

PROJECT RE-ENVISION RENOVATION GUIDEBOOK

University of Florida

Information on how to renovate existing 1-,2-,3-, and
4-bedroom 1960s and 1970s Public-Housing Properties

With specific focus on the redesign of the:

- 1) Transition from the bedroom to the bathroom
- 2) Kitchen maneuverability and ergonomics

Innovations and renovation guidance to enhance accessibility through repurposing strategies
for older, public, affordable, small-scale, attached housing

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Guidebook Purpose and Project Background

This guidebook's purpose is to inform professionals, consumers and consumer advocates of ways to implement and renovate certain design innovations that enhance accessibility in older US public housing and other low-cost residences. The particular interior areas of renovation include the: 1) transition from the bedroom to the bathroom, and 2) kitchen. These areas were chosen after focus groups identified them as being most problematic for persons with disabilities to navigate and maneuver safely, comfortably, and successfully on a routine basis. Our intention also is to “spark” new ways of thinking and redesigning for residential accessibility that are affordable and attractive—so that others will begin to produce innovative interior renovations for other areas of the home—and other home layouts that can be shared with homebuilding renovators, healthcare professionals, and consumers.

This guidebook is intended for use by professionals at all levels. Those with minimal expertise in construction and renovation will be able to share this document with others who are more versed in the construction industry about how to undertake these renovations and their cost effectiveness. For instance, US Cooperative Extension agents could convene classes with their local homebuilder associations' (HBAs) remodelers division/council to review the guidebook with them. In turn, HBA member can become familiar with the design and construction details involved in renovating the areas covered in this guidebook. This would be a system whereby a broad-reaching group of cross-trained professionals (in terms of subject matter) were able to market and describe the guidebook to more highly trained subject-matter professionals who might otherwise not be exposed to the guidebook.

The background of this project stems from a research and design team at the University of Florida—called Project Re-Envision at the University of Florida—that entered into a cooperative agreement with the US Dept of Housing (HUD) in 2017. Our team's approach was to analyze, and then redesign and repurpose, various floorplans of US public housing and other older affordable housing layouts from the 1950s through 1970s. The team developed redesigns of those layouts via input from our Advisory Council, academic literature reviews, focus group interviews, a design charrette, and feedback from pilot tests involving healthcare professionals and persons with disabilities who “experienced” moving through digitized and virtual simulations of the interior redesigns.

The guidebook most successfully will be used as a tool to inform interested entities of an existing housing problem in the US and a set of proposed solutions to enhance resident accessibility in a manner that is both cost effective and attractive. This guidebook identifies some of the key accessibility and livability problems underling the transition from the bedroom to the bathroom, and the kitchen, in older public and low-cost housing stock. Moreover, it offers innovative redesigns for these specific problems by repurposing spaces and interior features that can be implemented successfully by most remodelers in a cost-effective manner. The guidebook can be used by, but is not limited to,: 1) those consumers, disability advocates and healthcare professionals desiring to

inform construction professionals; 2) construction professionals themselves; 3) investors and/or developers; and 4) any other interested entities desiring to investigate whether they might be interested in becoming involved in some aspect of renovating older US public and low-cost housing stock.

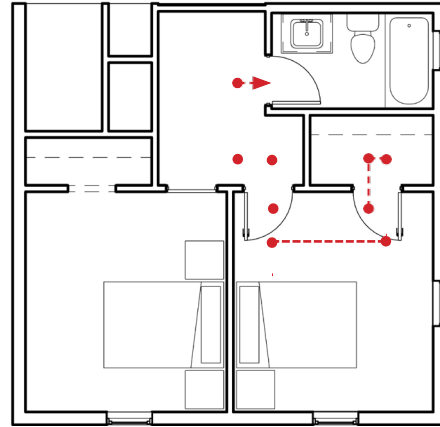
This Guidebook is Organized so each section follows a similar format: they begin by offering an actual layout of an interior area that identifies problems and challenges. This is followed by a redesign of that area, with programmatic requirements guiding the redesign, graphic highlights of that redesign, and then exploded views and item schedules (i.e., for take-offs, cost analyses, etc.). The final section (Appendix) is offered to show just a few examples of the many items reviewed early in this project as we were formulating ideas for how to incorporate efficiencies into our redesigns.

TRANSITION FROM BEDROOM TO BATHROOM

Original Design

PROBLEMS AND CHALLENGES

- Many turns to maneuver from bed to bath
- Limited visual access to bathroom door when exiting bedroom
- Complicated choreography for from bed, to dressing, to bathroom
- Cramped storage/closet space
- Bathroom is shared with other members of household
- Swing doors take up valuable movement space; challenge to close when in tight spaces

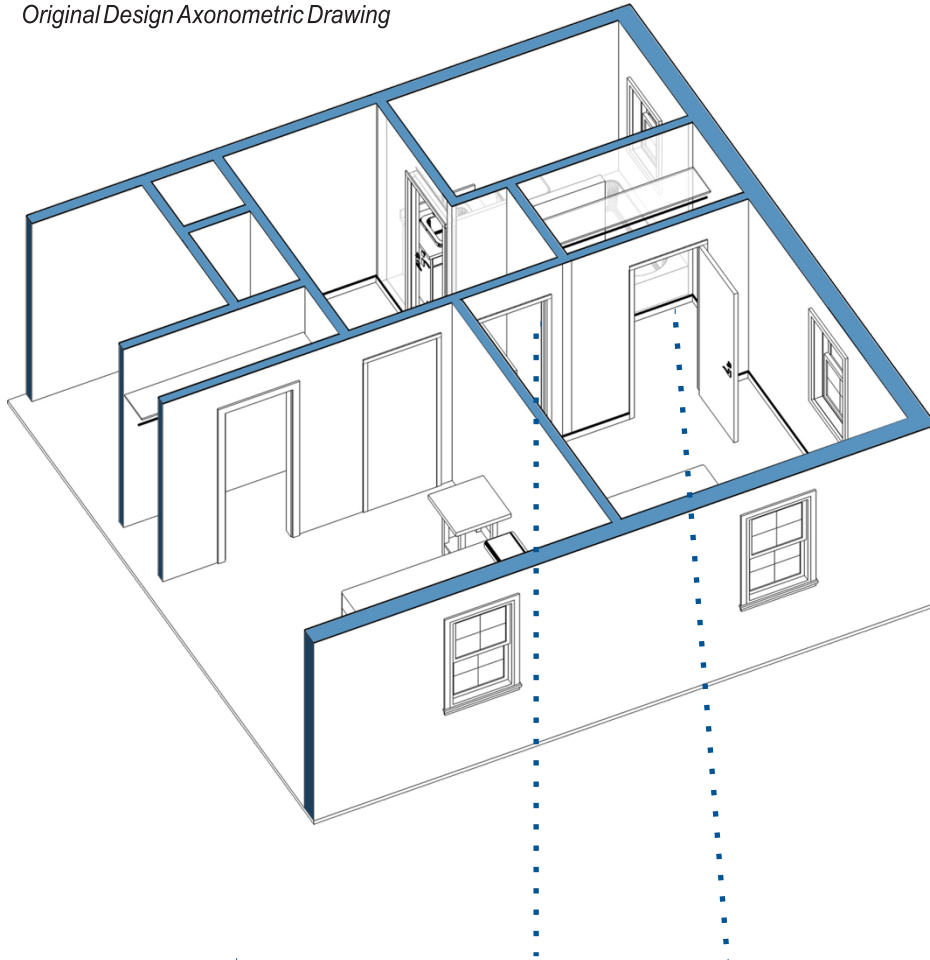


Original Design Floor Plan
Many turns from bedroom to
bathroom



Perspective: View from Bed showing Closet and Hallway leading to Bathroom Entrance

Original Design Axonometric Drawing



Visual Connection Issue

Residents unable to view bathroom from their bedroom, making it challenging to find at night for those with impaired vision.



Traditional Closet System

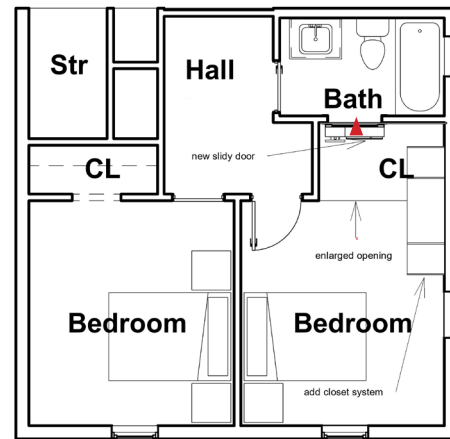
Small closet does not provide space to maneuver for dressing or to easily locate clothing.

TRANSITION FROM BEDROOM TO BATHROOM

Re-Design

PROGRAMMATIC REQUIREMENTS

- Slidy wall serves as both door and storage
- Slidy wall maintains privacy and ease of operation
- Closet becomes storage and transition space
- Simplify choreography between bed-to-dressing to bathroom
- Off-the-rack storage systems that mount on walls
- Bathroom door frames has LED strip lighting for visual guidance at night
- Color contrast to heighten visual accessibility
- Shared bathroom easy to access for everyone
- Bathroom configuration and size not under FHAA regulations in complexes < 5 units

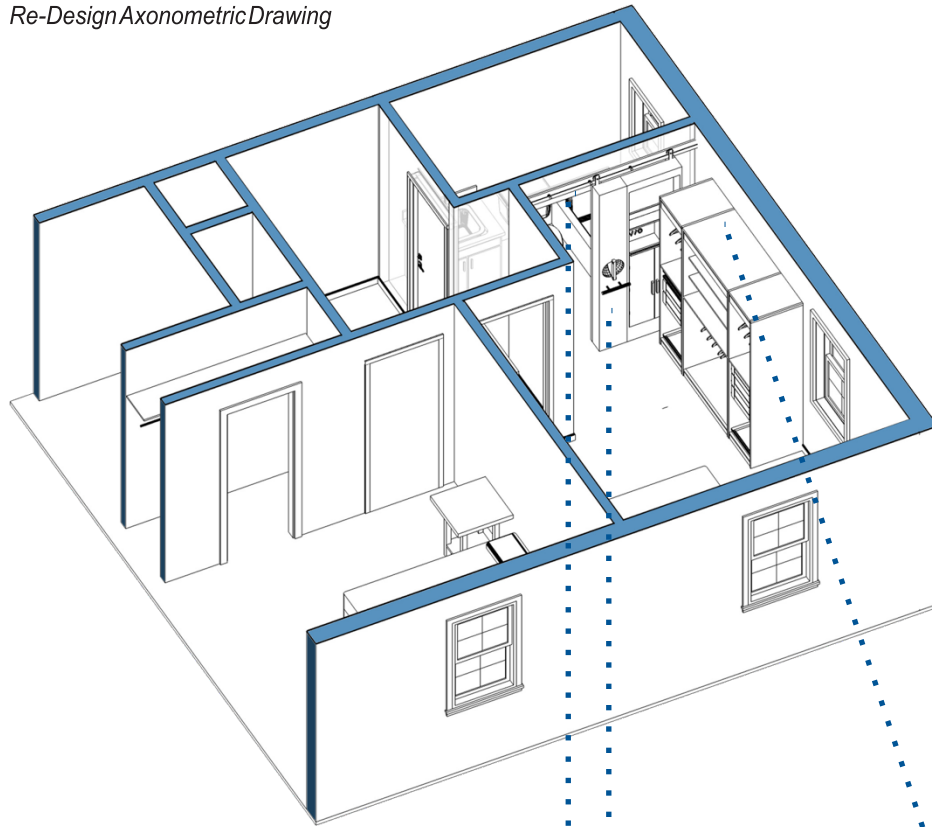


Re-Design Floor Plan
Shorten the distance and reduce
number of turns from bed-to-
dressing to bathroom



Perspective: View from Bed showing Slidy Wall (Direct) Entrance to Bathroom

Re-Design Axonometric Drawing



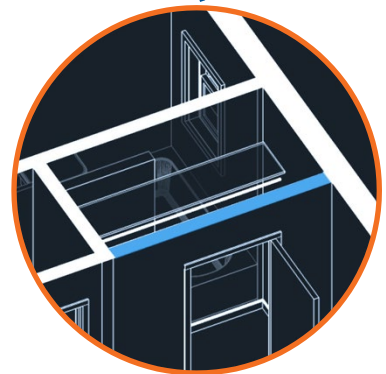
LED Strip Light

The LED strip light provides visual guidance to the bathroom during night.



Multi-functional Slidy Wall

The multi-functional, 12" thick slidy wall provides storage for linens, etc. (weighing no more than 75 lbs total). The two ergonomically designed (vertical and horizontal) handles provide better accessibility to the bathroom, and enhance safety.

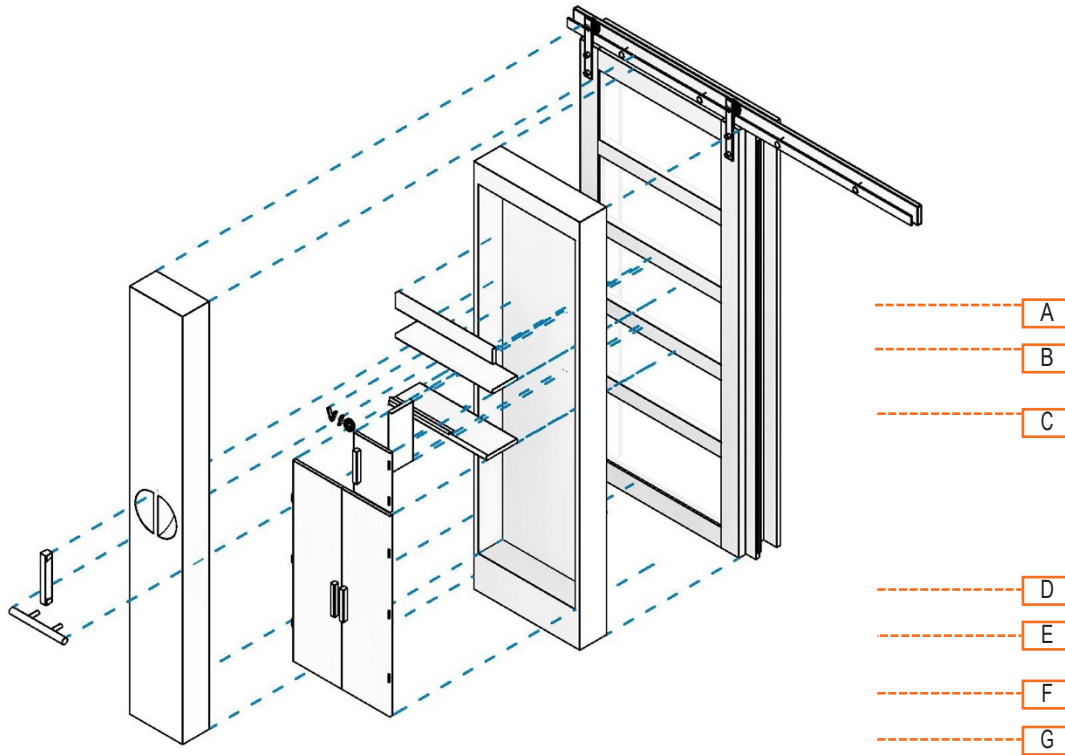


Remove Partition

Remove the original partition to enhance the transition between bedroom to bathroom. Minimize the risk of falls by reducing turns.

TRANSITION FROM BEDROOM TO BATHROOM

Re-Design - Exploded View & Item Schedule



Exploded View of Slidy Wall

Item Schedule				
S.No.	Item Key	Item Name	Item Description	Comments
1	C1	Closet	Ikea PAX Wardrobe 09247262	See Drawing
2	C2	Closet	Ikea Lillangen Wall Cabinet 10396637	See Drawing
3	D1	Sliding Door	Renin (Pavilion 5-Lite Complete Barn Door Kit)	See Drawing

Demolition Notes	
S.No.	Note Description
1	REMOVE EXISTING DOORS, FURNISHING AND EQUIPMENT SPECIFIED IN REMOVAL SCHEDULE.
2	EXISTING LIGHTING AND ELECTRICAL IN CEILING TO REMAIN.
3	EXISTING BATHROOM FIXTURES TO REMAIN.
4	EXISTING PLUMBING TO REMAIN.

Removal Schedule	
S.No.	Notes
1	Closet Door
2	Closet Shelving
3	Bathroom Door
4	Bathroom Door Fixtures
5	Closet Door Fixtures

Re-Design - Cost Estimation

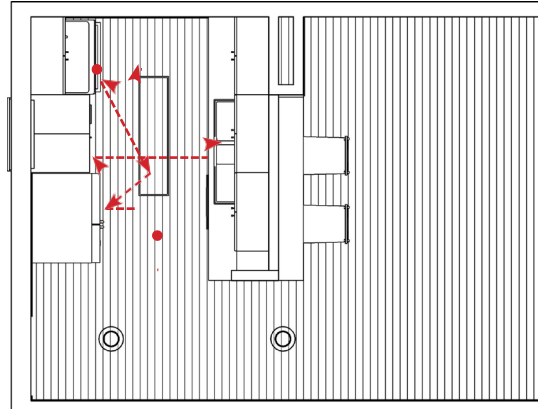
Item Schedule									
S.No.	Item Key	Item Name	Item Description	Quantity	Unit	Total Cost	URL/Info	Manufacture	Model
1		Ikea Cabinet System	Ikea Pax Cabinet System	1	no(s)	\$598	Please See Drawings and spec sheet	Ikea	Pax Wardrobe System(PAX code: 9969HJ)
2	B+E	Cabinet	Sliding Door Cabinet (7'x2'x4") : (Frame and Door : 1" Particleboard; Backpanel: 1/2" Fiberboard; Shelf: 1" Fiberboard)	1	no(s)		Please See Drawings	Custom	
3	D	Cabinet	Sliding Door Cabinet(3'5"x1'x4") : (Frame and Door : 1" Particleboard; Backpanel: 1/2" Fiberboard; Shelf: 1" Fiberboard)	1	no(s)		Please See Drawings	Custom	
4	A	Sliding Door	Bathroom Door(Renin (Pavilion 5-Lite Complete Barn Door Kit))	1	no(s)	\$639	https://www.renin.com/barn-doors/pavilion-barn-door/	Renin	Pavilion 5-Lite Complete Barn Door Kit
5	F	Door Handle	Custom Handle (9"x1" Diameter): Hard- wood dowel	1	no(s)			Custom	
6	G	Bar Handle	Amerock Bar Pulls 10-1/16 in	1	no(s)	\$11	https://www.amerock.com/Products/Detail/pid/674/ s/256mm-bar-pull-8429	Amerock	BP19013SS
7	B	Rectangle Flush Handle	Rectangle Flush Handle	1	no(s)	\$39-\$45	https://www.renin.com/us/hardware/rectangle-flush-pull/	Renin	Rectangle Flush Handle(BD460)
8	B	Barn Door Lock	Easy Latch Barn Door Privacy Hardware Kit(BDF8000)	1	no(s)	\$189	https://www.renin.com/us/hardware/easy-latch-barn-door-privacy-hardware-kit/	Renin	BDF8000

Bedroom-to-Bathroom Cost Schedule				
Description	Low-end	Average	High-end	
Base Permit Fee (Alachua County, FL)	180	180	180	
Supervision (2-weeks)	2,400	2,400	2,400	
Tools and Expendables	100	100	100	
Sawcut/Demo 4" wall @ bathroom room door opening	28	53	78	
Demo 4" wd stud wall gyp both sides (Less Closet Door)	40	43	45	
Demo wd closet door/frame	20	63	105	
Demo Misc Closet Specialties	10	30	50	
Load and Haul	60	53	45	
Dumpster (10cy Dumpster)	225	225	225	
Final Cleaning	110	110	110	
Misc 2x Framing @ New Sliding Door Opening	52	52	52	
Case Door Opening for Barn Door Slider Finish	123	123	123	
Assemble and Install Ikea Pax Cabinet System (22 Pieces total, 1hr per piece)	1,038	1,119	1,200	
Install Renin Barn Door Kit Hardware/Hang Door	739	820	900	
Install Cabs Back of Barn Door (Manufactured by Cabinet Sub (Includes Custom Wood Handle)	1,080	1,440	1,800	
Install Barn Door Lock	229	252	275	
Install Barn Door Handle - H3	0	98	195	
Install Cabinet Pull - H2	31	66	100	
Plaster Patch (Sub Covers Misc Materials)	400	400	400	
Painting (1 day - 1 guy)	500	500	500	
Floor Patch	250	250	250	
LED Light Strip Install (Additional Branch Circuits May need to be moved or demoed included in #)	575	575	575	
Subtotal	8,189	8,949	9,708	
Labor Burden	1,058	1058	1,058	
TAX	141	141	141	
TOTAL cost	9,388	10,147	10,906	
Markup	2,446	2,446	2,446	
Bid price	11,834	12,593	13,352	

*Note: Wherever there were missing line items from 1 of the 2 companies offering bids, the other company's data was used for both companies to maintain compatibility

PROBLEMS AND CHALLENGES

- Area for meal preparation and clean-up (sink, frig, cooktop, oven, countertop) requires too many turns
- Difficult to reach cupboards, back of countertops, especially in corners
- No knee space beneath sink, stove
- For people with visual impairments, cabinet doors without identifying markings can be an extra strain for figuring out interior contents
- Fixed placement of storage instead of that which is easily moveable/wheeled around
- Challenge to lift heavy pots/pans from oven to counter

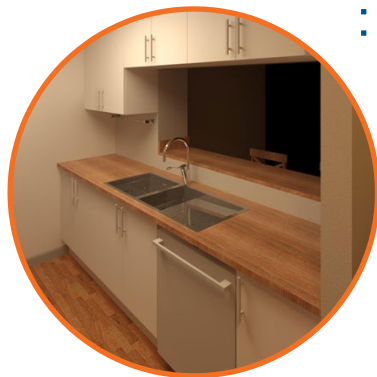
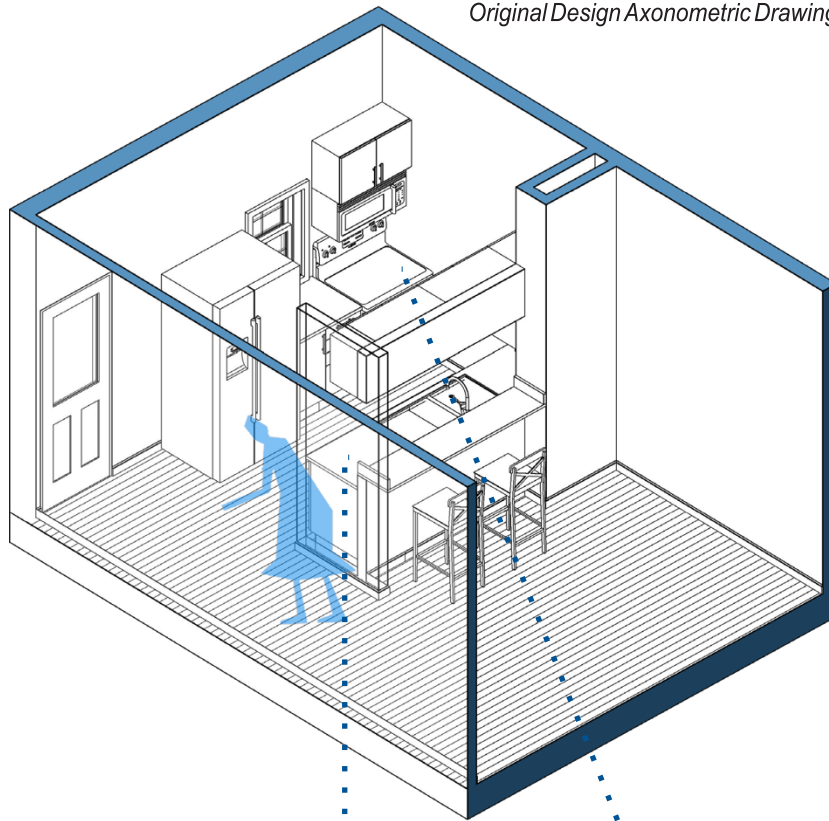


Original Design Floor Plan
Many turns when resident is attempting to boil an egg



Perspective: View from the Entrance to the Kitchen

Original Design Axonometric Drawing



Traditional Stove System

There is no knee space beneath stovetop. People use this area for everything from meal preparation to clean-up.



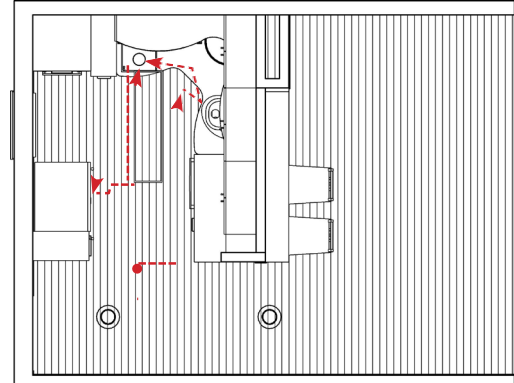
Traditional Sink and Countertop

Difficult to reach cupboards/cabinets, back of countertops, especially in corners. No knee space beneath sink.

Re-Design - The Pivot Kitchen

PROGRAMMATIC REQUIREMENTS

- Design kitchen workspace around a pivot point that will minimize walking and moving between cooktop, oven, refrigerators and sink
- Reconsider customized “Skyline” kitchen design by Snaidero to be more affordable by using off-the-shelf and stock items found in office-line furniture and Ikea
- Minimize having to extend reach: 1) overhead in accessing shelves/cabinets, and 2) to the back of deep countertops
- Whenever possible, use adjustable, variable-height countertops and overhead cabinetry
- Have plenty of countertop space for setting items on top of, preparing meals, etc.
- Maximize visibility to where cooking and serving wares are in the kitchen/eating area
- Provide an eating surface that can convert to work surface when needed
- Provide color contrast among shelves, countertops, cabinets and walls
- Stovetop with single row of burners and controls in front

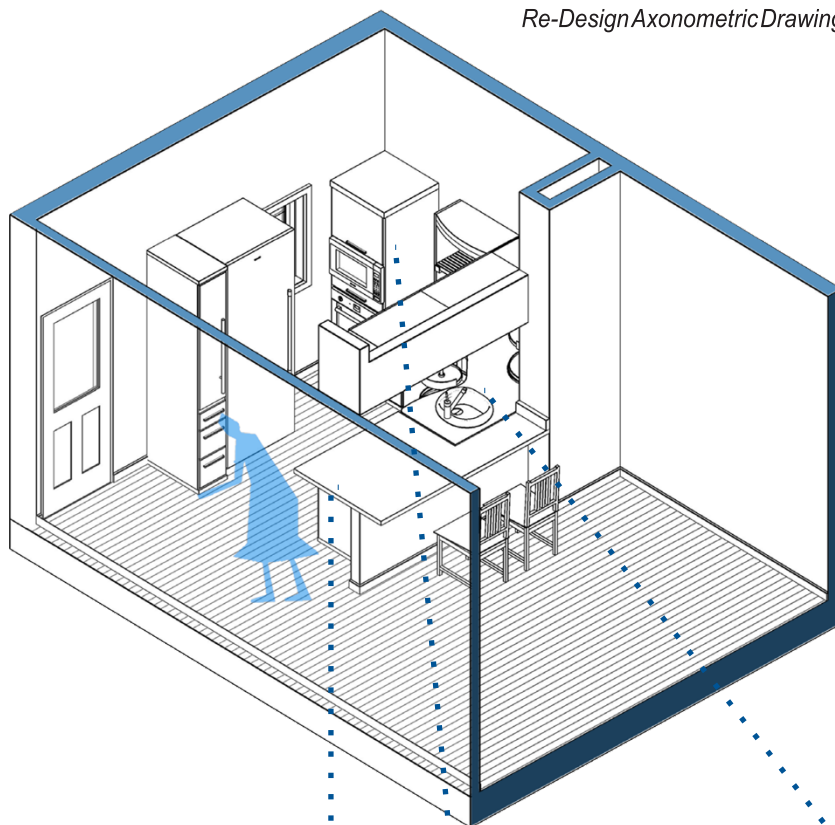


Re-Design Floor Plan
Minimize walking/movement
when preparing meals.



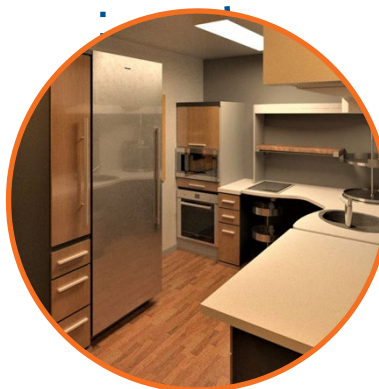
Perspective: View from Entrance to the Kitchen

Re-Design Axonometric Drawing



Large Countertop Space

Large countertop space provides adequate space for setting on top of it and preparing meals. It can be used as an eating space. When needed, this surface can be converted to a work surface.



Pivot Workflow

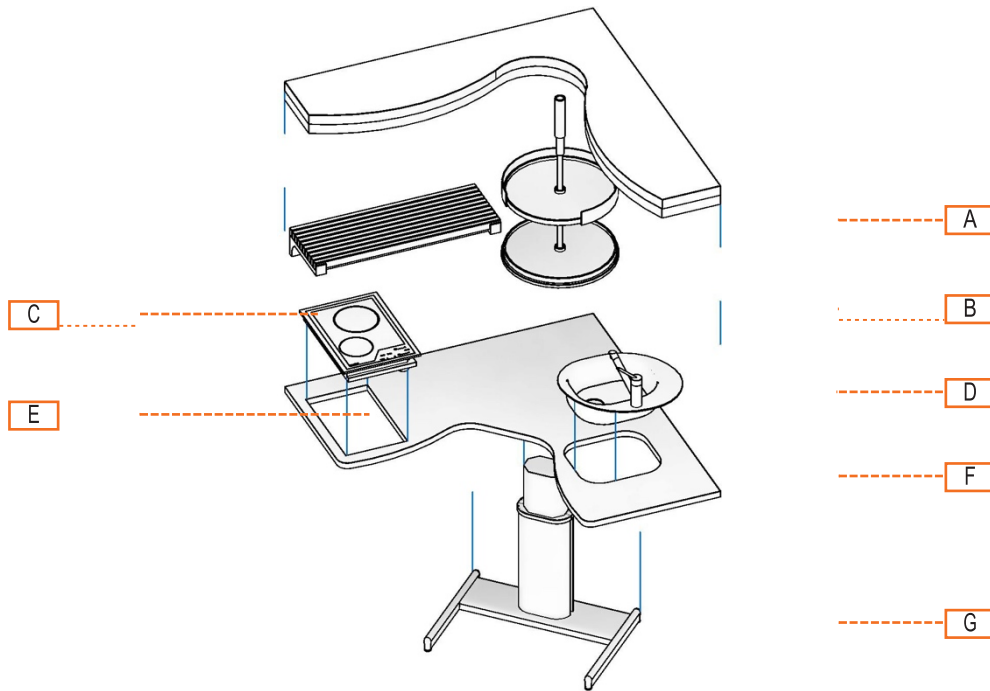
Cluster the kitchen fixtures in a corner to minimize walking and grasping movement while working.



Height-adjusted Countertop

The height-adjusted countertop provides adequate space for people of varying heights. The range of the countertop varies from 2'-6" to 3'-7". Using the Lazy Susan tray reactivates the corner and minimizes the need to extend reach.

Re-Design - Exploded View & Item Schedule



*Exploded View of
Height-adjusted Countertop*

Item Schedule									
S.No.	Item Key	Item Name	Item Description	Quantity	Unit	Cost/Unit	URL/Info	Manu- facture	Model
Electrical Equipment									
1		Refrigerator	DoorFlush Fresh Food Column: Fridge(Thermador T30IR900SP)	1	no(s)	\$6599	https://www.thermador.com/us/products-list/refrigeration/refrigerationrefrigerationcolumns/T30IR900SP	Therma- dor	T30IR900SP
2	E	Stove	Wolf Electric Cooktop	1	no(s)	\$1215	https://www.subzero-wolf.com/wolf/cooktops-and-rangetops/electric-cooktops/15-inch-transitional-electric	Wolf	CE152T-S
3		Microwave	Bosch Microwave Oven HMB5051	1	no(s)	\$549	https://www.bosch-home.com/us/productslist/home-appliances/HMB5051	Bosch	HMB5051
4		Oven	Bosch Wall Ovens HBE5451UC	1	no(s)	\$2099	https://www.bosch-home.com/us/productslist/HBE5451UC	Bosch	HBE5451UC
5		Dishwasher	Bosch Dishwasher SGX-68U55UC	1	no(s)	\$1049	https://www.bosch-home.com/us/productslist/dishwashers/top-controls/SGX68U55UC	Bosch	SGX68U55UC
Furniture									
6		Kitchen Countertop	Laminate (6'3" x 3' 5"x2")	1	no(s)			Renin	Pavilion 5-Lite Complete Barn Door Kit

Re-Design - Cost Estimation

S.No.	Item Key	Item Name	Item Description	Quantity	Unit	Cost/Unit	URL/Info	Manu- facture	Model
7	B	Lazy Susan Turntable	Knap & Vogt 2-Tier Plastic Pie-Cut Cabinet Lazy Susan	1	no(s)		https://www.lowes.com/pd/Knap-Vogt-2-Tier-Plastic-Pie-Cut-Cabinet-Lazy-Susan/1002937962?cm_mmc=shop_-c_-prd_-dcr_-google_-pla_-232_-soskitchenlaundryorganization_-1002937962_-0&placeholder=nul&gold=CQKQJwgJv4BRCArAB-17J17-PhN6Yc7dmUS2T2e1jv0T9R7nak0CzjSSORA-muEw3_yqbkaAl-EALw_wcB&gclid=aw.ds	Custom	
8		Lazy Susan Turntable	Lazy Susan Turntable	1	no(s)			Amer- ock	BP19013SS
9	C	Wall Mounted Pan/ Pot Rack	Wall Mounted rack	1	no(s)		http://www.eaglegrp.com/ProductDisplay.asp?numDivId=1&num-ModelNumber=WSP1236&numMaj-CatId=2&SubCatId=706	Renin	Rectangle Flush Handle(BD460)
10	G	Universal Table	Steelcase Height Adjustable Desk Airtouch Universal Table 90 Degree Corner: 22 1/4D x 39 1/4W - 3mm Edge	1	no(s)		https://www.steelcase.com/search/?gsc_q=airtouch+universal+table	Renin	BDF8000
11		Kitchen Touch Trash Bin	iTouchless Sensor Trash Can	1	no(s)		https://www.itouchless.com/13-gal-lon-deodorizer-sensor-trash-can-with-wheels		
12		Kitchen Cabinet	Kitchen Cabinet(Ikea SEKTION / MAXIMERA: S89370314)	1	no(s)	\$506	https://www.ikea.com/us/en/p/sek-tion-maximera-high-cab-w-glass-dr-3-dwr-1-door-white-axstad-matt-white-s89370314/		
13		Kitchen Isle	Kitchen Isle for Oven and Microwave(Ikea Sektion: S79274011)	1	no(s)	\$404	https://www.ikea.com/us/en/p/sek-tion-high-cab-f-micro-oven-draw-er-door-white-maximera-lerhyttan-light-gray-s79274011/		
14		Kitchen Base Cabinet	Kitchen Base Cabinet under counter top(Ikea Knoxhult: 20372264)	1	no(s)	\$132	https://www.ikea.com/us/en/p/knoxhult-base-cabinet-with-draw-ers-gray-20372264/		
15		Kitchen Top Cabinet	Marbodal: Wall cabinet Arkitekt Plus	1	no(s)				
Plumbing Fixtures									
16	F	Kitchen Sink	Kohler K-5964 Mayfield Sink			\$239.2	https://www.us.kohler.com/us/mayfield-25-x-22-x-8-3-4-top-mount-single-bowl-kitchen-sink-with-4-faucet-holes/productDetail/kitchen-sinks/418813.htm	Kohler	K-5964
17		Telescopic Drain	Adjust-a-Sink T1514(14" adjustment)				https://www.adjustasink.com/drains/t1514.html	Adjust-a-Sink	T1514
18		Counter Top	Laminate	37.9	SF				

Demolition Notes		Casework Schedule						
S.No.	Note Description	Type	Width	Depth	Height	Description	Phase Created	Count
1	REMOVE EXISTING FURNISHING AND EQUIPMENTS SPECIFIED IN REMOVAL SCHEDULE.	Cabinets - Doors for Uppers	2' - 7 1/2"	1' - 3"	1' - 6 1/2"	European style doors for upper cabinets		5
2	FOR WALL DEMOLITION CHECK ELEVATION PLAN.	Cabinets - Oven Low - Microwave High	2' - 11 1/2"	1' - 11 1/2"	2' - 11 1/2"	Custom configuration of stock cabinets - oven lower cabinet with counter, two side panels supporting upper cabinet	New Construction	1
3	EXISTING TOP KITCHEN CABINETS ARE TO BE REMOVED AND STORED FOR REUSE.	Cabinets - Tall Pantry	2' - 11 1/2"	1' - 11 1/2"	2' - 11 1/2"	Pantry Cabinet 3-drawers low & 1-doors high	New Construction	1
4	EXISTING LIGHTING AND ELECTRICAL IN CEILING TO REMAIN.	Cabinets - Upper with Doors	4' - 0"	2' - 0"	3' - 0"	12" deep wall cabinets with doors & 3 shelves	Existing	1
5	EXISTING SINK ALONG WITH DRAIN TO BE REMOVED.							
6	EXISTING PLUMBING TO REMAIN.							

Kitchen Cost Schedule

Description	Low -end	Average	High -end
Base Permit Fee (Alachua County)	180	180	180
Supervision	3,600	3,600	3,600
Tools and Expendables	150	150	150
Demo 4" wd stud wall at cabinets on sink side of kitchen	47	71	95
Demo base cabinets	120	130	140
Demo Upper Cab - D1	15	29	43
Carefully Remove Upper Cabinets	60	65	70
Remove Fridge	20	30	40
Remove Stove/Oven	20	50	80
Load and Haul	100	100	100
Dumpster (10cy)	225	225	225
2x Framing New Wall at Upper Cabinets	173	173	173
Replace Base @ removed Base Cab under window	16	16	16
Assemble/Install Kitchen Cab - C1	646	823	1,000
Assemble/Install Kitchen Cab - C2	584	530	475
Assemble/Install Kitchen Cab - C3	464	464	464
Laminate Countertop (Installed, Includes Custom Top Shelf and Laminate Shelf Supports)	1,706	2,558	3,410
Reinstall Upper Cabinets	120	120	120
Install Cabinet - C4	80	113	225
Fasteners	60	60	60
Install 5/8" Type X to new upper cabinet support sink wall (Sub Price - Hang, Finish, Supply All Material)	225	225	225
Plaster Patch (Sub Covers Misc Materials, Includes Plumbing and Electrical Patches)	300	300	300
Painting (1 day - 1 guy)	500	500	500
Floor Patch	250	250	250
Wall Mounted Rack (F4)	533	354	175
Lazy Susan (F2)	230	190	150
Lazy Susan Base (F3)	480	315	150
Universal Table (Sink and Stove Top Cut-Out)	2,080	2,428	2,775
Itouch trashcan (2hrs of Time Covers Unboxing and Wheeling into Apt, All Equipment Below as well)	155	115	75
Dishwasher	1,089	1,092	1,095
Microwave	589	863	1,137
Wall Oven	2,139	1,830	1,520
Stove Top	1,255	1,175	1,095
Fridge	6,639	6,120	5,600
Plumbing Demolition	400	400	400
Plumbing Rough-in Adjustment	1,200	1,200	1,200
New Plumbing Fixtures (Labor Only)	600	600	600
Kitchen Sink	239	620	1,000
Kitchen Faucet	100	100	100
Electrical (Move Microwave Outlet, Move 240V for Oven, New Circuit for Dishwasher, New Dedicated Circuit for Stovetop)	4,800	4,800	4,800

Subtotal	32,188	33,000	33,812
Labor Burden	1,593	1,593	1,593
TAX	1,174	1,174	1,174
TOTAL cost	34,955	35,766	36,578
Markup	6,071	6,071	6,071
Bid Price	41,026	41,838	42,649

* Note: Wherever there were missing line items from 1 of the 2 companies offering bids,
The other company's data was used for both companies to maintain compatibility

APPENDIX

Examples of Repurposed Products



*Skyline Lab
Wheel-chair-friendly Kitchen Design*



*Ikea PAX Wardrobes
without Doors*



*Steelcase Airtouch
Height-adjustable Table*