15. Does Tukwila have any particular policies regarding the implementation of ADA standards in public buildings and specifically fire stations?

    ADA is required in all buildings and enforced by the Dept. of Justice (Seattle Fire going thru ADA problems now). With that in mind, maybe the ADA sink could double as a coffee bar, etc.

    Bob will answer this but I think entrance, community room and public facing bathrooms should all be ADA compliant.

    Building Code first, and budget 2nd.

    Yes, the normal ADA standards. Nothing specific for fire stations.

16. What are the standards / needs / desires for the quality and durability of the interior materials at the stations? Is carpeting desirable, or should all surfaces be able to be easily disinfected? Should the materials in the living areas prioritize durability over livability and comfort, or be more residential in character?

    Decontamination is a priority. Materials that are easy to clean and disinfect. NO carpet. We would prioritize durability however, livability and comfort are also desirable.

    Q for Fire.

    Easily cleaned and maintained and long lifespan. Balance durability and livability

    Durability should be a key goal of the stations. Carpets are not a good idea in stations. They should all be easily maintained surfaces. I think you can make a station durable and also livable and comfortable. Maybe within some of the areas that are for relaxing, such as the TV room, if the firefighters feel that will make it more livable.

17. How much of the interior furnishings should be freestanding versus built-in? Will the City want the Architect to assist in the selection of furnishings, or does Tukwila have a facilities group that performs that function?

    Built in cabinets and counters in restrooms, dorms, kitchens, and work spaces. Lots of counter and bench space restrooms for shift changes.

    There should be a discussion about existing furnishings and whether some of them can move over. I'd hate for us to just start from a place of needing new stuff. Someone outside of Fire should do an evaluation – perhaps PW staff. Then I think it makes sense to have more of a conversation about furnishings. Regardless, we'd want Public Works to be heavily involved.

    Don't know. City facilities maintenance are not staffed for setting furnishing standards, it has been case by case. Need to balance cost with functionality and maintenance needs.

    I am not sure. Freestanding would seem to allow for more flexibility in the future.
    I don't believe Tukwila has a group specific to the furnishings and will rely on the architect to perform this function.

SECTION C: GENERAL OPERATIONAL QUESTIONS *If you need more space for your answers, please feel free to type responses in a separate document, referencing the section letter and question numbers*

1. Is a Fire Department Organizational Chart available, which includes current staffing, future anticipated staffing, and/or unfunded requests?

   Yes, delivered to WAU on 4/20. Future staffing needs TBD.

   Not exactly sure what you mean by [unfunded requests]. I would assume you will hear about the need for more staffing from firefighters. Please be advised that the City has funded five new pipeline positions at the department over the past three years, so they have been given additional staffing resources recently.

   See fire department response.
   Current staffing is around 65 staff. There should be space for possible additional growth as mainly Southcenter area grows.

2. What type and size of meetings/conferences/classroom training requirements need to be accommodated in each facility, and how frequently do those gatherings occur? Can they be accommodated elsewhere in the City?

   See Section B number 14.
   Currently, there are numerous groups meeting at station 51 on a very regular basis.
   Conference room required 100SF at a min.
   Training room can double as public meeting space, occupant load of 50. 1700SF

   Q for Fire. I do think that a community room could also be used as a training room/computer room, etc. and would look for dual use opportunities. Also, keep in mind that the Justice Center will have 6,000 square feet for the EOC, which could be used for Fire needs. Finally, the HQ station will need to have some sort of backup EOC functionality in the event that the Justice Center becomes inaccessible at some point in an emergency.

   See fire response. I would think some general training areas would be helpful at all stations to allow more flexibility. There should be an area that allows all of the department to meet together if necessary. There should be technology in all buildings that allow all of the stations to meet together from each of their stations as well.

3. Will any community room be incorporated into any of the stations?

   See above and section B, 14.

   See above regarding dual use – yes.

   I would like to have a community room in each station, but there is a concern that these may not be used.

4. Will Station 51 be used as a back-up EOC or Resource Center for the Fire Department/City, which may dictate additional needs?

   Station 52 possible back-up EOC, etc.

   The HQ station will be a backup EOC, so yes, there will be additional needs. However, I don't think 51 will be the HQ station in the end.

   The main EOC will be at the Justice Center. If there is space, a fire station could be a backup EOC, this would be at headquarters which would most likely be station 52. If there is additional training space created, this could also be used a backup EOC

5. Are there currently standard products / systems currently in use by the TFD that should be incorporated into the new buildings, or is the Department pursuing the opportunity to develop new standards at this time?
   a. Source capture exhaust systems
   b. Dilution/air scrubbing systems
   c. Alerting systems
   d. Apparatus exiting protocols
   e. Preferred apparatus bay door configurations
   f. Drive-through apparatus bays
   g. Security systems
   h. Access controls
   i. Etc.

   We need to review all our current standards and develop new ones.

   Q for Fire.

   See Fire department staff responses.

6. Standards for clearances, drive aisles, turning radii, etc., for existing AND future fleet: What apparatus will need to be accommodated at each station, near and long term? Should all vehicles fit in all bays?

   All stations must be WAC 296-305 compliant – at least 3 feet min. around all equipment.

   Must be NFPA 1500 compliant

   Bay large enough for a Tiller truck (future expansion).

   Min. 3 bays, plan for future expansion of a 4th bay.

   Drive through bays

   Wall space for Map areas

   Decon transition zones

   Plenty of room between apparatus to eliminate slow response. I.e. when L54 and A54 are responding together, everyone bumping into each other.

   All apparatus should fit in the station or under cover. Station 51 has many trailers and secondary apparatus stored outside in the weather. Consideration for those trailers is a must. Maybe a covered shed attached to a training tower.

   Q for Fire but I would say yes to [should all vehicles fit in all bays] to stay flexible and responsive to unforeseen growth patterns.

See Fire department staff responses.

7. Strategies for reducing firefighter exposure to environmental toxins:
    a. What is your protocol for firefighter decontamination and cleaning at the scene and in the station?
    b. How can contaminates be further reduced within the station?

Need to develop compressive plan and protocols. Hot, Warm, & Cold zones. Decon rooms in a transition area. Sinks & boot wash at each door leading into transition.

Q for Fire.

See Fire department staff responses.

8. Strategies for promoting firefighter physical and mental well-being:
    a. What is the desired alerting strategy? (Alarms, annunciators, lights, silencers, reader boards, countdown clocks, etc.)
    b. Should the buildings be designed to assist the firefighters with regulating their circadian rhythms? (Control of daylight, temperature, etc.)
    c. What types of things do the Tukwila crews do to rehab and decompress when they return from an intense call?
    d.

Physical and mental health are a priority. A large fitness center is desired.

    a. Alerting that are separate for each apparatus. A gradual ascending light and tone for the alarm. No sudden shock.
    b. Yes
    c. Needs review, can look at zone 3 recommendations.

Q for Fire.

9. Turnout gear storage practices:
    a. How do you typically inspect and dry turnout gear?
    b. What mechanical / UV protection / etc. requirements will there be for this room or area?
    c. Will there be an extractor in the same area?
    d. How many sets of gear are there per assigned staff? Will extra gear need to be stored elsewhere in the station?
    e. What specialty gear should be considered by station? For example: technical rescue, hazmat, etc.
    f. How might new PPE technologies drive additional requirements for storage, power, data?

Need a separate room for bunker gear with wire lockers for air flow. Separate exhaust and UV protection for this room.

Extractor would be a better fit in a separate decon room.

2 sets of gear for each member – along with a lot of extra stuff (i.e. water gear, rescue gear, etc.)

Q for Fire.

10. Hose towers vs. hose dryers vs. neither:

    Note: Hose towers, while no longer critical for hose drying, can also serve other, parallel functions, such as locations for tarp hanging, cleaning tool storage, ladder training targets, or hose evolutions, in addition to serving as visual beacons in the community, marking the location of the fire station from a distance.

    a. Which hose drying method is desired?
    b. Will all three stations employ the same drying strategy?

    Drying hose is not necessary. Same hose all stations. Maybe hose tower can be incorporated into a training tower.

    Q for Fire.

11. Sleeping room arrangements: dorm style or individual? What should be provided for each firefighter on duty? Should extra space be provided for visiting firefighters, medical students, floating aid car crews, etc.? Do officers have independent sleeping room needs?

    Most FFs in favor of individual dorms. Individual restrooms like station 46 would be a bonus. Must add extra dorm space for future growth. Now 3 personal on an engine. However, one or two additional apparatus could run out of station 51 as the CBD grows. An additional FF on each rig also could be added for 2 in / 2 out policies. This would require at least 12 dorms.

    A desk should be added in each dorm.

    Locker space outside dorm for transitioning crews

    Q for Fire.

    There should be individual sleeping quarters that also allow for community teambuilding.

12. Kitchen / Dining / Dayroom standards:
    a. Should the kitchens and dayrooms be connected?
    b. Does the dayroom need to have complete daylight control?
    c. Should the kitchens have high-quality residential or commercial appliances?
    d. What are the standards for individual food lockers, shift pantries, communal pantry?

    Day room and kitchen must be connected as a great room – to keep comradery like station 54. Commercial appliances, commercial hood, commercial walk-in fridge/freezer.

    Big food lockers, current ones are small. A shift pantry would be welcomed.

    Q for Fire.

    Yes, they should all be commercial grade appliances.

13. Incorporation of on-site training opportunities:
    a. Do the Tukwila firefighters train anywhere other than at their stations?
    b. How might larger training consortium activities impact training needs at Station 51?
    c. What types of training activities will be performed on site, by facility, and what necessary space, equipment and props will be used? Will this activity generate noise?
        i. Hose drills
        ii. Ladder drills
        iii. Ventilation props
        iv. Other: specify

Yes, companies are going all over the zone to accommodate JATC. If we had our own training tower, we could stay in service and stay in our response zones.

Training facility with vent prop, etc. in one of the more central located stations. Training opportunities in the bay similar to Burien 28 & 29 or points around the station.

Incorporate the hill side at station 51 with a platform – rope drills, etc.

Q for Fire but I liked the indoor training components incorporated into the Burien stations and think it should be considered for all of ours.

This is an interesting area that should be explored. All stations should allow for some training on site to reduce having to leave the building and being out of the service area.

Station 51 has the possibility of having space for regional training and other uses. This could be built in over time if not enough funding is available up front. There could be space for future uses.

14. Aside from a dedicated physical training room, what types of physical training opportunities might be incorporated into the building or site? Basketball hoops, pull-up bars, ropes or rings, tall walls for medicine ball throws…? Who supplies equipment for these activities?

See fitness center hand out. We will also further develop needs from a sub-committee.

Fitness committee purchases equipment.

Q for Fire.

15. Are there specialty programs, public or departmental, that are housed in each station, (i.e. the Explorer Program, Ham Radio groups)?

Yes, we will need storage for EM, Pub Ed, FMO, Explorers, Ham, disaster relief, etc.

Q for Fire.

There is a fire explorer program, there is also a very active Ham Radio group. There could also be space for other needs such as SCBA's and other needs of the department. There are space needs for logistics as well.

16. Aside from housing different apparatus, will some stations perform functions the others do not, such as oxygen tank filling, haz. mat. response, etc?

    Each station should have a cascade fill station. Headquarters could house a lot of the specialty functions. See station 51 programming sheet delivered to WAU on 4/20.

    Q for Fire.

    See fire department needs

17. Does the Department provide courtesy blood pressure checks? How might aid needs change in the future? Should aid rooms be provided in any of the stations?

    Add room currently at 52 and will remain at that station. However, each station must have a BP station – in public space, separate from fire station.

    Q for Fire.

    Not sure

18. Do the stations need to accommodate any CERT needs, or emergency/disaster supply storage needs for the community and/or staff?

    Yes, CERT storage is required

    Q for Fire. CERT is currently run out of Emergency Management, which would be in the justice center. Just want to make sure everyone remembers this.

    Yes, the department has emergency trailers, specialized trailers and other needs.

19. How are station inventories and delivery needs accommodated and stored? Does the City have a Central Stores/Commissary? How might this change in the future?

    Union store is at station 54 in an old locker. It would be nice to have a designated place for the store. Currently, no plans to change the store.

    Q for Fire.

    See Fire Department staff.

20. What kind of expansion potential will these stations need to accommodate? Will the City be acquiring additional equipment or adding more crews in the coming years as Tukwila grows? Will these three stations need to accommodate that growth, or might a fifth Tukwila station be added?

    See question 11. We must plan for future growth in our station design.

    See answer early on. I think we should design these with expansion capabilities in mind.

    Most likely there will be additional commercial growth in the Southcenter area and possibly another aid car or engine. There may need to for an additional bay in the future if necessary.

21. How often is the public allowed into the operational and residential areas of the station? What security needs to exist between the public lobby and the rest of the building? How much of the daily station activity should be visible to the public?

    Completely separate public space. No access to Fire Station without keycard. Keycard access from public lobby to rest of building. Min. daily activity in public view. Secured fencing is a must.

    Yes to the security between lobby and rest of building. I was impressed with Burien's design that allowed passcode entrance to the lobby area, community room and public restrooms, but had the rest of the building secure. This way community groups could use the meeting area and restrooms without disturbing the on-duty crews.

    I would like the public access to these buildings.

22. Are there specific public events that are hosted by or related to the fire stations? If so, what are the activities, frequencies and general number of participants? Are there types of possible/desired public events that the existing fire stations cannot accommodate that perhaps the new fire stations could accommodate?

    If we had a large public space with its own amenities, more public events could be held. Food / parties in the bay is a bad idea.

    I'd love to see the stations be able to have pancake breakfast type of events on a regular basis that include kids activities, etc.

    I think there should be space for public events. I would like to see what possibilities are available for these buildings to invite the public.

23. Does the Fire Department provide BLS, ALS and Transport?

    Not usually, we will transport city employees and others under special circumstances.

    Q for Fire but we don't transport.

    The fire department currently only provides BLS. ALS is provided by Medic One and it is not currently at Tukwila Fire Stations. It could be in the future and these buildings should allow for that possibility. This would be a different crew with their own needs. Transport is not currently provided.

24. Is Tukwila proposing to share any of the resources related to these building with other City departments, such as PD, or neighboring fire departments?

    Police workstation is needed at each station.

    No. Particularly in terms of the expansion capabilities, I think we should be thinking about PD and their ultimate need for precinct offices beyond the Justice Center. I could see this being particularly relevant at the 51 site and potentially relevant at 52, depending on the ultimate site.

    Station 51 could be built with space for PD satellite for their future use and growth. There could be welcoming space in each station for police to visit.

25. What is the Fire Department's policy for fueling?

    Must maintain all apparatus with ¾ full of fuel. Refueling happens at least once during a 2 day cycle.

    Q for Fire.

    There should be fueling on site for each station, most likely above ground

26. Does the Fire Department have a policy for emergency generator run time such as 48 or 72 hours? Should this be consistent at each station?

    Generator runs once a week on Saturdays. Need a fuel pump for the apparatus at each generator. 450 gallon tank, min.

    Q for Fire.

    Yes, there should be a generator and there should be enough fuel for 72 hours. Yes, it should be consistent for all stations.

STRUCTURAL CRITERIA

1. ALL MATERIALS, WORKMANSHIP, DESIGN, AND CONSTRUCTION SHALL CONFORM TO THE DRAWINGS, SPECIFICATIONS, AND THE INTERNATIONAL BUILDING CODE (2015 EDITION) WITH CITY OF TUKWILA AMENDMENTS.

2. DESIGN LOADING CRITERIA:

ASSEMBLY AREAS

FLOOR LIVE LOAD (FIXED SEATS) . . . . . 60 PSF

FLOOR LIVE LOAD (MOVABLE SEATS, PLATFORMS, LOBBIES, & OTHER) .100 PSF

HANDRAILS AND GUARDS

GUARDRAILS/BALCONY RAILS . . . . . 50 PLF

GUARDRAILS/BALCONY RAILS CONCENTRATED LOAD . . . . . 200 LBS

OFFICES

FLOOR LIVE LOAD . . . . . 50 PSF

FLOOR LIVE LOAD (CORRIDORS ABOVE FIRST FLOOR) . . . . . 80 PSF

FLOOR LIVE LOAD (LOBBIES AND FIRST-FLOOR CORRIDORS) . . . . 100 PSF

FLOOR CONCENTRATED LOAD . . . . . 2000 LBS

ROOF

ROOF LIVE LOAD . . . . . 25 PSF

ROOF LIVE LOAD (TENANT ACCESSIBLE) . . . . . 60 PSF

ROOF LIVE LOAD (PUBLIC ACCESSIBLE) . . . . . .100 PSF

ROOF LIVE LOAD (ACCESSIBLE AREAS LESS THAN 750 SQUARE FEET). 60 PSF

MISCELLANEOUS LOADS

STAIR AND CORRIDOR LIVE LOAD (UNLESS OTHERWISE INDICATED) .100 PSF

DECKS . . . . . 1.5 x AREA SERVED

PARTITION LOADING . . . . . 15 PSF

MECHANICAL UNITS . . . . . WEIGHTS FURNISHED BY MANUFACTURER

DEFLECTION CRITERIA

LIVE LOAD DEFLECTION L/360

TOTAL LOAD DEFLECTION L/240

ENVIRONMENTAL LOADS

SNOW . . . . . Ce=1.0, Is=1.0, Ct=1.1, Pg=25 PSF, Pf=20 PSF

WIND . . . . . GCpi=0.18, 115 MPH, RISK CATEGORY IV, EXPOSURE "B"

EARTHQUAKE . ANALYSIS PROCEDURE: EQUIVALENT LATERAL FORCE PROCEDURE
LATERAL SYSTEM: VARIES, Vs = KIPS
SITE CLASS= , Ss= , Sds= , S1= , SD1= , Cs=
SDC D, Ie=1.5, R=

SEE PLANS FOR ADDITIONAL LOADING CRITERIA

3. STRUCTURAL DRAWINGS SHALL BE USED IN CONJUNCTION WITH ARCHITECTURAL DRAWINGS FOR BIDDING AND CONSTRUCTION. ARCHITECTURAL DRAWINGS ARE THE PRIME CONTRACT DRAWINGS. ANY DISCREPANCIES FOUND AMONG THE DRAWINGS, THE SPECIFICATION, THESE GENERAL NOTES AND THE SITE CONDITIONS SHALL BE REPORTED TO THE ARCHITECT, WHO SHALL CORRECT SUCH DISCREPANCY IN WRITING. ANY WORK DONE BY THE GENERAL CONTRACTOR AFTER DISCOVERY OF SUCH DISCREPANCY SHALL BE DONE AT THE GENERAL CONTRACTOR'S RISK.

4. PRIMARY STRUCTURAL ELEMENTS NOT DIMENSIONED ON THE STRUCTURAL PLANS AND DETAILS SHALL BE LOCATED BY THE ARCHITECTURAL PLANS AND DETAILS. VERTICAL DIMENSION CONTROL IS DEFINED BY THE ARCHITECTURAL WALL SECTIONS, BUILDING SECTION, AND PLANS. DETAILING AND SHOP DRAWING PRODUCTION FOR STRUCTURAL ELEMENTS WILL REQUIRE DIMENSIONAL INFORMATION CONTAINED IN BOTH ARCHITECTURAL AND STRUCTURAL DRAWINGS.

5. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL SAFETY PRECAUTIONS AND THE METHODS, TECHNIQUES, SEQUENCES OR PROCEDURES REQUIRED TO PERFORM THE CONTRACTORS WORK. THE STRUCTURAL ENGINEER HAS NO OVERALL SUPERVISORY AUTHORITY OR ACTUAL AND/OR DIRECT RESPONSIBILITY FOR THE SPECIFIC WORKING CONDITIONS AT THE SITE AND/OR FOR ANY HAZARDS RESULTING FROM THE ACTIONS OF ANY TRADE CONTRACTOR. THE STRUCTURAL ENGINEER HAS NO DUTY TO INSPECT, SUPERVISE, NOTE, CORRECT, OR REPORT ANY HEALTH OR SAFETY DEFICIENCIES TO THE OWNER, CONTRACTORS, OR OTHER ENTITIES OR PERSONS AT THE PROJECT SITE.

6. CONTRACTOR SHALL PROVIDE TEMPORARY BRACING FOR THE STRUCTURE AND STRUCTURAL COMPONENTS UNTIL ALL FINAL CONNECTIONS HAVE BEEN COMPLETED IN ACCORDANCE WITH THE PLANS. CONFORM TO ASCE 37-14 "DESIGN LOADS ON STRUCTURES DURING CONSTRUCTION".

7. CONTRACTOR-INITIATED CHANGES SHALL BE SUBMITTED IN WRITING TO THE ARCHITECT AND STRUCTURAL ENGINEER FOR APPROVAL PRIOR TO FABRICATION OR CONSTRUCTION. CHANGES SHOWN ON SHOP DRAWINGS ONLY WILL NOT SATISFY THIS REQUIREMENT.

8. DRAWINGS INDICATE GENERAL AND TYPICAL DETAILS OF CONSTRUCTION. WHERE CONDITIONS ARE NOT SPECIFICALLY INDICATED BUT ARE OF SIMILAR CHARACTER TO DETAILS SHOWN, SIMILAR DETAILS OF CONSTRUCTION SHALL BE USED, SUBJECT TO REVIEW AND APPROVAL BY THE ARCHITECT AND THE STRUCTURAL ENGINEER. ALL TYPICAL NOTES AND DETAILS SHOWN ON DRAWINGS SHALL APPLY, UNLESS NOTED OTHERWISE. TYPICAL DETAILS MAY NOT NECESSARILY BE INDICATED ON THE PLANS BUT SHALL STILL APPLY AS SHOWN OR DESCRIBED IN THE DETAILS. WHERE TYPICAL DETAILS ARE NOTED ON THE PLANS, THE SPECIFIED TYPICAL DETAIL SHALL BE USED. WHERE NO TYPICAL DETAIL IS NOTED, IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO CHOOSE THE APPROPRIATE TYPICAL DETAIL FROM THOSE PROVIDED OR REQUEST ADDITIONAL INFORMATION. THE CONTRACTOR SHALL SUBMIT ALL PROPOSED ALTERNATE TYPICAL DETAILS TO THOSE PROVIDED WITH RELATED CALCULATIONS TO THE ENGINEER FOR APPROVAL PRIOR TO SHOP DRAWING PRODUCTION AND FIELD USE.

9. ALL STRUCTURAL SYSTEMS, WHICH ARE TO BE COMPOSED OF COMPONENTS TO BE FIELD ERECTED, SHALL BE SUPERVISED BY THE SUPPLIER DURING MANUFACTURING, DELIVERY, HANDLING, STORAGE AND ERECTION IN ACCORDANCE WITH INSTRUCTIONS PREPARED BY THE SUPPLIER.

10. SHOP DRAWINGS FOR THE FOLLOWING ITEMS SHALL BE SUBMITTED TO THE ARCHITECT AND STRUCTURAL ENGINEER FOR REVIEW PRIOR TO FABRICATION OF THESE ITEMS.

    GLUED LAMINATED MEMBERS
    METAL DECKING
    LIGHT GAUGE STRUCTURAL FRAMING
    OPEN WEB STEEL JOISTS AND JOIST GIRDERS
    PRECAST CONCRETE MEMBERS
    REINFORCING STEEL (FOR BOTH CONCRETE AND MASONRY CONSTRUCTION)
    STRUCTURAL STEEL
    PRE-FABRICATED ASSEMBLIES (INCLUDING PANELIZED SYSTEMS)
    DESIGN BUILD ELEMENTS

CONTRACTOR SHALL SUBMIT WALL ELEVATION DRAWINGS OF AT LEAST 1/8" = 1'-0" SCALE INDICATING LOCATIONS OF CONNECTION EMBEDMENTS AND WALL OPENINGS FOR REVIEW PRIOR TO CONSTRUCTION. CONTRACTOR SHALL COORDINATE WALL ELEVATION DRAWINGS WITH REINFORCEMENT SHOP DRAWINGS.

APPROVED SETS OF ALL SHOP DRAWINGS SHALL ALSO BE SUBMITTED TO THE BUILDING DEPARTMENT.

11. SHOP DRAWING REVIEW: DIMENSIONS AND QUANTITIES ARE NOT REVIEWED BY THE ENGINEER OF RECORD, THEREFORE MUST BE VERIFIED BY THE CONTRACTOR. CONTRACTOR SHALL REVIEW AND STAMP DRAWINGS PRIOR TO REVIEW BY ENGINEER OF RECORD. CONTRACTOR SHALL REVIEW DRAWINGS FOR CONFORMANCE WITH THE MEANS, METHODS, TECHNIQUES, SEQUENCES AND OPERATIONS OF CONSTRUCTION, AND ALL SAFETY PRECAUTIONS AND PROGRAMS INCIDENTAL THERETO. SUBMITTALS SHALL INCLUDE A REPRODUCIBLE AND ONE COPY; REPRODUCIBLE WILL BE MARKED AND RETURNED WITHIN TWO WEEKS OF RECEIPT WITH A NOTATION INDICATING THAT THE SUBMITTAL HAS BEEN FOUND TO BE IN GENERAL CONFORMANCE WITH THE DESIGN OF THE BUILDING. THE SUBMITTED ITEMS SHALL NOT BE INSTALLED UNTIL THEY HAVE BEEN APPROVED BY THE BUILDING OFFICIAL.

    SHOP DRAWING SUBMITTALS PROCESSED BY THE ENGINEER ARE NOT CHANGE ORDERS. THE PURPOSE OF SHOP DRAWING SUBMITTALS BY THE CONTRACTOR IS TO DEMONSTRATE TO THE ENGINEER THAT THE CONTRACTOR UNDERSTANDS THE DESIGN CONCEPT, BY INDICATING WHICH MATERIAL IS INTENDED TO BE FURNISHED AND INSTALLED AND BY DETAILING THE INTENDED FABRICATION AND INSTALLATION METHODS. IF DEVIATIONS, DISCREPANCIES, OR CONFLICTS BETWEEN SHOP DRAWING SUBMITTALS AND THE CONTRACT DOCUMENTS ARE DISCOVERED EITHER PRIOR TO OR AFTER SHOP DRAWING SUBMITTALS ARE PROCESSED BY THE ENGINEER, THE DESIGN DRAWINGS AND SPECIFICATIONS SHALL CONTROL AND SHALL BE FOLLOWED.

12. SHOP DRAWINGS OF DESIGN BUILD COMPONENTS INCLUDING CANOPIES, BALCONIES, COLD FORM STEEL FRAMING, TEMPORARY SHORING, CURTAIN WALL SYSTEMS, SKYLIGHT FRAMES, PREFABRICATED STAIR SYSTEMS, EXTERIOR CLADDING, AND PRE-ENGINEERED SYSTEM SHALL BE STAMPED AND SIGNED BY A STRUCTURAL ENGINEER LICENSED IN THE STATE OF WASHINGTON. SHOP DRAWINGS SHALL BE APPROVED BY THE COMPONENT DESIGNER PRIOR TO REVIEW OF THE ARCHITECT OR ENGINEER OF RECORD FOR GENERAL CONFORMANCE WITH THE DESIGN OF THE BUILDING. THE COMPONENT DESIGNER IS RESPONSIBLE FOR CODE CONFORMANCE AND ALL NECESSARY CONNECTIONS NOT SPECIFICALLY CALLED OUT ON ARCHITECTURAL OR STRUCTURAL DRAWINGS. SHOP DRAWINGS SHALL INDICATE MAGNITUDE AND DIRECTION OF ALL LOADS IMPOSED ON BASIC STRUCTURE. DESIGN CALCULATIONS SHALL BE SUBMITTED WITH THE SHOP DRAWINGS.

13. DEFERRED SUBMITTALS: SHOP DRAWINGS AND CALCULATIONS OF DEFERRED SUBMITTAL COMPONENTS SHALL BE STAMPED AND SIGNED BY A STRUCTURAL ENGINEER LICENSED IN THE STATE OF WASHINGTON AND SHALL BE APPROVED BY THE COMPONENT DESIGNER PRIOR TO REVIEW BY THE ARCHITECT OR ENGINEER OF RECORD FOR GENERAL CONFORMANCE. ALL NECESSARY CONNECTIONS NOT SPECIFICALLY CALLED OUT ON THE ARCHITECTURAL OR STRUCTURAL DRAWINGS SHALL BE INCLUDED. SHOP DRAWINGS SHALL INCLUDE THE MAGNITUDE AND DIRECTION OF ALL LOADS IMPOSED ON THE BASIC STRUCTURE. DESIGN CALCULATIONS SHALL ACCOMPANY ALL DEFERRED SUBMITTALS. THE ARCHITECT OR CONTRACTOR SHALL FORWARD DEFERRED SUBMITTALS TO THE BUILDING OFFICIAL WHERE REQUIRED.

DEFERRED SUBMITTAL BUILDING COMPONENTS FOR THIS PROJECT SHALL INCLUDE:

DESIGN-BUILD ELEMENTS

QUALITY ASSURANCE

14. SPECIAL INSPECTION SHALL BE PROVIDED IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS AND SECTIONS 110 AND 1705 OF THE INTERNATIONAL BUILDING CODE BY A QUALIFIED TESTING AGENCY DESIGNATED BY THE ARCHITECT, AND RETAINED BY THE BUILDING OWNER. THE ARCHITECT, STRUCTURAL ENGINEER, AND BUILDING DEPARTMENT SHALL BE FURNISHED WITH COPIES OF ALL INSPECTION AND TEST RESULTS. SPECIAL INSPECTION OF THE FOLLOWING TYPES OF CONSTRUCTION IS REQUIRED UNLESS NOTED OTHERWISE.

STRUCTURAL STEEL FABRICATION AND ERECTION	PER AISC 360
OPEN-WEB STEEL JOISTS AND JOIST GIRDERS	PER TABLE 1705.2.3
COLD FORMED STEEL DECK CONSTRUCTION	PER ANSI/SDI QA/QC-2011
CONCRETE CONSTRUCTION	PER TABLE 1705.3
MECHANICAL SPLICES IN CONCRETE REINFORCING	CONTINUOUS
PRECAST CONCRETE ERECTION	PER TABLE 1705.3
MASONRY CONSTRUCTION	PER TMS 402-13 TABLE 3.1-3.3
SOIL CONDITIONS, FILL PLACEMENT, AND DENSITY	PER TABLE 1705.6
DRIVEN DEEP FOUNDATION	PER TABLE 1705.7
CAST-IN-PLACE DEEP FOUNDATION	PER TABLE 1705.8
EXPANSION BOLTS AND THREADED EXPANSION INSERTS	PER MANUFACTURER
EPOXY GROUTED INSTALLATIONS	PER MANUFACTURER

PERIODIC INSPECTION: INSPECTION SHALL BE PERFORMED AT INTERVALS NECESSARY TO CONFIRM THAT WORK REQUIRING SPECIAL INSPECTION IS IN COMPLIANCE WITH REQUIREMENTS.
CONTINUOUS INSPECTION: INSPECTOR SHALL BE ONSITE AND OBSERVE THE WORK REQUIRING INSPECTION AT ALL TIMES THAT WORK IS PERFORMED.

15. UNLESS OTHERWISE NOTED, THE FOLLOWING ELEMENTS COMPRISE THE SEISMIC-FORCE-RESISTING SYSTEM AND ARE SUBJECT TO SPECIAL INSPECTION FOR SEISMIC RESISTANCE IN ACCORDANCE WITH SECTION 1705.12 OF THE INTERNATIONAL BUILDING CODE.

    A. STRUCTURAL STEEL MOMENT FRAMES AND BRACED FRAMES REQUIRE CONTINUOUS INSPECTION FOR WELDING PER AISC 341 EXCEPT SINGLE PASS FILLET WELDS NOT EXCEEDING 5/16-INCH.

    B. STRUCTURAL WOOD SHEAR WALL SYSTEMS REQUIRE PERIODIC INSPECTION FOR FIELD GLUEING, NAILING, BOLTING, ANCHORING AND OTHER FASTENING OF COMPONENTS WITHIN THE SEISMIC FORCE, RESISTING SYSTEM INCLUDING SHEAR WALLS, DIAPHRAGMS, DRAG STRUTS, BRACES AND HOLDOWNS.

    C. COLD FORMED STEEL FRAMING REQUIRES PERIODIC INSPECTION OF WELDING, SCREW ATTACHMENT, BOLTING, ANCHORING AND OTHER FASTENING OF COMPONENTS WITHIN THE SEISMIC FORCE RESISTING SYSTEM INCLUDING SHEAR WALLS, DIAPHRAGMS, BRACES AND HOLDOWNS.

GEOTECHNICAL

16. FOUNDATION NOTES: SUBGRADE PREPARATION INCLUDING DRAINAGE, EXCAVATION, COMPACTION, AND FILLING REQUIREMENTS, SHALL CONFORM STRICTLY WITH RECOMMENDATIONS GIVEN IN THE SOILS REPORT OR AS DIRECTED BY THE SOILS ENGINEER. FOOTINGS SHALL BEAR ON SOLID UNDISTURBED EARTH OR COMPACTED STRUCTURAL FILL AT LEAST 18" BELOW LOWEST ADJACENT FINISHED GRADE. FOOTING DEPTHS/ELEVATIONS SHOWN ON PLANS (OR IN DETAILS) ARE MINIMUM AND FOR GUIDANCE ONLY; THE ACTUAL ELEVATIONS OF FOOTINGS MUST BE ESTABLISHED BY THE CONTRACTOR IN THE FIELD WORKING WITH THE TESTING LAB AND SOILS ENGINEER. BACKFILL BEHIND ALL RETAINING WALLS WITH FREE DRAINING GRANULAR FILL AND PROVIDE FOR SUBSURFACE DRAINAGE AS NOTED IN THE SOILS REPORT.

ALLOWABLE SOIL PRESSURE (NATIVE SOILS / STRUCTURAL FILL).. 2500/2000 PSF
LATERAL EARTH PRESSURE (RESTRAINED/UNRESTRAINED). . . . . 55 PCF/35 PCF
ALLOWABLE PASSIVE EARTH PRESSURE (FS OF 1.5 INCLUDED). . . . . 300 PCF
COEFFICIENT OF FRICTION (FS OF 1.5 INCLUDED). 0.3
TRAFFIC SURCHARGE PRESSURE (UNIFORM LOAD) . . . . . 75 PSF
SEISMIC SURCHARGE PRESSURE (UNIFORM LOAD) . . . . . 7H PSF

SOILS REPORT REFERENCE:

CONCRETE

17. CONCRETE SHALL BE MIXED, PROPORTIONED, CONVEYED AND PLACED IN ACCORDANCE WITH ACI 301. STRENGTHS AT 28 DAYS AND MIX CRITERIA SHALL BE AS FOLLOWS:

MEMBER TYPE/CONSTRUCTION	STRENGTH F'C -PSI-	TEST AGE -DAYS-	MAX AGG -INCH-	MAX W/C RATIO	AIR CONT.
SLABS ON GRADE	3000	28	1	.45	5
TOPPING SLABS	3000	28	1	.50	--
FOOTINGS	4000	28	1	.50	--
BASEMENT WALLS	4000	28	1	.50	--
ALL ELEVATED SLABS AND BEAMS	5000	28	3/4	.42	--
COLUMNS AND SHEAR WALLS	5000	28	3/4	.50	--
SLABS ON METAL DECK	4000	28	1	.50	--
STAIR LANDINGS AND TREADS	4000	28	1	.50	--
PRECAST, NON-PRESTRESSED	5000	28	1	.42	--
ALL STRUCTURAL CONCRETE, UNO	3000	28	1	.50	--

MIX DESIGN NOTES:

A. MAXIMUM SHRINKAGE IN ALL 5000 PSI MIXES SHALL BE LIMITED TO .04 PERCENT IN 28 DAYS AS TESTED IN ACCORDANCE WITH ASTM C157 MODIFIED STANDARD TEST METHOD FOR LENGTH CHANGE OF CEMENT MORTAR AND CONCRETE.
B. W/C RATIO: WATER-CEMENTITIOUS MATERIAL RATIOS SHALL BE BASED ON THE TOTAL WEIGHT OF CEMENTITIOUS MATERIALS. RATIOS NOT NOTED IN TABLE ABOVE ARE CONTROLLED BY STRENGTH REQUIREMENTS.

C. CEMENTITIOUS CONTENT: THE USE OF FLY ASH, OTHER POZZOLANS, SILICA FUME, OR SLAG SHALL CONFORM TO ACI 301 SEC 4.2.2.8.B. FOR CONCRETE USED IN ELEVATED FLOORS, PORTLAND CEMENT CONTENT SHALL CONFORM TO ACI 301 SEC 4.2.2.1. ACCEPTANCE OF LOWER CEMENT CONTENT IS CONTINGENT ON PROVIDING SUPPORTING DATA TO THE ENGINEER FOR REVIEW AND ACCEPTANCE.

D. AIR CONTENT SHALL CONFORM TO ACI 301 SEC 4.2.2.4. HORIZONTAL EXTERIOR SURFACES IN CONTACT WITH THE SOIL REQUIRE ENTRAINED AIR. USE "MODERATE EXPOSURE". VERTICAL EXTERIOR SURFACES REQUIRE "MODERATE EXPOSURE". TOLERANCE IS +/- 1.5 PERCENT. AIR CONTENT SHALL BE MEASURED AT POINT OF PLACEMENT.

E. SLUMP SHALL CONFORM TO ACI 301 SEC 4.2.2.2. SLUMP SHALL BE DETERMINED AT THE POINT OF PLACEMENT.

F. CHLORIDE CONTENT SHALL CONFORM TO ACI 301 SEC 4.2.2.6 AND TABLE 4.2.2.6 FOR "OTHER REINFORCED CONCRETE CONSTRUCTION".

18. A CONCRETE PERFORMANCE MIX SHALL BE SUBMITTED TO THE STRUCTURAL ENGINEER AND THE BUILDING DEPARTMENT FOR APPROVAL TWO WEEKS PRIOR TO PLACING ANY CONCRETE. THE PERFORMANCE MIX SHALL INCLUDE THE AMOUNTS OF CEMENT, FINE AND COARSE AGGREGATE, WATER AND ADMIXTURES AS WELL AS THE WATER CEMENT RATIO, SLUMP, CONCRETE YIELD AND SUBSTANTIATING STRENGTH DATA IN ACCORDANCE WITH ACI 318, SECTION 5.3. THE USE OF A PERFORMANCE MIX REQUIRES BATCH PLANT INSPECTION, THE COST OF WHICH SHALL BE PAID BY THE GENERAL CONTRACTOR. REVIEW OF MIX SUBMITTALS BY THE ENGINEER OF RECORD INDICATES ONLY THAT INFORMATION PRESENTED CONFORMS GENERALLY WITH CONTRACT DOCUMENTS. CONTRACTOR OR SUPPLIER MAINTAINS FULL RESPONSIBILITY FOR SPECIFIED PERFORMANCE.

19. ALL CONCRETE WITH SURFACES EXPOSED TO WEATHER OR STANDING WATER SHALL BE AIR-ENTRAINED WITH AN AIR-ENTRAINING AGENT CONFORMING TO ASTM C260, C494, AND C618. TOTAL AIR CONTENT FOR FROST-RESISTANT CONCRETE SHALL BE IN ACCORDANCE WITH ACI 318, TABLE 19.3.2.1 MODERATE EXPOSURE, F1.

20. REINFORCING STEEL SHALL CONFORM TO ASTM A615 (INCLUDING SUPPLEMENT S1), GRADE 60, FY = 60,000 PSI. EXCEPTIONS: ANY BARS SPECIFICALLY SO NOTED ON THE DRAWINGS SHALL BE GRADE 40, FY = 40,000 PSI. WELDED WIRE FABRIC SHALL CONFORM TO ASTM A-185. SPIRAL REINFORCEMENT SHALL BE DEFORMED WIRE CONFORMING TO ASTM A615, GRADE 60, FY = 60,000 PSI.

21. WELDING OF GRADE 60 REINFORCING BARS INDICATED ON DRAWINGS SHALL CONFORM TO ASTM A706. REINFORCING COMPLYING WITH ASTM A615 (S1) MAY BE WELDED ONLY IF MATERIAL PROPERTY REPORTS INDICATING CONFORMANCE WITH WELDING PROCEDURES SPECIFIED IN AWS D1.4 ARE SUBMITTED. WELDING OF GRADE 60 REINFORCING BARS SHALL BE PERFORMED USING LOW HYDROGEN ELECTRODES. WELDING OF GRADE 40 REINFORCING BARS SHALL BE PERFORMED USING E70XX ELECTRODES. WELDING WITHIN 4" OF COLD BENDS IN REINFORCING STEEL IS NOT PERMITTED.

22. DETAILING OF REINFORCING STEEL (INCLUDING HOOKS AND BENDS) SHALL BE IN ACCORDANCE WITH ACI 315-99 AND 318-14. LAP ALL REINFORCEMENTS IN ACCORDANCE WITH "THE REINFORCING SPLICE AND DEVELOPMENT LENGTH SCHEDULE." PROVIDE CORNER BARS AT ALL WALL AND FOOTING INTERSECTIONS. LAP ADJACENT MATS OF WELDED WIRE FABRIC A MINIMUM OF 8" AT SIDES AND ENDS.

NO BARS PARTIALLY EMBEDDED IN HARDENED CONCRETE SHALL BE FIELD BENT UNLESS SPECIFICALLY SO DETAILED OR APPROVED BY THE STRUCTURAL ENGINEER.

23. CONCRETE PROTECTION (COVER) FOR REINFORCING STEEL SHALL BE AS FOLLOWS:

    FOOTINGS AND OTHER UNFORMED SURFACES CAST AGAINST AND PERMANENTLY EXPOSED
    TO EARTH . . . . . 3"
    FORMED SURFACES EXPOSED TO EARTH OR WEATHER (#6 BARS OR LARGER). . . 2"
    FORMED SURFACES EXPOSED TO EARTH OR WEATHER (#5 BARS OR SMALLER) 1-1/2"
    COLUMN TIES OR SPIRALS AND BEAM STIRRUPS . . . . . 1-1/2"
    SLABS AND WALLS (INT. FACE). .GREATER OF BAR DIAMETER PLUS 1/8" OR 3/4"

24. CONCRETE WALL REINFORCING--PROVIDE THE FOLLOWING UNLESS DETAILED OTHERWISE:

6" WALLS	#4 @ 16 HORIZ.	#4 @ 18 VERTICAL	1 CURTAIN
8" WALLS	#4 @ 12 HORIZ.	#4 @ 18 VERTICAL	1 CURTAIN
10" WALLS	#4 @ 18 HORIZ.	#4 @ 18 VERTICAL	2 CURTAINS
12" WALLS	#4 @ 16 HORIZ.	#4 @ 18 VERTICAL	2 CURTAINS

25. CAST-IN-PLACE CONCRETE: SEE ARCHITECTURAL DRAWINGS FOR EXACT LOCATIONS AND DIMENSIONS OF DOOR AND WINDOW OPENINGS IN ALL CONCRETE WALLS. SEE MECHANICAL DRAWINGS FOR SIZE AND LOCATION OF MISCELLANEOUS MECHANICAL OPENINGS THROUGH CONCRETE WALLS. SEE ARCHITECTURAL DRAWINGS FOR ALL GROOVES, NOTCHES, CHAMFERS, FEATURE STRIPS, COLOR, TEXTURE, AND OTHER FINISH DETAILS AT ALL EXPOSED CONCRETE SURFACES, BOTH CAST-IN-PLACE AND PRECAST.

26. PRECAST PRESTRESSED CONCRETE UNITS SHALL BE DESIGNED BY THE MANUFACTURER FOR THE LOADS AND SPANS SHOWN ON THE PLANS. MANUFACTURER SHALL DESIGN FOR SPECIAL CONDITIONS AT OPENINGS AND BLOCK-OUTS SHOWN ON STRUCTURAL, ARCHITECTURAL AND MECHANICAL DRAWINGS. DESIGN AND FABRICATION SHALL BE IN ACCORDANCE WITH THE MANUFACTURER'S PUBLISHED SPECIFICATIONS FOR THE UNIT FURNISHED AND ACI STANDARD 318-11. SUBMIT COMPLETE DESIGN CALCULATIONS AND SHOP DRAWINGS FOR REVIEW PRIOR TO FABRICATION. ALL SUBMITTALS SHALL BEAR THE STAMP AND SIGNATURE OF A REGISTERED PROFESSIONAL ENGINEER, STATE OF WASHINGTON.

    PRECAST CONCRETE MEMBERS SHALL BE ADEQUATELY BRACED UNTIL ALL FINAL CONNECTIONS HAVE BEEN COMPLETED IN ACCORDANCE WITH THE PLANS. CONTRACTOR SHALL PROVIDE ANY EXTRA REINFORCEMENT, INSERTS, LIFTING DEVICES, PRESTRESSING, ETC., REQUIRED FOR HANDLING AND ERECTION.

27. NON-SHRINK GROUT SHALL BE FURNISHED BY AN APPROVED MANUFACTURER AND SHALL BE MIXED AND PLACED IN STRICT ACCORDANCE WITH THE MANUFACTURER'S PUBLISHED RECOMMENDATIONS. GROUT STRENGTH SHALL BE AT LEAST EQUAL TO THE MATERIAL ON WHICH IT IS PLACED (3000 PSI MINIMUM).

28. MECHANICAL SPLICING OF REINFORCING BARS, WHERE INDICATED ON THE DRAWINGS, SHALL BE BY AN ICC-ES APPROVED SYSTEM (SUCH AS LENTON, FOX-HOWLETT, ETC.) AND SHALL DEVELOP 125% OF THE SPECIFIED YIELD STRENGTH OF THE BARS. SPLICE LOCATIONS OF ALTERNATE BARS SHALL BE OFFSET BY A DISTANCE WHICH CONFORMS TO THE ICC-ES REPORT OF THE SPLICE USED. REFER

TO THE STRUCTURAL PLANS FOR LIMITATIONS ON PLACEMENT OF MECHANICAL SPLICES.

29. HIGH STRENGTH THREADED RODS (STRESSED AND NON-STRESSED) SHALL BE DYWIDAG THREADBARS WITH APPROPRIATE ANCHORAGE PLATES, NUTS, AND COUPLERS AS MANUFACTURED BY DICKERHOFF AND WIDMANN, INC., IN CONFORMANCE WITH ASTM A-722 (fpu = 150,000 PSI).

ANCHORAGE

30. EXPANSION BOLTS INTO CONCRETE AND CONCRETE MASONRY UNITS SHALL BE "KWIK BOLT TZ" AS MANUFACTURED BY THE HILTI CORP., INSTALLED IN STRICT ACCORDANCE WITH ICC-ES REPORT NO. ESR-1917, INCLUDING MINIMUM EMBEDMENT REQUIREMENTS. BOLTS INTO CONCRETE MASONRY OR BRICK MASONRY UNITS SHALL BE INTO FULLY GROUTED CELLS. SUBSTITUTES PROPOSED BY CONTRACTOR SHALL BE SUBMITTED FOR REVIEW WITH ICC REPORTS INDICATING EQUIVALENT OR GREATER LOAD CAPACITIES. PERIODIC SPECIAL INSPECTION IS REQUIRED TO VERIFY ANCHOR TYPE, ANCHOR DIMENSIONS, ANCHOR LOCATION, TIGHTENING TORQUE, HOLE DIMENSIONS, ANCHOR EMBEDMENT, AND ADHERENCE TO THE INSTALLATION INSTRUCTIONS.

31. EPOXY-GROUTED ITEMS (THREADED RODS OR REINFORCING BAR) SPECIFIED ON THE DRAWINGS SHALL BE INSTALLED USING "HIT RE 500-SD" AS MANUFACTURED BY HILTI CORP. INSTALL IN STRICT ACCORDANCE WITH ICC-ES REPORT NO. ESR-2322. MINIMUM BASE MATERIAL TEMPERATURE IS 41 DEGREES, F. RODS SHALL BE ASTM A-36 UNLESS OTHERWISE NOTED. PERIODIC SPECIAL INSPECTION OF INSTALLATION IS REQUIRED TO VERIFY ANCHOR OR EMBEDED BAR TYPE AND DIMENSIONS, LOCATION, ADHESIVE IDENTIFICATION AND EXPIRATION, HOLE DIMENSIONS, HOLE CLEANING PROCEDURE, ANCHOR EMBEDMENT, AND ADHERENCE TO THE INSTALLATION INSTRUCTIONS. CONTINUOUS SPECIAL INSPECTION IS REQUIRED FOR HORIZONTAL AND OVERHEAD INSTALLATIONS.

32. DRIVE PINS AND OTHER POWDER-ACTUATED FASTENERS SHALL BE LOW VELOCITY TYPE (SERIES X-U, 0.157" DIAMETER (STEEL), UNLESS OTHERWISE NOTED) AS MANUFACTURED BY THE HILTI CORP. OR AN APPROVED EQUIVALENT IN STRENGTH AND EMBEDMENT. INSTALL IN STRICT ACCORDANCE WITH ICC-ES REPORT NO. ESR-1663. MINIMUM EMBEDMENT IN CONCRETE SHALL BE 1" UNLESS OTHERWISE NOTED. MAINTAIN AT LEAST 3" TO NEAREST CONCRETE EDGE.

MASONRY

33. CONCRETE MASONRY UNIT WALLS SHALL BE CONSTRUCTED OF GRADE N, MEDIUM WEIGHT UNITS, CONFORMING TO ASTM C90, LAID IN A RUNNING BOND. MORTAR SHALL BE TYPE "S" CONFORMING TO ASTM C270. GROUT SHALL CONFORM TO ASTM C476 AND ATTAIN A MINIMUM COMPRESSIVE STRENGTH OF f’m, WITH A MINIMUM COMPRESSIVE STRENGTH OF 2,000 PSI, AT 28 DAYS. DESIGN f’m = 2000 PSI.

    STRENGTH SHALL BE VERIFIED BY EITHER THE UNIT STRENGTH METHOD OR PRISM TESTING IN ACCORDANCE WITH TMS-602/ACI-530.1/ASCE-6 SECTION 1.4. WHEN VERIFIED BY THE UNIT STRENGTH METHOD, MASONRY UNITS SHALL BE CHOSEN IN ACCORDANCE WITH TMS-602/ACI-530.1/ASCE-6, TABLE 2.

UNLESS NOTED OTHERWISE, PROVIDE THE FOLLOWING REINFORCEMENT:

4" WALLS	#4 @ 48" O.C. VERT.	3/16 dia. WIRE JOINT REINF AT 8" O.C. HORIZ.
6" WALLS	#4 @ 48" O.C. VERT.	(2) #4 @ 48" O.C. HORIZ.
8" WALLS	#5 @ 48" O.C. VERT.	(2) #4 @ 48" O.C. HORIZ.
10" WALLS	#5 @ 40" O.C. VERT.	(2) #5 @ 48" O.C. HORIZ.
12" WALLS	#5 @ 32" O.C. VERT.	(2) #5 @ 40" O.C. HORIZ.

IN ADDITION, PROVIDE (1) #5 (#4 @ 6" AND 4" WALLS) VERT. AT EACH SIDE OF OPENINGS, AT WALL CORNERS AND INTERSECTIONS AND AT FREE ENDS OF WALLS AND (2) #4 (#4 @ 4" WALLS) HORIZ. AT ELEVATED FLOOR AND ROOF LEVELS, AT TOPS OF WALLS AND ABOVE AND BELOW ALL OPENINGS. ALL HORIZONTAL REINFORCEMENT SHALL BE PLACED IN BOND BEAMS. EXTEND REINFORCEMENT AROUND OPENINGS 2'-0" BEYOND FACE OF OPENING. IF 2'-0" IS UNAVAILABLE EXTEND AS FAR AS POSSIBLE AND HOOK. PROVIDE CORNER BARS TO LAP HORIZONTAL REINFORCING AT CORNERS AND INTERSECTIONS. LAP ALL REINFORCING STEEL 48 BAR DIAMETERS OR 24" MINIMUM.

FILL ALL CELLS CONTAINING REINFORCEMENT OR EMBEDDED ITEMS AND ALL CELLS BELOW GRADE WITH GROUT. PROVIDE CLEANOUT HOLES AT BOTTOM OF ALL CELLS CONTAINING REINFORCEMENT FOR ALL GROUT POURS OVER 5 FEET IN HEIGHT. UNITS MAY BE LAID TO THE FULL HEIGHT OF THE GROUT POUR AND GROUT SHALL BE PLACED IN A CONTINUOUS POUR IN GROUT LIFTS NOT EXCEEDING 5 FEET. ALL PREPARATION AND PLACING OF MASONRY SHALL CONFORM TO SECTION 2104 OF THE INTERNATIONAL BUILDING CODE AND TMS602/ACI530.1/ASCE 6.

REINFORCING STEEL SHALL CONFORM TO ASTM A615 (INCLUDING SUPPLEMENT S1), GRADE 60, FY = 60,000 PSI. EXCEPTIONS: ANY BARS SPECIFICALLY SO NOTED ON THE DRAWINGS SHALL BE GRADE 40, FY = 40,000 PSI.

34. MASONRY VENEER, 5" MAXIMUM THICKNESS, SHALL BE ANCHORED TO MASONRY BACKING WALLS PER SECTION 1405.6 OF THE INTERNATIONAL BUILDING CODE WITH 7/8" x 22 GAUGE CORRUGATED CORROSION RESISTANT SHEET METAL OR NO. 9 GAGE WIRE ANCHORS MINIMUM. ANCHOR TIES SHALL BE SPACED SO AS TO SUPPORT NOT MORE THAN TWO SQUARE FEET OF WALL AREA AND SHALL BE SPACED NOT MORE THAN 32" O.C. HORIZONTALLY AND 25" O.C. VERTICALLY. ATTACHMENTS SHALL BE WITH CORROSION RESISTANT FASTENERS AND CONNECT TO FRAMING MEMBERS OR CONCRETE OR MASONRY BACKING. TIES SHALL HAVE A LIP OR HOOK ON THE EXTENDED LEG THAT WILL ENGAGE OR ENCLOSE A NO. 9 GAGE REINFORCEMENT WIRE. JOINT REINFORCEMENT SHALL BE CONTINUOUS WITH BUTT SPLICES BETWEEN TIES PERMITTED.

35. MASONRY VENEER, 5" MAXIMUM THICKNESS, SHALL BE ANCHORED TO BACKING WALLS PER SECTION 1405.6 OF THE INTERNATIONAL BUILDING CODE WITH "RJ-711" OR "HB-200" ADJUSTABLE VENEER ANCHORS AS MANUFACTURED BY WIRE-BOND, INC. ANCHORS SHALL BE SPACED SO AS TO SUPPORT NOT MORE THAN TWO SQUARE FEET OF WALL AREA AND SHALL BE SPACED NOT MORE THAN 24" O.C. HORIZONTALLY. ATTACHMENTS SHALL BE WITH CORROSION RESISTANT FASTENERS AND CONNECT TO FRAMING MEMBERS OR CONCRETE OR MASONRY BACKING. INSTALL ANCHORS IN STRICT ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS. THE SHEAR LUGS OF EACH ANCHOR SHALL ENGAGE A NO. 9 GAUGE JOINT REINFORCEMENT WIRE. JOINT REINFORCEMENT SHALL BE CONTINUOUS WITH BUTT SPLICES BETWEEN TIES PERMITTED.

STEEL

36. STRUCTURAL STEEL DESIGN, FABRICATION, AND ERECTION SHALL BE BASED ON:

    A. AISC 360 AND SECTION 2205.2 OF THE INTERNATIONAL BUILDING CODE.
    B. APRIL 14, 2010 AISC CODE OF STANDARD PRACTICE FOR STEEL BUILDINGS AND BRIDGES AMENDED AS FOLLOWS: AS NOTED IN THE CONTRACT DOCUMENTS, BY THE DELETION OF PARAGRAPH 4.4.1, AND REVISE REFERENCE FROM "STRUCTURAL DESIGN DRAWINGS" TO "CONTRACT DOCUMENTS" IN PARAGRAPH 3.1.
    C. SPECIFICATION FOR STRUCTURAL JOINTS USING ASTM F3125 GRADE A325 OR GRADE A490 BOLTS.

37. STRUCTURAL STEEL SHALL CONFORM TO THE FOLLOWING REQUIREMENTS:

TYPE OF MEMBER	ASTM SPECIFICATION	FY
A. WIDE FLANGE SHAPES	A992	50 KSI
B. OTHER SHAPES, PLATES, AND RODS	A36	36 KSI
C. OTHER SHAPES AND PLATES (NOTED GRADE 50 ON PLANS)	A572 (GRADE 50)	50 KSI
D. PIPE COLUMNS	A53 (E OR S, GR.B)	35 KSI
E. STRUCTURAL TUBING	A500 (GR.B) OR ASTM A1085	
-SQUARE OR RECTANGULAR		46 KSI
-ROUND		42 KSI
F. CONNECTION BOLTS (3/4" ROUND, UNLESS SHOWN OTHERWISE)	F3125 GRADE A325-N	

38. WIDE FLANGE SHAPES SHALL CONFORM TO ASTM A992, FY = 50 KSI. OTHER ROLLED SHAPES INCLUDING PLATES, SHALL CONFORM TO ASTM A36, FY = 36 KSI. STEEL PIPE SHALL CONFORM TO ASTM A-53, TYPE E OR S, GRADE B, Fy = 35 KSI. STRUCTURAL TUBING SHALL CONFORM TO ASTM A500, GRADE B, FY = 42 KSI (ROUND), FY = 46 KSI (SQUARE AND RECTANGULAR). CONNECTION BOLTS SHALL CONFORM TO ASTM A307.

39. ARCHITECTURALLY EXPOSED STRUCTURAL STEEL SHALL CONFORM TO SECTION 10 OF THE AISC CODE OF STANDARD PRACTICE FOR STEEL BUILDINGS AND BRIDGES.

40. ALL STEEL EXPOSED TO THE WEATHER OR IN CONTACT WITH GROUND SHALL BE CORROSION PROTECTED BY GALVANIZATION OR PROVIDED WITH EXTERIOR PAINT SYSTEM, UNLESS OTHERWISE NOTED.

41. SHOP PRIME ALL STEEL EXCEPT:

    A. STEEL ENCASED IN CONCRETE.
    B. SURFACES TO BE WELDED.
    C. CONTACT SURFACES AT HIGH-STRENGTH BOLTS.
    D. MEMBERS TO BE GALVANIZED.
    E. MEMBERS WHICH WILL BE CONCEALED BY INTERIOR FINISHES.
    F. SURFACES TO RECEIVE SPRAYED FIREPROOFING.
    G. SURFACES TO RECEIVE OTHER SPECIAL SHOP PRIMERS.

42. ALL ASTM F3125 A325-N CONNECTION BOLTS NEED ONLY BE TIGHTENED TO A SNUG TIGHT CONDITION, DEFINED AS THE TIGHTNESS THAT EXISTS WHEN ALL PLIES IN

A JOINT ARE IN FIRM CONTACT. THIS MAY BE ATTAINED BY A FEW IMPACTS OF AN IMPACT WRENCH OR THE FULL EFFORT OF AN IRONWORKER USING AN ORDINARY SPUD WRENCH.

43. CONNECTIONS NOTED AS 'SLIP CRITICAL' SHALL BE MADE USING LOAD INDICATOR WASHERS OR ASTM F1852 TENSION CONTROL BOLTS (SUCH AS LeJEUNE TENSION CONTROL BOLTS, ETC.) AND SHALL BE INSTALLED IN STRICT ACCORDANCE WITH THE MANUFACTURER'S PUBLISHED RECOMMENDATIONS.

44. ALL ANCHORS EMBEDDED IN MASONRY OR CONCRETE SHALL BE A307 HEADED BOLTS OR A36 THREADED ROD WITH AN ASTM 563 HEAVY HEX NUT TACK WELDED ON THE EMBEDDED END.

45. OPEN WEB STEEL JOISTS (INCLUDING BRIDGING) SHALL CONFORM TO SECTION 2207 OF THE INTERNATIONAL BUILDING CODE AND THE SPECIFICATIONS OF THE STEEL JOIST INSTITUTE, LATEST EDITION, FOR THE JOIST SERIES DESIGNATED ON THE PLANS. ENDS OF BRIDGING ROWS SHALL BE FIELD WELDED TO STRUCTURAL STEEL MEMBERS OR TO PLATES EMBEDDED IN CONCRETE OR MASONRY UNLESS DETAILED OTHERWISE. JOIST MANUFACTURER SHALL CHECK ROOF JOIST AND PROVIDE UPLIFT BRIDGING AS REQUIRED TO ADEQUATELY BRACE THE BOTTOM CHORD AGAINST LATERAL MOVEMENT UNDER WIND UPLIFT PRESSURES (SEE DESIGN CRITERIA NOTE FOR WIND CRITERIA). AT COMPLETION OF MANUFACTURE OF JOISTS, THE MANUFACTURER SHALL SUBMIT A CERTIFICATE OF COMPLIANCE IN ACCORDANCE WITH IBC SECTION 2207.5.

46. ALL WELDING SHALL BE IN CONFORMANCE WITH AISC AND AWS STANDARDS AND SHALL BE PERFORMED BY WABO CERTIFIED WELDERS USING E70XX ELECTRODES. WELDERS SHALL BE WABO CERTIFIED FOR THE WELDS BEING PERFORMED. ONLY PREQUALIFIED WELDS (AS DEFINED BY AWS) SHALL BE USED. ALL COMPLETE JOINT PENETRATION GROOVE WELDS SHALL BE MADE WITH A FILLER MATERIAL THAT HAS A MINIMUM CVN TOUGHNESS OF 20 FT-LBS AT –20 DEGREES F AND 40 FT - LBS AT 70 DEGREES F, AS DETERMINED BY AWS CLASSIFICATION OR MANUFACTURER CERTIFICATION.

47. METAL FLOOR AND ROOF DECKING SHALL BE IN ACCORDANCE TO THE FOLLOWING: PROVIDE SIZE, TYPE, GAUGE, AND ATTACHMENT TO THE SUPPORTING STRUCTURE AS SHOWN ON THE PLANS. ARC SEAM AND SPOT (PUDDLE) WELDS FOR FIELD ASSEMBLY OF METAL DECK SHALL BE MADE WITH MINIMUM E60XX ELECTRODES. DECK ALTERNATES MUST BE CONNECTED ACCORDING TO PUBLISHED ICC-ES CRITERIA FOR DIAPHRAGM SHEARS SHOWN. PROVIDE TEMPORARY SHORING WHERE REQUIRED PER MANUFACTURER'S PUBLISHED CRITERIA.

    A. NONCOMPOSITE STEEL FLOOR DECKS SHALL BE DESIGNED AND CONSTRUCTED IN ACCORDANCE WITH ANSI/SDI-NC1.0.
    B. STEEEL ROOF DECK SHALL BE DESIGNED AND CONSTRUCTED IN ACCORDANCE WITH ANSI/SDI-RD1.0.
    C. COMPSITE SLABS ON STEEL DECKS SHALL BE DESIGNED AND CONSTRUCTED IN ACCORDANCE TWITH SDI-C.

48. COLD-FORMED STEEL FRAMING NOTES--THE FOLLOWING APPLY UNLESS OTHERWISE SHOWN ON THE PLANS:

    A. COLD FORMED STEEL DESIGN, FABRICATION, AND ERECTION SHALL BE BASED ON AISI S100-12, "NORTH AMERICAN SPECIFICATION FOR THE DESIGN OF

COLD-FORMED STEEL STRUCTURAL MEMBERS," AND ON THE 2012 NORTH AMERICAN STANDARDS FOR COLD FORMED STEEL FRAMING, INCLUSIVE.

B. THE CONTRACTOR SHALL PROVIDE A QUALITY CONTROL PROGRAM OVER ALL FABRICATION AND ERECTION ACTIVITY THROUGH THE USE OF AN INDEPENDENT TESTING AGENCY AND/OR A QUALIFIED REPRESENTATIVE OF THE STEEL MANUFACTURER. THE CONTRACTOR SHALL OBTAIN MILL CERTIFICATION FROM THE GAUGE STEEL MANUFACTURER OR SHALL SUBMIT TENSILE TESTS AND GALVANIZATION TESTS TO THE ENGINEER OF RECORD TO VERIFY THE ADEQUACY OF THE GAUGE MATERIALS.

C. COLD-FORMED STEEL FRAMING MEMBERS INDICATED ON PLAN SHALL BE IN ACCORDANCE WITH THE "2015 IBC-SSMA PRODUCT TECHNICAL GUIDE" PUBLISHED BY THE STEEL STUD MANUFACTURERS ASSOCIATION, AND SHALL COMPLY WITH ICC-ES REPORT ESR-3064P.

DESIGNATION:	600	S	200	-	54
	DEPTH	MEMBER STYLE	FLANGE WIDTH		MATERIAL THICKNESS(MILS)

D. MATERIAL:

METAL FRAMING SHALL BE GALVANIZED UNLESS OTHERWISE NOTED, CONFORMING AS FOLLOWS:

ASTM A653, GRADE 50	FY = 50 KSI	12, 14, AND 16 GAUGE
ASTM A653, GRADE 33	FY = 33 KSI	18 AND 20 GAUGE

WHERE NOTED, PAINTED STUDS SHALL CONFORM TO: ASTM A570, GRADE E, FY=KSI. ALL 8 AND 10 GAGE MATERIAL SHALL CONFORM TO: ASTM A36, FY=36 KSI

E. THE DESIGN OF INTERIOR COLD FORMED STEEL NON-BEARING WALLS, SOFFITS, CEILINGS AND OTHER MISCELLANEOUS FRAMING AND CONNECTIONS TO STRUCTURE SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR AND SHALL CONFORM TO THE REQUIREMENTS OF THE ARCHITECTURAL DRAWINGS. DESIGN AND DETAILING SHALL BE UNDER THE DIRECTION OF A PROFESSIONAL ENGINEER REGISTERED IN THE STATE OF WASHINGTON AND STAMPED DRAWINGS AND CALCULATIONS SHALL BE SUBMITTED TO THE ENGINEER OF RECORD PRIOR TO CONSTRUCTION.

F. ACCESSORIES SHALL BE OF THE TYPE, SIZE, AND SPACING SHOWN ON THE DRAWINGS OF A MINIMUM 16 GAUGE MATERIAL UNLESS OTHERWISE SPECIFIED. FASTENING OF COMPONENTS SHALL BE BY WELDING OR SCREWING OR BY OTHER MEANS OF FASTENING AS INDICATED ON THE DRAWINGS. PROVIDE MISCELLANEOUS CLIP ANGLES, LEDGERS, AND ACCESSORIES OF A MINIMUM 16 GAUGE OR THE THICKNESS OF THE MATERIAL BEING FASTENED, WHICHEVER IS GREATER, FOR CONNECTIONS AND BEARING CONDITIONS NOT OTHERWISE NOTED IN THE DRAWINGS. WELDS SHALL BE OF SUFFICIENT SIZE TO INSURE THE STRENGTH OF THE CONNECTION: WIRE TYING OF COMPONENTS SHALL NOT BE PERMITTED. ALL WELDS SHALL BE TOUCHED UP WITH A ZINC-RICH PAINT.

G. SCREWS: ALL SCREWS (REFERRED TO AS TEK) SHALL BE SELF-TAPPING SELF-DRILLING FASTENERS THAT ARE ZINC COATED AS MANUFACTURED BY HILTI KWIK-FLEX (ICC-ES ESR-2196), OR APPROVED EQUAL. THE MINIMUM SCREW SIZE/TYPE/POINT SHALL BE #8-18 (#2 POINT) OR #10-16 (#2 POINT)

FOR USE IN 20 GAUGE THROUGH 16 GAUGE, AND #10-16 (#3 POINT) OR #12-14 (#2 OR #3 POINT) FOR HEAVIER THAN 16 GAUGE UNLESS NOTED OTHERWISE. SCREWS FOR SHEATHING CONNECTIONS SHALL BE OF THE PROPER SIZE AND TYPE FOR A POSITIVE SHEATHING-TO-METAL CONNECTION. ALL SCREW CONNECTIONS SHALL BE MADE FROM THE LIGHTER MATERIAL INTO THE HEAVIER MATERIAL UNLESS NOTED OTHERWISE. SCREWS SHALL HAVE A MINIMUM PROJECTION OF 3 THREADS THROUGH THE LAST MATERIAL JOINED AND SHALL HAVE MINIMUM EDGE DISTANCES AND CENTER-TO-CENTER SPACING OF 1-1/2 AND 3 SCREW DIAMETERS, RESPECTIVELY. ALL SCREWS SHALL CONFORM TO SAE J78 AND SHALL BE COATED WITH A CORROSIVE-RESISTANT COATING. THE SCREW MANUFACTURER SHALL PROVIDE VERIFICATION OF THE FASTENERS RESISTANCE TO HYDROGEN EMBRITTLEMENT, UPON REQUEST.

H. WELDING OF COLD-FORMED METAL FRAMING SHALL CONFORM TO AWS D1.3 AND SHALL BE PERFORMED BY WABO CERTIFIED WELDERS QUALIFIED TO PRODUCE THE SPECIFIED CLASSES OF WELD.

I. WALL FRAMING: REFER ARCHITECTURAL DRAWINGS FOR ALL STUD WALLS NOT SHOWN. EXTERIOR WALL STUDS SHALL BE MINIMUM 20 GAUGE (33 MILS) SPACED AT 16" O.C. UNLESS INDICATED OTHERWISE. TWO STUDS MINIMUM SHALL BE PROVIDED AT THE END OF ALL WALLS AND AT EACH SIDE OF ALL OPENINGS. TWO 800S162-54 HEADERS SHALL BE PROVIDED OVER ALL OPENINGS NOT OTHERWISE NOTED. SOLID BLOCKING FOR MULTI-STUD OR STEEL COLUMNS SHALL BE PROVIDED THROUGH FLOORS TO SUPPORTS BELOW. PROVIDE CONTINUOUS FULL WIDTH BLOCKING AT MID-HEIGHT OF ALL STUD WALLS OVER 10' IN HEIGHT.

J. ALL STUD WALLS SHALL HAVE THEIR BOTTOM TRACKS ATTACHED TO FRAMING BELOW WITH #8 SCREWS AT 24" O.C. OR ATTACHED TO CONCRETE WITH 0.145" DIAMETER DRIVE-PINS @ 24" O.C. UNLESS INDICATED OTHERWISE. INDIVIDUAL MEMBERS OF BUILT-UP POSTS SHALL BE WELDED TO EACH OTHER IN ACCORDANCE WITH THE DETAILS. REFER TO THE PLANS AND SHEAR WALL SCHEDULE FOR REQUIRED SHEATHING AND STRAP BRACING. WHEN NOT OTHERWISE NOTED, PROVIDE GYPSUM WALLBOARD ON INTERIOR SURFACES AND GYPSUM SHEATHING ON EXTERIOR SURFACES SCREWED TO ALL STUDS, TOP AND BOTTOM TRACKS AND BLOCKING WITH SCREWS AT 12" O.C. TRACK SECTIONS SHALL MATCH THE WALL STUD GAUGE, BE UN-PUNCHED AND HAVE AT LEAST 1-1/4" FLANGES.

K. BRIDGING AND BRACING IS TO BE INSTALLED AT ALL COLD FORMED STEEL BEARING WALLS. BRIDGING AND BRACING SHALL BE INSTALLED AS SHOWN ON THE STRUCTURAL PLANS, OR THE CONTRACTOR SHALL EMPLOY A PROFESSIONAL ENGINEER REGISTERED IN THE STATE OF WASHINGTON TO DESIGN AN ALTERNATE BRACING SYSTEM. IF AN ALTERNATE BRACING SYSTEM IS USED, THE CONTRACTOR SHALL SUBMIT STAMPED DRAWINGS AND CALCULATIONS TO THE ENGINEER OF RECORD, WHICH DEMONSTRATES THAT THE BRACING SYSTEM WAS DESIGNED TO PROVIDE PERMANENT WEAK AXIS BRACING OF THE STUDS UNDER CODE PRESCRIBED LOADS. DOCUMENTATION SHALL BE SUBMITTED FOR REVIEW PRIOR TO CONSTRUCTION.

49. HEADED STUDS FOR COMPOSITE CONNECTION OF STRUCTURAL STEEL TO CAST-IN-PLACE CONCRETE SHALL BE MANUFACTURED FROM MATERIAL CONFORMING TO ASTM A-29, AND A-108 AND SHALL BE WELDED IN CONFORMANCE WITH A.W.S. D1.1.

50. DEFORMED BAR ANCHORS SHALL BE TYPE D2L ANCHORS BY NELSON STUD WELDING, INC. ANCHORS SHALL BE INSTALLED IN ACCORDANCE WITH ICC-ES ESR-2907.

WOOD

51. FRAMING LUMBER SHALL BE S-DRY, KD, OR MC-19, AND GRADED AND MARKED IN CONFORMANCE WITH WCLIB STANDARD "GRADING RULES FOR WEST COAST LUMBER NO. 17", OR WWPA STANDARD, "WESTERN LUMBER GRADING RULES 2011". FURNISH TO THE FOLLOWING MINIMUM STANDARDS:

JOISTS AND BEAMS	(2X & 3X MEMBERS)	HEM-FIR NO. 2 MINIMUM BASE VALUE, Fb = 850 PSI
	(4X MEMBERS)	DOUGLAS FIR-LARCH NO. 1 MINIMUM BASE VALUE, Fb = 1000 PSI
BEAMS	(INCL. 6X AND LARGER)	DOUGLAS FIR-LARCH NO. 1 MINIMUM BASE VALUE, Fb = 1350 PSI
POSTS	(4X MEMBERS)	DOUGLAS FIR-LARCH NO. 2 MINIMUM BASE VALUE, Fc = 1350 PSI
	(6X AND LARGER)	DOUGLAS FIR-LARCH NO. 1 MINIMUM BASE VALUE, Fc = 1000 PSI
STUDS, PLATES & MISC. FRAMING:		DOUGLAS-FIR-LARCH OR HEM-FIR NO. 2

52. GLUED LAMINATED MEMBERS SHALL BE FABRICATED IN CONFORMANCE WITH ASTM AND ANSI/AITC STANDARDS. EACH MEMBER SHALL BEAR AN AITC OR APA-EWS IDENTIFICATION MARK AND SHALL BE ACCOMPANIED BY AN AITC OR APA-EWS CERTIFICATE OF CONFORMANCE. ALL SIMPLE SPAN BEAMS SHALL BE DOUGLAS FIR COMBINATION 24F-V4, Fb = 2,400 PSI, Fv =265 PSI. ALL CANTILEVERED BEAMS SHALL BE DOUGLAS FIR COMBINATION 24F-V8, Fb = 2400 PSI, Fv = 265 PSI. CAMBER ALL SIMPLE SPAN GLULAM BEAMS TO 3,500' RADIUS, UNLESS SHOWN OTHERWISE ON THE PLANS.

53. LOG MEMBERS SHALL BE GRADED AND MARKED IN ACCORDANCE WITH ASTM D3957. THE GRADE MARK OF AN APPROVED LUMBER GRADING OR INSPECTION AGENCY SHALL IDENTIFY LOG MEMBERS OR A CERTIFICATE OF INSPECTION MUST ACCOMPANY THE LOG MEMBERS TO SPECIES AND GRADE ISSUED BY AN APPROVED LUMBER GRADING OR INSPECTION AGENCY.

54. MANUFACTURED LUMBER, PSL, LVL, AND LSL SHOWN ON PLAN ARE BASED PRODUCTS MANUFACTURED BY THE WEYERHAEUSER CORPORATION IN ACCORDANCE WITH ICC-ES REPORT ESR-1387. MEMBERS SHALL HAVE THE FOLLOWING MINIMUM PROPERTIES:

PSL (2.0E)	Fb = 2900 PSI,	E = 2000 KSI,	Fv = 290 PSI
LVL (2.0E)	Fb = 2600 PSI,	E = 2000 KSI,	Fv = 285 PSI
LSL (1.55E)	Fb = 2325 PSI,	E = 1550 KSI,	Fv = 310 PSI

ALTERNATE MANUFACTURED LUMBER MANUFACTURERS MAY BE USED SUBJECT TO REVIEW AND APPROVAL BY THE ARCHITECT AND STRUCTURAL ENGINEER. ALTERNATE MANUFACTURER'S PRODUCTS SHALL BE COMPATIBLE WITH THE JOIST HANGERS AND OTHER HARDWARE SPECIFIED ON PLANS, OR ALTERNATE HANGERS AND HARDWARE

SHALL SUBMITTED FOR REVIEW AND APPROVAL. SUBSTITUTED ITEMS SHALL HAVE ICC-ES REPORT APPROVAL FOR EQUAL OR GREATER LOAD CAPACITIES.

MANUFACTURED LUMBER PRODUCTS SHALL BE INSTALLED WITH A MOISTURE CONTENT OF 12% OR LESS. THE CONTRACTOR SHALL MAKE PROVISIONS DURING CONSTRUCTION TO PREVENT THE MOISTURE CONTENT OF INSTALLED BEAMS FROM EXCEEDING 12%. EXCESSIVE DEFLECTIONS MAY OCCUR IF MOISTURE CONTENT EXCEEDS THIS VALUE.

55. PREFABRICATED OPEN WEB WOOD TRUSSES (OR COMBINATION WOOD AND METAL) SHALL BE DESIGNED BY THE MANUFACTURER FOR THE SPANS AND CONDITIONS SHOWN ON THE PLANS AND SHALL BE FURNISHED AND INSTALLED IN CONFORMANCE WITH THE MANUFACTURER'S PUBLISHED SPECIFICATIONS. ALL NECESSARY BRIDGING, BLOCKING, BLOCKING PANELS, STIFFENERS, ETC., SHALL BE DETAILED AND FURNISHED BY THE MANUFACTURER. SUBMIT SHOP DRAWINGS AND DESIGN CALCULATIONS TO THE ARCHITECT AND STRUCTURAL ENGINEER FOR REVIEW PRIOR TO FABRICATION. DESIGN SUBMITTALS SHALL BEAR THE STAMP AND SIGNATURE OF A REGISTERED PROFESSIONAL ENGINEER, STATE OF WASHINGTON. PERMANENT AND TEMPORARY BRIDGING SHALL BE INSTALLED IN CONFORMANCE WITH MANUFACTURER'S SPECIFICATIONS.

56. PREFABRICATED PLYWOOD WEB JOISTS SHALL BE DESIGNED BY THE MANUFACTURER FOR THE SPANS AND CONDITIONS SHOWN ON THE PLANS AND SHALL BE FURNISHED AND INSTALLED IN CONFORMANCE WITH THE MANUFACTURER'S PUBLISHED SPECIFICATIONS. ALL NECESSARY BRIDGING, BLOCKING, BLOCKING PANELS, STIFFENERS, ETC., SHALL BE DETAILED AND FURNISHED BY THE MANUFACTURER. SUBMIT SHOP DRAWINGS AND DESIGN CALCULATIONS TO THE ARCHITECT AND STRUCTURAL ENGINEER FOR REVIEW PRIOR TO FABRICATION. DESIGN SUBMITTALS SHALL BEAR THE STAMP AND SIGNATURE OF A REGISTERED PROFESSIONAL ENGINEER, STATE OF WASHINGTON. PERMANENT AND TEMPORARY BRIDGING SHALL BE INSTALLED IN CONFORMANCE WITH MANUFACTURER'S SPECIFICATIONS.

    THE DESIGN SHOWN ON THE PLANS IS BASED ON JOISTS MANUFACTURED BY THE WEYERHAEUSER CORPORATION. ALTERNATE PLYWOOD WEB JOIST MANUFACTURERS MAY BE USED SUBJECT TO REVIEW AND APPROVAL BY THE ARCHITECT AND STRUCTURAL ENGINEER. ALTERNATE MANUFACTURER'S PRODUCTS SHALL BE COMPATIBLE WITH THE JOIST HANGERS AND OTHER HARDWARE SPECIFIED ON PLANS, OR ALTERNATE HANGERS AND HARDWARE SHALL SUBMITTED FOR REVIEW AND APPROVAL. SUBSTITUTED ITEMS SHALL HAVE ICC-ES REPORT APPROVAL FOR EQUAL OR GREATER LOAD CAPACITIES.

57. PREFABRICATED PLYWOOD WEB JOIST DESIGN SHOWN ON PLANS IS BASED ON JOISTS MANUFACTURED BY THE WEYERHAEUSER CORPORATION. ALTERNATE PLYWOOD WEB JOIST MANUFACTURERS MAY BE USED SUBJECT TO REVIEW AND APPROVAL BY THE ARCHITECT AND STRUCTURAL ENGINEER. ALTERNATE MANUFACTURER'S PRODUCTS SHALL BE COMPATIBLE WITH THE JOIST HANGERS AND OTHER HARDWARE SPECIFIED ON PLANS, OR ALTERNATE HANGERS AND HARDWARE SHALL SUBMITTED FOR REVIEW AND APPROVAL. SUBSTITUTED ITEMS SHALL HAVE ICC-ES REPORT APPROVAL FOR EQUAL OR GREATER LOAD CAPACITIES.

58. PREFABRICATED CONNECTOR PLATE WOOD ROOF TRUSSES SHALL BE DESIGNED BY THE MANUFACTURER IN ACCORDANCE WITH THE "NATIONAL DESIGN STANDARD FOR METAL PLATE-CONNECTED WOOD TRUSS CONSTRUCTION, ANSI/TPI 1" BY THE TRUSS PLATE INSTITUTE FOR THE SPANS AND CONDITIONS SHOWN ON THE PLANS. LOADING SHALL BE AS FOLLOWS:

TOP CHORD LIVE LOAD	25 PSF
TOP CHORD DEAD LOAD	10 PSF
BOTTOM CHORD DEAD LOAD	5 PSF
TOTAL LOAD	40 PSF
WIND UPLIFT (TOP CHORD)	5 PSF
BOTTOM CHORD LIVE LOAD	10 PSF

(BOTTOM CHORD LIVE LOAD DOES NOT ACT CONCURRENTLY WITH THE ROOF LIVE LOAD)

WOOD TRUSSES SHALL UTILIZE APPROVED CONNECTOR PLATES (GANGNAIL OR EQUAL). SUBMIT SHOP DRAWINGS AND DESIGN CALCULATIONS TO THE ARCHITECT AND STRUCTURAL ENGINEER FOR REVIEW PRIOR TO FABRICATION. SUBMITTED DOCUMENTS SHALL BE SIGNED AND STAMPED BY A STRUCTURAL ENGINEER REGISTERED IN THE STATE OF WASHINGTON. PROVIDE FOR SHAPES, BEARING POINTS, INTERSECTIONS, HIPS, VALLEYS, ETC., SHOWN ON THE DRAWINGS. EXACT COMPOSITION OF SPECIAL HIP, VALLEY, AND INTERSECTION AREAS (USE OF GIRDER TRUSSES, JACK TRUSSES, STEP-DOWN TRUSSES, ETC.) SHALL BE DETERMINED BY THE MANUFACTURER UNLESS SPECIFICALLY INDICATED ON THE PLANS. PROVIDE ALL TRUSS TO TRUSS AND TRUSS TO GIRDER TRUSS CONNECTION DETAILS AND REQUIRED CONNECTION MATERIALS. PROVIDE FOR ALL TEMPORARY AND PERMANENT TRUSS BRACING AND BRIDGING.

59. PLYWOOD SHEATHING SHALL BE GRADE C-D, EXTERIOR GLUE OR STRUCTURAL II, EXTERIOR GLUE IN CONFORMANCE WITH DOC PS 1 OR PS 2. ORIENTED STRAND BOARD OF EQUIVALENT THICKNESS, EXPOSURE RATING AND PANEL INDEX MAY BE USED IN LIEU OF PLYWOOD.

    ROOF SHEATHING SHALL BE 1/2" (NOMINAL) WITH SPAN RATING 32/16.

    FLOOR SHEATHING SHALL BE 3/4" (NOMINAL) WITH SPAN RATING 48/24.

    WALL SHEATHING SHALL BE 1/2" (NOMINAL) WITH SPAN RATING 24/0.

    PROVIDE APPROVED PLYWOOD EDGE CLIPS CENTERED BETWEEN JOISTS/TRUSSES AT UNBLOCKED ROOF SHEATHING EDGES. ALL FLOOR SHEATHING EDGES SHALL HAVE APPROVED T&G JOINTS OR SHALL BE SUPPORTED WITH SOLID BLOCKING. ALLOW 1/8" SPACING AT ALL PANEL EDGES AND ENDS OF FLOOR AND ROOF SHEATHING.

    REFER TO WOOD FRAMING NOTES BELOW FOR TYPICAL NAILING REQUIREMENTS.

60. STRUCTURAL INSULATED ROOF AND WALL PANELS (SIP) SHALL BE MANUFACTURED BY PREMIER BUILDING SYSTEMS. MANUFACTURE AND INSTALLATION SHALL BE IN STRICT ACCORDANCE WITH ICC-ES REPORT ESR-1882. PANELS SHALL BE CONNECTED TOGETHER WITH FIELD INSTALLED OSB SPLINES. THE OSB FACINGS SHALL BE CONNECTED TO THE SPLINES WITH 8d BOX NAILS AT 6" O.C. THE MANUFACTURER SHALL PROVIDE COMPLETE SHOP DRAWINGS THAT INDICATE PANEL LAYOUT AND APPROPRIATE INSTALLATION DETAILS. SHOP DRAWINGS SHALL BE ACCOMPANIED BY STRUCTURAL CALCULATIONS STAMPED BY A PROFESSIONAL ENGINEER LICENSED IN THE STATE OF WASHINGTON. THE CALCULATIONS SHALL INCLUDE ALL THE DESIGN LOADS. PANELS SHALL BE DESIGNED TO DEVELOP THE SHEAR CAPACITIES INDICATED ON THE DRAWINGS.

61. TONGUE-AND-GROOVE STRUCTURAL ROOF AND FLOOR DECKING SHALL BE INSTALLED AS FOLLOWS: 2X DECKING SHALL BE TOENAILED THROUGH THE TONGUE AND FACE – NAILED WITH ONE 16d NAIL PER PIECE PER SUPPORT. 3X AND 4X DECKING SHALL BE TOENAILED WITH ONE 40d COMMON NAIL AND FACENAILED WITH ONE 60d COMMON NAIL PER SUPPORT. COURSES SHALL BE SPIKED TOGETHER WITH 8" SPIKES @ 30" O.C. (MAXIMUM) AND @ 10" (MAXIMUM) FROM THE END OF EACH PIECE. SPIKES SHALL BE INSTALLED IN PREDRILLED EDGE HOLES. DECKING SHALL BE PLACED WITH A CONTROLLED RANDOM LAYOUT UNLESS OTHERWISE NOTED AND SHALL EXTEND ACROSS A MINIMUM OF THREE SPANS. EACH PLANK SHALL BEAR ON AT LEAST ONE SUPPORT. ALL JOINTS SHALL BE END MATCHED AND ALL PLANKS NAILED TOGETHER WITHIN ONE FOOT OF EACH SIDE OF THE END JOINT. END JOINTS IN ADJACENT PLANKS SHALL BE AT LEAST TWO FEET APART AND END JOINTS IN ALTERNATE PLANKS SHALL BE MORE THAN ONE FOOT APART WHEN MEASURED ALONG THE LENGTH OF THE DECKING. END JOINTS NOT OCCURRING OVER SUPPORTS SHALL BE MATCHED TONGUED AND GROOVED OR SHALL BE CONNECTED WITH 10 GAUGE METAL SPLINES DRIVEN INTO PRE-CUT SLOTS. TONGUE AND GROOVE JOINTS SHALL BE GLUED WITH CONSTRUCTION ADHESIVE WHERE NOTED ON PLAN.

62. ALL WOOD IN DIRECT CONTACT WITH CONCRETE OR MASONRY SHALL BE PRESSURE-TREATED WITH AN APPROVED PRESERVATIVE OR (2) LAYERS OF ASPHALT IMPREGNATED BUILDING PAPER SHALL BE PROVIDED BETWEEN UNTREATED WOOD AND CONCRETE OR MASONRY.

63. PRESERVATIVE TREATED WOOD SHALL BE TREATED PER AWPA STANDARD U1 TO THE USE CATEGORY EQUAL TO OR HIGHER THAN THE INTENDED APPLICATION. TREATED WOOD FOR ABOVE GROUND USE SHALL BE TREATED TO AWPA UC3B. WOOD IN CONTINUOUS CONTACT WITH FRESH WATER OR SOIL SHALL BE TREATED TO AWPA UC4A. WOOD FOR USE IN PERMANENT FOUNDATIONS SHALL BE TREATED TO AWPA UC4B.

64. WOOD TREATED FOR FIRE RESISTANCE SHALL MEET THE REQUIREMENTS OF ASTM E 84 OR UL 723 AND HAVE A LISTED FLAME SPREAD INDEX OF 25 OR LESS. FIRE RETARDANT TREATED LUMBER AND WOOD STRUCTURAL PANELS SHALL BE LABELED IN ACCORDANCE WITH IBC 2303.2.4. WOOD TREATED FOR FIRE PROTECTION FOR USE IN INTERIOR ABOVE GROUND CONSTRUCTION AND CONTINUOUSLY PROTECTED FROM WEATHER AND OTHER SOURCES OF MOISTURE SHALL BE TREATED TO AWPA UCFA. WOOD TREATED FOR FIRE PROTECTION FOR USE IN EXTERIOR ABOVE GROUND CONSTRUCTION AND SUBJECT TO WETTING OR OTHER SOURCES OF MOISTURE SHALL BE TREATED TO AWPA UCFB.

65. FASTENERS AND TIMBER CONNECTORS USED WITH TREATED WOOD SHALL HAVE CORROSION RESISTANCE AS INDICATED IN THE FOLLOWING TABLE, UNLESS OTHERWISE NOTED.

WOOD TREATMENT	CONDITION	PROTECTION
HAS NO AMMONIA CARRIER	INTERIOR DRY	G90 GALVANIZED
CONTAINS AMMONIA CARRIER	INTERIOR DRY	G185 OR A185 HOT DIPPED OR CONTINUOUS HOT-GALVANIZED PER ASTM A653
CONTAINS AMMONIA CARRIER	INTERIOR WET	TYPE 304 OR 316 STAINLESS
CONTAINS AMMONIA CARRIER	EXTERIOR	TYPE 304 OR 316 STAINLESS
AZCA	ANY	TYPE 304 OR 316 STAINLESS

INTERIOR DRY CONDITIONS SHALL HAVE WOOD MOISTURE CONTENT LESS THAN 19%. WOOD MOISTURE CONTENT IN OTHER CONDITIONS (INTERIOR WET, EXTERIOR WET, AND EXTERIOR DRY) IS EXPECTED TO EXCEED 19%. CONNECTORS AND THEIR FASTENERS SHALL BE THE SAME MATERIAL. COMPLY WITH THE TREATMENT MANUFACTURERS RECOMMENDATIONS FOR PROTECTION OF METAL.

66. TIMBER CONNECTORS CALLED OUT BY LETTERS AND NUMBERS SHALL BE "STRONG-TIE" BY SIMPSON COMPANY, AS SPECIFIED IN THEIR CATALOG NUMBER C-2015. EQUIVALENT DEVICES BY OTHER MANUFACTURERS MAY BE SUBSTITUTED, PROVIDED THEY HAVE ICC-ES APPROVAL FOR EQUAL OR GREATER LOAD CAPACITIES. PROVIDE NUMBER AND SIZE OF FASTENERS AS SPECIFIED BY MANUFACTURER FOR MAXIMUM LOAD CARRYING CAPACITY. CONNECTORS SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.

    ALL 2X JOISTS SHALL BE CONNECTED TO FLUSH BEAMS WITH "LUS" SERIES JOIST HANGERS. ALL TJI JOISTS SHALL BE CONNECTED TO FLUSH BEAMS WITH "ITS" SERIES JOIST HANGERS. ALL DOUBLE-JOIST BEAMS SHALL BE CONNECTED TO FLUSH BEAMS WITH "MIT" SERIES JOIST HANGERS.

    WHERE CONNECTOR STRAPS CONNECT TWO MEMBERS, PLACE ONE-HALF OF THE NAILS OR BOLTS IN EACH MEMBER.

    ALL SHIMS SHALL BE SEASONED AND DRIED AND THE SAME GRADE (MINIMUM)AS MEMBERS CONNECTED.

67. WOOD FASTENERS

    A. NAIL SIZES SPECIFIED ON DRAWINGS ARE BASED ON THE FOLLOWING SPECIFICATIONS:

SIZE	LENGTH	DIAMETER
6d	2"	0.113"
8d	2-1/2"	0.131"
10d	3"	0.148"
12d	3-1/4"	0.148"
16d BOX	3-1/2"	0.135"

    IF CONTRACTOR PROPOSES THE USE OF ALTERNATE NAILS, THEY SHALL SUBMIT NAIL SPECIFICATIONS TO THE STRUCTURAL ENGINEER (PRIOR TO CONSTRUCTION) FOR REVIEW AND APPROVAL.

    NAILS - PLYWOOD (APA RATED SHEATHING) FASTENERS TO FRAMING SHALL BE DRIVEN FLUSH TO FACE OF SHEATHING WITH NO COUNTERSINKING PERMITTED. TOE-NAILS SHALL BE DRIVEN AT AN ANGLE OF 30 DIGRESS WITH THE MEMBER AND STARTED 1/3 THE LENGTH OF THE NAIL FROM THE MEMBER END.

    B. ALL BOLTS IN WOOD MEMBERS SHALL CONFORM TO ASTM A307. PROVIDE WASHERS UNDER THE HEADS AND NUTS OF ALL BOLTS AND LAG BOLTS BEARING ON WOOD. INSTALLATION OF LAG BOLTS SHALL CONFORM TO THE NATIONAL DESIGN SPECIFICATION FOR WOOD CONSTRUCTION WITH A LEAD BORE HOLE OF 60 TO 70 PERCENT OF THE SHANK DIAMETER. LEAD HOLES ARE NOT REQUIRED FOR 3/8" AND SMALLER LAG SCREWS.

68. NOTCHES AND HOLES IN WOOD FRAMING:

A. NOTCHES ON THE ENDS OF SOLID SAWN JOISTS AND RAFTERS SHALL NOT EXCEED ONE-FOURTH THE JOIST DEPTH. NOTCHES IN THE TOP OR BOTTOM OF SOLID SAWN JOISTS SHALL NOT EXCEED ONE-SIXTH THE DEPTH AND SHALL NOT BE LOCATED IN THE MIDDLE THIRD OF THE SPAN. HOLES BORED IN SOLID SAWN JOISTS AND RAFTERS SHALL NOT BE WITHIN 2 INCHES OF THE TOP OR BOTTOM OF THE JOIST, AND THE DIAMETER OF ANY SUCH HOLE SHALL NOT EXCEED ONE-THIRD THE DEPTH OF THE JOIST.

B. IN EXTERIOR WALLS AND BEARING PARTITIONS, ANY WOOD STUD IS PERMITTED TO BE CUT OR NOTCHED TO A DEPTH NOT EXCEEDING 25 PERCENT OF ITS WIDTH. A HOLE NOT GREATER IN DIAMETER THAN 40 PERCENT OF THE STUD WIDTH IS PERMITTED TO BE BORED IN ANY WOOD STUD. IN NO CASE SHALL THE EDGE OF THE BORED HOLE BE NEARER THAN 5/8 INCH TO THE EDGE OF THE STUD. BORED HOLES SHALL NOT BE LOCATED AT THE SAME SECTION OF STUD AS A CUT OR NOTCH.

C. NOTCHES AND HOLES IN MANUFACTURED LUMBER AND PREFABRICATED PLYWOOD WEB JOISTS SHALL BE PER THE MANUFACTURERS RECOMMENDATIONS UNLESS OTHERWISE NOTED.

69. WOOD FRAMING NOTES--THE FOLLOWING APPLY UNLESS OTHERWISE SHOWN ON THE PLANS:

A. ALL WOOD FRAMING DETAILS NOT SHOWN OTHERWISE SHALL BE CONSTRUCTED TO THE MINIMUM STANDARDS OF THE INTERNATIONAL BUILDING CODE, THE AITC "TIMBER CONSTRUCTION MANUAL" AND THE AF&PA "NATIONAL DESIGN SPECIFICATION FOR WOOD CONSTRUCTION". MINIMUM NAILING, UNLESS OTHERWISE NOTED, SHALL CONFORM TO IBC TABLE 2304.10.1. COORDINATE THE SIZE AND LOCATION OF ALL OPENINGS WITH MECHANICAL AND ARCHITECTURAL DRAWINGS.

B. WALL FRAMING: REFER ARCHITECTURAL DRAWINGS FOR THE SIZE OF ALL WALLS. ALL STUDS SHALL BE SPACED AT 16" O.C. UNO. TWO STUDS MINIMUM SHALL BE PROVIDED AT THE END OF ALL WALLS AND AT EACH SIDE OF ALL OPENINGS, AND AT BEAM OR HEADER BEARING LOCATIONS. TWO 2x8 HEADERS SHALL BE PROVIDED OVER ALL OPENINGS NOT OTHERWISE NOTED. SOLID BLOCKING FOR WOOD COLUMNS SHALL BE PROVIDED THROUGH FLOORS TO SUPPORTS BELOW. PROVIDE CONTINUOUS SOLID BLOCKING AT MID-HEIGHT OF ALL STUD WALLS OVER 10'-0" IN HEIGHT.

ALL WALLS SHALL HAVE A SINGLE BOTTOM PLATE AND A DOUBLE TOP PLATE. END NAIL TOP PLATE TO EACH STUD WITH TWO 16d NAILS, AND TOENAIL OR END NAIL EACH STUD TO BOTTOM PLATE WITH TWO 16d NAILS. FACE NAIL DOUBLE TOP PLATE WITH 16d @ 12" O.C. AND LAP MINIMUM 4'-0" AT JOINTS AND PROVIDE EIGHT 16d NAILS @ 4" O.C. EACH SIDE JOINT.

ALL STUD WALLS SHALL HAVE THEIR LOWER WOOD PLATES ATTACHED TO WOOD FRAMING BELOW WITH TWO ROWS OF 16d NAILS @ 12" ON-CENTER, OR ATTACHED TO CONCRETE BELOW WITH 5/8" DIAMETER ANCHOR BOLTS @ 4'-0" ON-CENTER EMBEDDED 7" MINIMUM, UNLESS INDICATED OTHERWISE. INDIVIDUAL MEMBERS OF BUILT-UP POSTS SHALL BE NAILED TO EACH OTHER WITH TWO ROWS OF 16d @12" ON-CENTER. UNLESS OTHERWISE NOTED, GYPSUM WALLBOARD SHALL BE FASTENED TO THE INTERIOR SURFACE OF ALL STUDS AND PLATES WITH NO. 6 X 1-1/4" TYPE S OR W SCREWS @ 8" ON-CENTER. UNLESS INDICATED OTHERWISE, 1/2" (NOMINAL)APA RATED

SHEATHING (SPAN RATING 24/0) SHALL BE NAILED TO ALL EXTERIOR SURFACES WITH 8d NAILS @ 6" ON-CENTER AT PANEL EDGES AND TOP AND BOTTOM PLATES (BLOCK UN-SUPPORTED EDGES)AND TO ALL INTERMEDIATE STUDS AND BLOCKING WITH 8d NAILS @ 12" ON-CENTER ALLOW 1/8" SPACING AT ALL PANEL EDGES AND PANEL ENDS.

C. FLOOR AND ROOF FRAMING: PROVIDE DOUBLE JOISTS UNDER ALL PARALLEL PARTITIONS THAT EXTEND OVER MORE THAN HALF THE JOIST LENGTH AND AROUND ALL OPENINGS IN FLOORS OR ROOFS UNLESS OTHERWISE NOTED. PROVIDE SOLID BLOCKING AT ALL BEARING POINTS. TOE-NAIL JOISTS TO SUPPORTS WITH TWO 16d NAILS. ATTACH TIMBER JOISTS TO FLUSH HEADERS OR BEAMS WITH SIMPSON METAL JOIST HANGERS IN ACCORDANCE WITH NOTES ABOVE. NAIL ALL MULTI JOIST BEAMS TOGETHER WITH TWO ROWS 16d @ 12" ON-CENTER.

UNLESS OTHERWISE NOTED ON THE PLANS, PLYWOOD ROOF AND FLOOR SHEATHING SHALL BE LAID UP WITH GRAIN PERPENDICULAR TO SUPPORTS AND NAILED AT 6" ON-CENTER WITH 8d NAILS TO FRAMED PANEL EDGES, STRUTS AND OVER STUD WALLS AS SHOWN ON PLANS AND @ 12" ON-CENTER TO INTERMEDIATE SUPPORTS. PROVIDE APPROVED PLYWOOD EDGE CLIPS CENTERED BETWEEN JOISTS/TRUSSES AT UNBLOCKED ROOF SHEATHING EDGES. ALL FLOOR SHEATHING EDGES SHALL HAVE APPROVED T&G JOINTS OR SHALL BE SUPPORTED WITH SOLID BLOCKING. ALLOW 1/8" SPACING AT ALL PANEL EDGES AND ENDS OF FLOOR AND ROOF SHEATHING. TOENAIL BLOCKING TO SUPPORTS WITH 16d @ 12" ON-CENTER UNLESS OTHERWISE NOTED.