

# RIPL Project Two

## Post-occupancy built and technology design evaluation

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## Project Background

In 2010 the Transport Accident Commission (TAC) established Residential Independence Pty Ltd (RIPL), a property trust dedicated to the development of small-scale home-like living environments. These new environments are intended to offer a model of shared support, bringing together the design of the environment and the use of integrated personal care, mobility transfer (e.g. hoist), home automation and communication assistive technologies to meet the needs of TAC claimants with near 24-hour care requirements following neurotrauma (TAC, 2011).

RIPL Project Two opened in December 2014 and has delivered a cluster unit model. This project consists of five single-level units for TAC clients and a sixth two-story unit currently utilised as an office space for disability support workers. The units are co-located on a block of land in an outer Eastern suburb of Melbourne. A model of 24-hour shared support, coupled with a comprehensive home automation and resident-staff communication system, has been provided onsite.

RIPL Project Two is located on the first parcel of land procured by RIPL, and was the inaugural project designed by the property trust. However, some delays to Local Council approvals for RIPL Project Two, and the retrofit approach taken with apartments purchased in a project already under construction at RIPL Project One, has meant that Project Two was the second housing project delivered.

This post-occupancy evaluation report details an interdisciplinary evaluation of RIPL Project Two. A customised Environment-Experience Evaluation Framework (E-EEF), established and piloted previously by the research group at RIPL Project One (Tregloan, Callaway, Meyer, Wood & Ianello, 2014a) has been applied. The application of the E-EEF reviewed the previous criteria established and documented via the further analysis and review of stated ambitions for RIPL projects, and briefing and construction documentation. User perspective was evaluated at RIPL Project Two against these criteria using the E-EEF. Innovative approaches to the communication of the evaluation and the evidence it builds upon were refined and new methodologies were included. These are presented in this Research Report, with associated navigable panoramas. Recommendations to inform future RIPL developments are offered, including design and technology brief development, and further refinement of the ambitions for the Scheme and the delivery of future models of housing and support for people with disability.

The Transport Accident Commission (TAC) has identified an ongoing need to separate the supply of housing and provision of support for people with neurotrauma, and to drive innovation within this approach. Following the development of the TAC's Accommodation Strategy (TAC, 2011), the organisation undertook a further comprehensive review of this strategy in 2015. The TAC has continued to invest in new models of housing and support through their property trust, Residential Independence Pty Ltd (RIPL). The trust aims to facilitate independent living by developing purpose built, accessible housing coupled with integrated assistive technologies and a client-centred model of support (TAC, 2016).

This report is the second part of a suite of post-occupancy research reporting that commenced with post-occupancy evaluation (POE) of RIPL Project One (Tregloan et al., 2014; Callaway et al., 2016). The research team developed a tailored Environment-Experience Evaluation Framework (E-EEF) for RIPL projects, piloted through the POE of RIPL Project One. The research delivered an evaluation of the impact of the designed built and technology environments at RIPL Project One on user experiences, informing the further development of the RIPL Design Brief documents.

The current report details a POE of RIPL's second project, delivered within an interactive and navigable PDF document. RIPL Project Two is a cluster model development, located in an outer suburban residential area of Melbourne. Project Two includes four two-bedroom single story units, one single story unit with capacity for three bedrooms, and a support worker office located in a two-bedroom double story unit. RIPL Project Two opened in December 2014.

For RIPL Project Two, the research aims were to:

- Revise and extend the pilot E-EEF used in POE of RIPL Project One to deliver a comprehensive and tailored POE of RIPL Project Two
- Use the E-EEF to undertake an actual use review of RIPL Project Two, examining the benefits and limitations of the case study as a designed (built and technology) environment, in terms of the identified design criteria
- Elicit key learnings and recommendations re criteria, processes and outcomes to inform future RIPL projects and further application.

The mixed methods approach to the POE of this project, using both quantitative and qualitative research methods is detailed in the Methodology section of the report. Review of the eight criteria, and thirty related sub-criteria identified through the development of the E-EEF at RIPL Project One (Tregloan et al, 2014) was undertaken with key stakeholders involved in development of Project Two. This review of stakeholder aspirations for RIPL Project Two demonstrated that they continue to align with these original established criteria. The criteria and related sub-criteria are presented in the Criteria Overview section and include: Independence, Community Integration, Homelike Environment, Support, Effective Workplace, Flexibility, Risk Management, and Scheme Viability. A small proportion of the sub-criteria identified were considered beyond the scope of this project, or not yet able to be evaluated in the first year of RIPL Project Two's operation. These have been included for completeness with relevant notes.



The mixed methods approach extended the innovative and customised approach to POE developed in RIPL Project One, and included two new methodologies. These were 1) mapping changes in furnishings and other customisations made by tenants across two separate data collection time points, and 2) Projective Diagrams demonstrating an individual's degree of physical access within the three dwelling designs delivered at RIPL Project Two. Ethics approvals for participant recruitment were amended to allow a broader range of approaches to this for future projects.

As was the case in POE of Project One, an interdisciplinary approach brought together architectural and occupational therapy expertise, supported by consultancy from specialists including a physiotherapist and exercise physiologist for mobility tracking, and IT developers for panorama production. The collaborative approach of the interdisciplinary research team and the careful balance of selected research methods and projective approaches have informed a detailed perspective on RIPL Project Two.

One of the primary tasks of the research team undertaking POE of RIPL projects is to inform future developments for RIPL, other areas of the TAC, and by extension other providers of housing and support for people with disability. For this reason, RIPL Project Two was reviewed against the current version of the RIPL design brief (v5.0) rather than the version in place at the time of the design development. The translation of criteria through their application at RIPL Project Two and the impact on residents' experiences and future iterations of the RIPL design brief, are central concerns of the evaluation. Specific elements of RIPL Project Two have necessarily affected the way that these ambitions have been realised. Key factors included the design of this project as a cluster unit model, the necessary location of the housing in relation to shops, transport and services, and the design of the support staff hub as a two-story unit onsite.

Overall, acknowledging the limitation of small participant numbers in this study, RIPL Project Two was found to be successful against the vast majority of the established criteria and sub-criteria for the single participant. In general, the reported and observed user experience of the built and technology design, as well as anecdotal reports by families of other tenants, was positive. However, useful learnings have also been made and key recommendations stem from these. These findings have included the identification of trade-offs and conflicts, as well as intersections between identified criteria, observations, and key outcomes.

Detailed recommendations have been provided within the report, based on the evaluation findings and with a focus on their relevance to future development projects. Key points stemming from recommendations are summarised below:

#### ***Site planning and context***

RIPL Project Two is the first cluster model delivered by the RIPL property trust. Procurement of a site of a suitable scale for the anticipated site yield introduced some trade-offs in terms of ease of access from RIPL housing to transport and services. The ability of the research participant in this study to own and drive a vehicle opened up opportunities for independent community access, although it also reduced the opportunity for incidental contact with neighbours otherwise achieved by travelling from home on foot. Site selection in Project Two may increase the likelihood of a tenant with higher support needs requiring support from another person to travel out for particular purposes (e.g. grocery shopping), with implications for cost of support and frequency of travel into the local community. These findings reinforce the value of the terms now included in the current RIPL Design Background and Specifications with regard to Site Selection.

### ***Layout and planning***

The site layout of RIPL Project Two responds well to the requirements for orientation and access to private open space and all units appear to have good solar access to living spaces.

Planning of units is strongly influenced by decisions regarding the number of bedrooms per unit, and – by implication – the number of bathrooms and the scale of other spaces.

This approach aimed to offer individual housing and support to each tenant, while also providing for family members now or in the future. This decision was also made with a view to potential resale value. To date, single occupants who are TAC clients have tenanted all units. Of note, smart or internet-enabled appliances used by the participant in this study have subsequently reduced 'actual use' of the spare bedroom for this individual.

There are clear implications of the decision to develop two and three bedroom units in this type of housing model, in terms of the cost of construction, as well as running costs and maintenance. There are potential opportunity costs where development of single bedroom units on the same site may offer a greater yield. If this approach is to be pursued, trade-offs should be considered in terms of delaying tenant allocation for larger units to identify a TAC client who may wish to live with family or friends, versus accepting the additional costs implied by single occupancy.

The adjustment of furnishings between time points one and two provides some evidence, alongside interview data, of preferences for spatial connections and the locations of activity for the resident. Design decisions around the relationship of corridors and rooms, as well as the locations of power points and expectations for their use have the potential to limit, as well as offer, flexibility. The arrangement of sections of the RIPL Design Specification, and the table of requirements for electrical power outlets by room type may be further considered on this point.

### ***Fitting the fit out***

A number of criteria identified through the development of the E-EEF are relevant to the 'fit' between residents and elements of their environment. The findings from POE of RIPL Project Two support Project One notes re potential benefits of delaying installation of some joinery or fittings until the identity of the appointed resident is known. This will allow for installation of a final range of joinery and fittings that offer maximum individual access and independence. As noted in RIPL Project One recommendations, findings from POE of Project Two provided further evidence that the individualised needs of this client group make allowances for customisation at any stage of the project an important focus, with ramifications across many of the criteria identified. Decisions regarding investment by the TAC in customisation of fit outs after client selection may also impact the need or opportunity for further modifications.

### ***Home-like appearance vs functional effectiveness***

As was the case in RIPL Project One, there was interesting learning available in the current project in relation to the decisions people make to shape their own 'home' through choice of furnishings, and how these impact access and use. Carpeting timber floors to build a sense of homeliness, positioning lounge furnishings around a centralised internet-enabled audio-visual system and television chair, and provision of customised storage to allow for pursuit of personal hobbies were seen as significant contributions to the participant's sense of 'home' in Project Two. Selection of adjustable furniture, such as an extension dining table that can be set at its smallest size when the person is home alone, or at a longer length when dining with visitors, has allowed further flexibility.

**Customisation and flexibility**

For the participant in this study, ply lining of bathroom walls behind plasterboard and tiling has allowed for flexible retrofit of necessary grab rails in the bathroom. The installation of a recessed track for a ceiling hoist is noted in the participant's bedroom at RIPL Project Two, anticipating a range of future needs in the dwelling and allowing use of this for transfers by future tenants if necessary. The provision of a large undercover carport space has enabled installation of a shed and freestanding shelving undercover, whilst still ensuring a vehicle can be parked with undercover / wet weather access. The participant in this study is ambulant, and therefore has lesser requirements for equipment storage than might be anticipated in other RIPL sites or for other residents. Future POE of other RIPL projects will have further capacity to examine this.

**Client selection**

Findings from POE with the participant in this study, coupled with anecdotal reporting from other families and key stakeholders, highlight questions regarding the cost-benefit of tenanting two or three-bedroom units with single TAC client occupants. Provision of a two-bedroom dwelling to a single occupant more flexibly accommodates overnight guests or the development of future partner live-in relationships or child-bearing; however, the past POE of RIPL Project One demonstrated visitors' accommodation in a one-bedroom unit, prompting further consideration of this point.

The findings in this project also point to potential for Scheme cost gains by further considering alternatives to RIPL housing for some individuals, or possible extension of support to include more independent community living. RIPL Project Two lends itself well to the development of a 'neighbourhood network' or 'keyring' support model (Poll, 2007), where a unit could be purchased within a mainstream unit development in close proximity to RIPL Project Two, with staffing support from Project Two outreaching to this additional dwelling.

**Transition planning**

For the participant in this study, transition was reportedly well-planned and seamless and included visits to the new home prior to tenants' final move. Transition planning has included the opportunity for the participant to review and experience greater choice regarding the type, amount and timing of both disability support and main meals. The participant has had significant input regarding choice and recruitment of disability support staff, particularly those providing targeted one-to-one supports each week. The participant has focused on recruiting support staff that have skills that will support particular and valued role participation, including gardening. The person's ability to drive, and vehicle ownership, has allowed good access in the local and broader community. Transitioning from living with others to living alone has been seen as particularly positive in terms of building privacy and autonomy.

**Building skills and independence**

Participant findings, coupled with anecdotal reports from other families, have indicated that the accessible design and flexible support accessed via smart home communication systems has decreased reliance on line-of-sight paid supports. Following a transition from shared living with other people with disability to living in one's own home has allowed significant positive changes in relation to privacy, choice (e.g. regarding meal types and timing) and autonomy for the participant in this study. In contrast to participants in RIPL Project One, this tenant has not reported issues with loneliness when living alone. Examining the first year of occupancy with this tenant through POE highlights the significant gains in independence the person has made with adjustment from a block funded, 24-hour shared support model to a more flexible model of support, and staff identified the ongoing daily support needs experienced for this tenant, and how these have been more effectively met through an accessible home and community environment and flexible on-call supports.

**Assistive technology design**

The 'meshed' assistive technology system delivered across the units, which allows disconnection of single units in the case of resale, is a positive design step that builds further flexibility in RIPL projects in the view of the research team. However, feedback from the participant and support staff in this study, as well as anecdotal feedback from other families, points to issues with system malfunctions and failures, as well as problems with maintenance and response times experienced in the first year of project delivery. Necessary back-up systems have been provided and were reported to offer an alternative, basic system for contacting support staff, and it is reported that maintenance calls for the assistive technology installation have reduced over time.

Potential inclusion of building and system maintenance and response time parameters into contractual agreements, and review of reliable data to investigate frequency of failures, could support evidence-based decisions regarding system performances and future specification. With tenant consent, data collected via the home automation and communication technology may provide evidence on actual use (both frequency and type of technology being used in each dwelling). This evidence was sought for this study, but could not be collected due to system failures. Data collection will require an extended study period, and a level of reliability in the home automation and communication system and data collection processes via the server. This usage data would further inform the evidence base for RIPL and other TAC developments that include home automation.

**Support model**

The shared support at RIPL Project Two, offered through a flexible on-call model, has been particularly beneficial in building independence and reducing incidental and unnecessary line-of-sight support for this particular participant. This evaluation has highlighted that, for some TAC clients who move to RIPL settings, there is a potential to begin to focus on future transition planning for the next step of community living beyond RIPL. The recent approval by the RIPL board to invest in 'neighbourhood network' or 'keyring' models is a useful next step in a 'continuum of accommodation versus a continuum of support' recommended in previous reports to the TAC (O'Brien et al, 2010, p.34).

Specific to RIPL Project Two, there appears some potential to tenant the staff support unit and thus increase the tenancy rates and cost-benefit of RIPL Project Two. Such a proposal would require close consideration in relation to both the physical support needs of a potential new tenant in this two storey unit, and any additional costs of refit. The privacy of information regarding other tenants held in the staff support space would also need to be considered. Ensuring that this information is stored and discussed in a secure and private manner would be a key consideration.

**Work environment**

RIPL Project Two has also highlighted consideration of the movement of support staff outside and across dwellings, and the potential occupational health and safety aspects, particularly when staff are moving between supported units overnight. Personal security is a necessary consideration for staff in this case, alongside the benefits of this shared support model in relation to flexible supports received.



The two-story, two bedroom unit at the centre of this development is currently used as a support staff hub. It is a significant asset, potentially underutilised as the staffing hub. Future use considerations may include repurposing of some or all of this unit for TAC clients as tenants. If this becomes a shared staffing hub and tenancy arrangement, trade offs will again be required. Such an arrangement may offer a supported living placement for a person with greater support needs than that typical of a RIPL client, however, as detailed above, privacy of information regarding other tenants accessed by support staff must be considered. The impact of calls to staff located in this unit from other tenants, or staff coming and going from this unit, may be intrusive for a tenant. However, further exploration of flexible use of this large dwelling beyond just a staffing hub may be valuably considered.

### ***Translation of research findings***

The provision of this Interactive Research Report aims to effectively communicate the project findings and E-EEF approach to a number of audiences, including people with disability and their families, allied health professionals, designers and key stakeholders involved in RIPL projects. These findings look beyond the particulars of Project Two to consider the application of recommendations to future Scheme projects, which vary in nature. The production of the report as an interactive PDF document structured by the criteria, evaluations, and relevant evidence – with linking of navigable panoramas to represent occupied spaces with situated research findings – integrates detailed analysis and spatial experience considered in relation to TAC design background and specification documents (TAC, 2015a, b).

Relevant sections of the current RIPL Design Background and Specifications documents (TAC, 2015a, b) are documented in the full reporting of Recommendations in the RIPL Project Two report.



RIPL Project Two is the second project delivered by Residential Independence Proprietary Limited (RIPL). This project consists of five single-level units (four two-bedroom and one three-bedroom unit currently converted to a two-bedroom unit via removal of an internal wall) with a two-story support worker unit onsite. This support worker unit may, in the future, also be considered for tenancy by a TAC client or family. These units form a cluster in a new development in an outer suburb of Melbourne located on a residential street. The development is designed around open shared access via a central driveway. Each unit has a private, secure courtyard and covered carport.

### **Built Design**

The RIPL units at Project One have large internal open spaces and high ceilings, and three of the units have north-facing courtyards. Four of the single-story units include two bedrooms. The fifth unit includes capacity for three bedrooms, but is currently configured as a two bedroom plan with an additional flexible space, achieved by the removal of an internal wall. Each unit has a walk-in wardrobe and en-suite to the master bedroom. A second bathroom is provided in each unit for use by visitors or other household members. An open plan lounge / dining area, kitchen and European laundry are also included. Polished floorboards are provided throughout. Each unit has a secure, private courtyard space attached. The units are all fitted with split system heating and cooling, wall-mounted conventional and microwave ovens, four-burner induction cooktops and front loading washer-dryers. All bathroom walls were fitted with structural ply to allow flexible fitting of grab rails as required. Structural allowance has been made for the installation of ceiling-mounted tracks for hoists should this be required. The opportunity for individual clients to modify particular aspects of their homes via individual claims informed construction detailing and decision-making. Clients pay a rental fee, furnish their own homes, and are responsible for bill-paying for utilities.

Keyless access is offered to the interior and courtyard spaces via a security fob or use of a customized home automation application operated via smartphone or tablet (refer below). The support worker office is centrally located to the other five units on the block in the two-story unit.

### **Residents**

Residents in RIPL Project Two are TAC or WorkSafe clients who have experienced neurotrauma and as a result have near 24-hour support needs. Four of the five residents use a motorized or manual wheelchair to aid mobility, whilst one person is able to walk without a mobility aide. In Project Two, resident selection was managed by the TAC Claims Division, with input from TAC Business Intelligence, RIPL and a consultant occupational therapist. Prior to the move to RIPL Project Two, residents had lived in traditional shared supported accommodation models or with family.





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Associate Professor Gavin Williams, Epworth Rehabilitation

Dr Ross Clark, Australian Catholic University

Paul Marcolin, Spike Creative

### Research team

Dr Kate Tregloan is a registered Architect and a researcher and senior lecturer in the Department of Architecture, Monash Art Design + Architecture (MADA). She has professional experience working on low and medium density residential projects and community buildings. She has an ongoing research focus on the intersections of evaluation and design, and post-occupancy evaluation as it informs design development. On this project, Kate has designed and co-ordinated the development of the customized research methods, the interactive pdf package, the navigable panoramas and projection drawings.

Libby Callaway is a registered Occupational Therapist and a researcher and lecturer in the Department of Occupational Therapy at Monash University. Libby has worked with people with acquired brain and spinal cord injury for over two decades. Libby was the Research Project Lead on this project. She developed and maintained human ethics submissions, led discipline-specific data gathering processes and analyses, and enabled application of clinical knowledge of the RIPL client target group, and their range of outcomes, to evaluation findings.

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***Assistive technology***

Refers to aids and equipment and can be anything from a simple device in the kitchen to a wheelchair or a computer application (Australian Rehabilitation & Assistive Technology Association, 2012).

***Circulation Spaces***

Spaces within a built environment that permit movement or access to adjacent spaces.

***Community Integration***

Access to and participation in cultural, social, educational and productive tasks that offer the development of social relationships, engagement with mainstream services, community presence and connectedness.

***Flexibility***

The design of built and technology environments such that they allow for customisation and modification, and adjust to and anticipate individual resident's current or future needs.

***Homelike Environment***

The provision of a residential environment that offers a sense of home, responding to issues of security and comfort, agency and control, and self-expression. Primarily considered as a contrast to an institutional environment.

***Independence***

The capacity for an individual to engage in daily tasks, activities and life roles with a maximum level of autonomy, agency and control.

***Neurotrauma***

Injury to the central nervous system, particularly the brain or spinal cord (World Health Organisation, 1995).

***Post-occupancy evaluation***

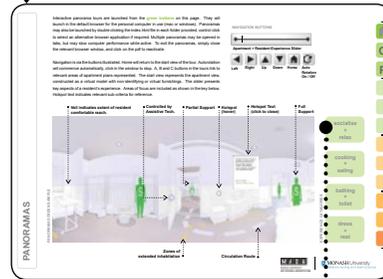
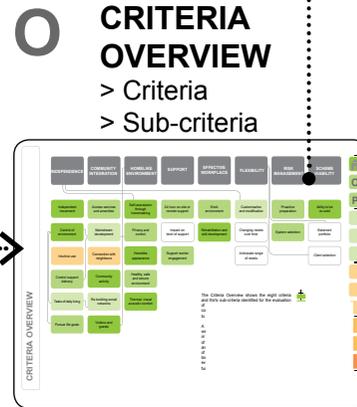
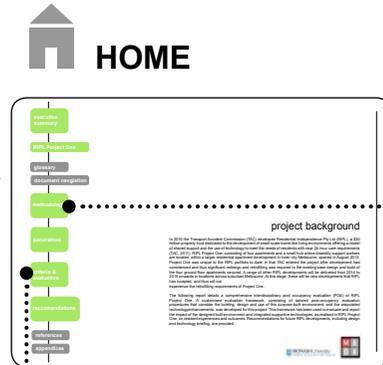
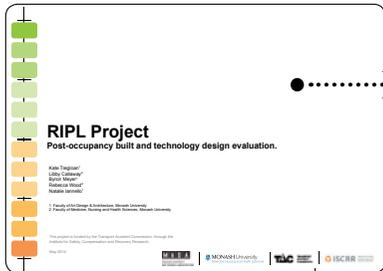
Post-occupancy evaluation (POE) is the examination of the effectiveness for human users of occupied designed environments, where effectiveness may include the many ways that physical and organisational factors enhance achievement of personal goals (Zimring & Reizenstein, 1980). POE is a careful, systematic, and reliable process intended to ensure that evaluation findings can be applied to future building and assistive technology design (White, 1986).

***Residential Independence Pty Ltd***

A property trust developed by the Transport Accident Commission dedicated to the development of small-scale home-like living environments that offer a model of shared support and the use of technology to meet the needs of residents with near 24-hour care requirements (TAC, 2011).



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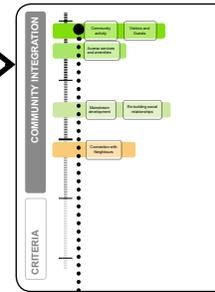


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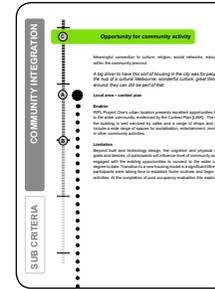
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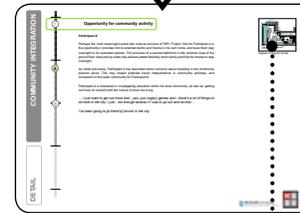
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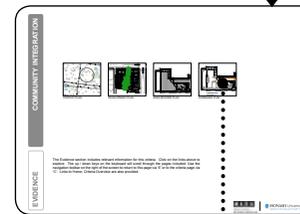
- C CRITERIA**
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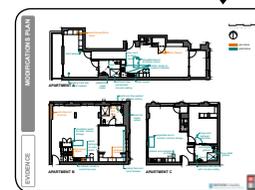
- S SUB-CRITERIA**
- Definitions
  - Discussion
  - Evaluation
  - > Detail



- D DETAIL**
- Definitions
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  - Evaluation
  - > Evidence



- E EVIDENCE**
- Evidence pages are provided at the end of each Criteria section



This section details the methodological approach for the project, phases of work, methods used, and permissions and ethical approvals obtained. Of note, the methodology used in post occupancy evaluation (POE) of RIPL Project Two (and reported below) has been replicated or extended from previous work of our research group. This methodology has now been reported in a range of publications (Callaway, Tregloan, Williams, & Clark, 2016, in press; Tregloan, Callaway, Meyer, Wood, & Ianello, 2014a; Tregloan, Callaway, Meyer, Wood & Ianello, 2014b).

The three main phases of the project outlined below each contributed to the further development and application of the research group's Environment-Experience Evaluation Framework (E-EEF) within POE of RIPL Project Two. Consistent with relevant POE approaches, the key focus of the framework was the investigation of factors influencing the design of a complex environment and correlating influences on behaviour and experience (Friedmann, Zimring, & Zube, 1978). The study followed relevant literature to develop an approach with a focus on user experience, evaluated on the basis of the design intentions as realised in the outcome (Shepley, 2011).

This second project, RIPL Project Two also introduced two new methodologies: 1) mappings of reach and access of 'example tenants' drawn from RIPL Project One and Two were projected onto the base plans of the range of unit designs delivered in RIPL Project Two to develop Projective Diagrams – Degrees of Physical Access, and 2) tenants' use and furnishing of indoor and outdoor spaces across two time points were represented on the furnished plans to highlight the implications of the changes made over time, beyond the inclusion of notes. The current project, when coupled with learnings from POE of RIPL Project One delivered previously by this research group (Callaway et al, 2016; Tregloan et al, 2014a), offers an innovative approach to address this evidence gap.

Project Phases generally reflect the timeline of the project, although some refinement of criteria and approach took place as the project progressed:

### **Phase 1**

*1.1 – Review of project background, documents and relevant literature*

*1.2 - Identification of criteria and sub-criteria*

### **Phase 2**

*2.1 - Investigation of the environment and users' experiences*

*2.2 – Evaluation of Residential Independence Pty Ltd (RIPL) Project Two against identified criteria*

*2.3 – Projection of circulation patterns, reach and access of participants met in RIPL Project One and RIPL Project Two onto the base plans of the dwellings delivered in RIPL Project Two*

### **Phase 3**

*3.1 - Communication of project findings and recommendations*

Approaches to data collection were driven by the requirements of each phase, and the potential for contribution to the development of the E-EEF. Details of these approaches are provided in following sections. Quantitative data collection included use of existing published measures relevant to the study. Customised methods developed by the research group previously built on professional site analysis, observation and representation techniques. Two new methodologies focussing on representation techniques and communication of project findings were developed. Qualitative data relating to the experience of stakeholders and residents were gathered via semi-

structured interviews. All on-site data were collected within an interdisciplinary approach by two researchers – a registered architect and a registered occupational therapist. Data were planned to be collected at a minimum of three months following the person moving into Project Two. This allows time for residents to settle into the new environment and ensures that any early transition or handover issues are addressed prior to participation in this research. However, due to an issue in grading of the master bedroom ensuite shower recesses, each unit needed the shower base re-graded leading to tenants having to move out of each unit as this process was completed. As such, tenants were recruited at five months post move, and then seen for a second round of data collection at nine months post move.

The approach to phases of development outlined above has ensured that the criteria identified by stakeholders, and the specifics of the RIPL program as translated in this second project, have been central to the content, approach and application of this evaluative framework. The inclusion of multiple methods in an interdisciplinary approach has allowed triangulation of findings, and a comprehensive tailored approach to post occupancy evaluation for this project.

## **Phase 1**

### **1.1 – Review of project background, documents and relevant literature**

#### **Pre-data collection**

Human Research Ethics Committee approval was obtained from the relevant academic institution for all aspects of this research. A low risk ethics approval was secured for the Phase One data collection completed with stakeholders involved in the RIPL Project Two development, whereas high risk approval was required and secured for Phase Two data collection, as it included recruitment of and research with people with disability.

Within the POE of RIPL Project One (Tregloan et al., 2014b), the research group undertook an international grey and academic literature review of existing post occupancy evaluation methods and associated published tools to inform the design of a tailored, interdisciplinary post occupancy evaluation framework for this project. This review informed the basis for the further work completed in POE of RIPL Project Two, noting the two new methodologies developed for and used within the current project (as detailed above). The developed outline for the framework was previously presented to a project reference group, which included key representatives of the TAC, RIPL, and the Institute of Safety, Compensation and Recovery Research.

A range of briefing documents, internal reports and other relevant resources were supplied to the researchers by the TAC and reviewed in detail. These included the RIPL Design Brief (including design specifications) (v 5.0) and design background version (v 5.1), a number of design development schematic and development application plans, full contract documentation set, assistive technology briefing notes and internal TAC documentation, including comprehensive Independence and Accommodation Strategies (Transport Accident Commission, 2011a, b). Key criteria or briefing aspirations / guidelines for RIPL project design were extracted from this range of documentation and explored further in relation to RIPL Project Two findings.

One of the primary foci of the POE undertaken is to inform RIPL and other housing developments for people with disability into the future. For this reason, we have reviewed RIPL Project Two against the current version of the design brief. The current version of the brief (v 5) was produced after delivery of RIPL Project Two and now consists of two documents, design background (Transport Accident Commission, 2015a) and design specifications (Transport Accident Commission, 2015b). There is a potential argument that RIPL Project Two should be reviewed against the version of the brief that informed its inception. However, the research group considered there would be more valuable learning gained for RIPL and the TAC if Project Two was reviewed against the current version, in order to further inform this developing brief.

### **Phase One participants**

Participants were key stakeholders in RIPL Project Two. Groups invited to participate in phase one included representatives from TAC and RIPL, as well as building, architectural, and assistive technology consultants who worked on RIPL Project Two. In addition, relevant data from RIPL and occupational therapy stakeholder interviews completed during POE of RIPL Project One were reanalysed and drawn on for Project Two (Tregloan et al., 2014b).

### **Recruitment**

A key RIPL representative identified all stakeholder organisations involved in the inception, development and delivery of RIPL Project Two. Researchers provided this RIPL representative with a permission slip outlining the research project, and inviting the organisation to consider returning the permission slip nominating a representative to be contacted by the research group. The RIPL representative sent potential participants this permission slip with a reply paid envelope. This was the extent of the RIPL representative's involvement in recruitment. If the organisation was willing to hear more about the study, or consider participation, they returned the slip with their contact details directly to the researchers. Researchers then arranged a time to meet with the potential participant, explain the research and provide the written explanatory statement and consent form for review. Willing participants signed the consent form and the research commenced within the same or a subsequent meeting. All four organisations invited to participate returned the permission slip, and then consented to and completed participation.

### **Data Collection and Analysis**

Phase one qualitative data were gathered via semi-structured interviews. Interview questions covered the following areas: the participant's background and introduction to the RIPL collaboration, how project deliverables were formulated, the participant's own aspirations for the project and experience of the project's development and delivery, and key learnings gathered about the built and technology design at RIPL Project Two. The eight criteria and their relevant sub-criteria (developed in the POE for RIPL Project One) were reviewed with each stakeholder to confirm these criteria were relevant to the development of RIPL Project Two and examine if there were additional criteria which should be considered in the current project – refer to criteria overview page for details. Interviews were audiotaped and transcribed verbatim. Reflections and field notes were recorded in reflective journals by the two principal researchers immediately following interviews (Braun & Clarke, 2013). A qualitative comparative method of thematic analysis was used to analyse the qualitative data (Braun & Clarke, 2013; Corbin & Strauss, 2008) and is detailed below.

## **1.2 – Review of previously identified criteria and sub-criteria**

Interview transcripts, researcher field notes and reflective journals were analysed thematically and explored against each of the key criteria and sub-criteria identified and published in the POE of RIPL Project One (Braun & Clarke, 2013). RIPL Project Two-specific issues and influences were also identified. Subsequently, the key researchers in this project reviewed the data, relevant TAC documentation, and linked thematic analysis. The initial criteria were reviewed via researcher consensus using qualitative auditing (Lincoln & Guba, 1985), with the original eight criteria and thirty one sub-criteria confirmed for use in POE of RIPL Project Two – refer to criteria overview page. Corresponding verbatim quotes from project participants were identified, and are included in this report to illustrate criteria.

### **Project reference group**

Key representatives at the TAC, RIPL, and the Institute of Safety, Compensation and Recovery Research were consulted in writing and via telephone, as well as being invited to attend relevant presentations by the research group in order to discuss post occupancy evaluation design and implementation, and review progress towards achievement of project aims and timelines for project delivery.

### **Phase 2**

#### **2.1 - Investigation of the environment and users' experiences**

##### **Phase 2 participants**

Adult TAC clients with neurotrauma were eligible for this study if they had capacity to provide their own consent, were aged over 18 years, were in receipt of TAC funding and had accepted placement in the RIPL Project Two.

##### **Recruitment**

The research group provided the nominated support provider at RIPL Project Two with a reply paid envelope and single page permission slip outlining the research project and inviting an eligible person to consider whether they would like to hear more about the study and consider participation. Potential participants were sent a permission slip outlining the research project, and inviting release of their contact details to the research group, as well as a reply paid envelope. This was the extent of the support provider's involvement in recruitment.

Upon receipt of the person's contact details via the permission slip, researchers arranged a time to meet to explain the project and provide the written explanatory statement and consent form for review. Willing participants signed the consent form and the research commenced within the same or a subsequent meeting. Consent was designed such that the person could opt in or out of all or some of the data collection methods used in this study. The permission slip, explanatory statement and consent form all detailed that the person's housing and support, or receipt of TAC funding, would be in no way affected if they declined participation in this study, or commenced participation but subsequently withdrew from the research.

Of the five eligible people from RIPL Project Two, one returned the permission slip providing their contact details and subsequently consented to participation in all methods in the study.

During the consent process, the participant had the choice to nominate a family member and / or paid support person to be interviewed by the research team in relation to project aims, if the nominated person granted consent. The participant nominated a paid support worker. No family members were nominated.

### Data Collection Methods – Published measures

Of note, the published measures used in POE of RIPL Project Two (and reported below) were comparative to those used in previous RIPL POE work delivered by our research group. These published measures have now been reported in a range of publications (Callaway et al., 2016; Tregloan et al., 2014a; Tregloan et al. 2014b).

#### *Residential Environment Impact Survey*

The Residential Environment Impact Survey Version 2.0 (REIS) (Fisher & Kayhan, 2012) was initially developed with a focus on assessing the impact of the built environment on resident outcomes of people with disability living in traditional shared supported accommodation settings (such as residential group homes). Despite its background, the REIS was always envisaged as a measure adaptable for use in other models of housing and support (Fisher & Kayhan). The REIS is a non-standardized assessment tool (University of Illinois Board of Trustees, 2014a). It consists of both semi-structured interview schedules, as well as structured rating forms. The REIS was designed as a measure of the opportunities available for resident participation and independence within the home setting, as well as a rating of the accessibility, impact and importance of indoor and outdoor spaces, objects within the home, tasks / activities available to the person and the social environment on these opportunities. The tool was originally designed for use by occupational therapists. Personal communication was undertaken with an author of the REIS (Fisher) who confirmed it was reasonable to use only those parts of the REIS that were most relevant to this project's aims and the design of the specific model of housing and support delivered within RIPL Project Two (personal email communication with G. Fisher, January 3, 2014). With her consent, this project used three key parts, and the associated semi-structured interview questions, of the REIS: Part I - Walk through observation guide, Part III a – Space checklist, and Part III b – Objects checklist.

While incidental staff–resident interactions were recorded as part of this evaluation, direct observations of staff–resident interactions during activities of daily living were not sought. The focus of this study remained an evaluation of the opportunities afforded to the resident by the built and technology design of RIPL Project Two, rather than an explicit evaluation of the direct support provision. However, the research groups acknowledged that the lived resident experience of supported housing cannot be separated from the delivery of support. The support model was discussed within semi-structured interviews with reference to the contribution of the built and technology design as an enabler or limitation to effective and efficient support delivery, and user experience of the same.

#### *Residential Environment Impact Survey–Short Form*

The Residential Environment Impact Survey, Short Form (REIS-SF) is a modified version of the REIS (University of Illinois Board of Trustees, 2014b). Like its parent, the REIS-SF is a non-standardised and semi-structured assessment tool. The REIS-SF was created by a group of community-based occupational therapists, in consultation with the first author of the REIS (Fisher & Kayhan, 2012). The REIS-SF is structured so that a user can document and summarise the qualities of the built environment that impact independence, participation and quality of life from the assessor's perspective, based on resident interview and observations of the built environment

and residents' use of and access within the same. There are a total of 17 items on the REIS-SF: five items related to the physical space, three items exploring the availability of resources within the home environment, four items assessing the nature and quality of social support, and five items examining opportunities to engage in meaningful activities and roles within and outside of the home. Each item is rated on a 4-point scale, with the rating reflecting how each aspect of the environment meets the needs and interests of the individual resident, and the extent to which the appropriate level of support and opportunity is provided (Fisher & Kayhan). A rating of 4 indicates exceptional opportunity / support afforded, whereas a rating of 1 indicates the need for major improvement. There is also allowance for written observations relevant to each item. The REIS-SF was used in this project to complement the three parts of the REIS long form.

#### *Quebec User Evaluation of Satisfaction with Assistive Technology*

The Quebec User Evaluation of Satisfaction with assistive Technology, version 2.0 (QUEST) (Demers, Weiss-Lambro, & Ska, 2000) is a standardized assessment of user satisfaction with a technology device and its related services. The 12-item scale asks the technology user to rate their device with regard to its physical properties, ease of use and effectiveness. Ratings are made on a scale of 1 (not satisfied at all) to 5 (very satisfied). The user is also asked to rate delivery, maintenance and follow up services using the same scale. The user then has the opportunity to choose the three assistive technology satisfaction items that are most important to him/her, from a total of 12 items. RIPL Project Two evaluation of assistive technologies in the form of home automation and support staff communication technology, controlled using an application loaded onto a smart phone or tablet (depending upon personal preference). In this study, the participant was therefore asked to rate, using the QUEST, their satisfaction with "the primary device they use to access this home automation and community system".

#### *Psychosocial Impact of Assistive Devices Scale*

The Psychosocial Impact of Assistive Devices Scale (PIADS) (Jutai & Day, 2002) was developed to measure the psychosocial effects a nominated assistive device has on its user. This 26-item questionnaire asks the user to rate the impact the assistive device has had on their sense of competence, adaptability and self-esteem in daily life. Scores range from -3 (negatively impacts the user) to +3 (positively impacts the user), with a rating of 0 indicating no perceived impact. The participant in this study was asked to rate the same assistive technology devices that they had rated using the QUEST.

#### *Analysis of data gathered via published measures*

The REIS, REIS-SF, PIADS and QUEST were administered and scored following the procedures outlined in each of their respective manuals, and reported descriptively in either words or figures for each participant within the relevant criteria section.

#### **Data Collection Methods – Customised measures**

Of note, the customised measures used in POE of RIPL Project Two (and reported below) were comparative to those used in previous RIPL POE work delivered by our research group. These customised measures have been reported in a range of publications (Callaway et al., 2016; Tregloan et al., 2014a; Tregloan et al., 2014b).

### *Task demonstration and photography*

During the first meeting with the researchers, the participant was asked to demonstrate their use of the built space by undertaking daily living task/s of their choice, following a design ethnography approach (Koskinen, Zimmerman, Binder, Redstrom, & Wensveen, 2011). Consent was given by the participant for these tasks to be digitally recorded by photography and / or video. This digital recording allowed further analysis by the research team after the data gathering session. Tasks chosen by the participant included making a hot drink, reaching for commonly used kitchen items, operating home automation technology, and demonstrating the person's access to bedroom, bathroom and kitchen storage areas. Audio data from the digital recordings were transcribed verbatim and thematically analysed against the RIPL stakeholder project criteria. The participant was also asked to identify elements of the built and technology design that they felt were either an enabler or barrier to their independence and participation. Analyses of digital photography and video recordings were guided by the observational ratings provided in the REIS long form. In order to maintain confidentiality, digital photography and video recordings that may be identifying were analysed and reported in writing, rather than by image, consistent with the ethics undertaking and only virtual modelled environments were represented, rather than images of the participant's actual furnished spaces.

### *Customised representations and design development*

The development of customised forms of spatial representation is consistent with the use of representation by designers in the analysis of existing sites and design issues, and the development of new proposals. A distinction is drawn here between design as the particular solution of a bounded problem (problem solving), and design that builds on a co-evolutionary engagement with problem and solution, interpreted as 'wicked' or ill-defined and complex potentials that characterize the inhabited environment (Cross, 2007; Dorst & Cross, 2001; Lawson, 2006; Poon & Maher, 1997; Rittel & Webber, 1973). Expert designers regularly represent spaces and the intersecting factors that influence a particular context to assist the generation, transformation and evaluation of emergent proposals and ideas (Goldschmidt, 1991; Visser, 2010).

The drawings developed to inform the evaluation of RIPL Project Two built first on accurate measured drawings of the spaces as both 'empty' and furnished environments. Identification, representation and contrast of selected aspects of the environment and its inhabitation were developed iteratively as outlined in the relevant sections below. Each of these drawings focuses on content or perspectives that are of particular relevance to the evaluation criteria identified. Evidence of all of these phenomena is present in the environment studied, however independent representation has been developed to permit focused consideration of these issues 'in isolation'. These customized representations also highlight particular issues or potential conflicts between criteria, providing rich analysis of this precedent to better inform future design development alongside site and project specific issues (Lawson, 2004; Moraes Zarzar, 2008).

### *Context Plan*

The Context Plan was produced on the basis of publicly available mapping, and local area information, filtered for key streets and landmarks only. Text and annotations were amended to de-identify the content, including generic terms for local features, amenities and services, and removing all street names.

### *Base Plans*

Unit Base Plans were produced on the basis of documentation by the architects for RIPL Project Two spaces. This comprised complete construction documentation as noted, including amendments confirmed during interviews. Review of the RIPL design specifications and background (Transport Accident Commission, 2015a, 2015b) also informed discussion of design decisions as they were recorded in the initial documentation. Accurate measurements of spaces and furnishings were collected by researchers on-site. Discrepancies were noted and further investigated in interviews where significant and relevant.

### *Base Building Plan*

The Base Building Plan of the unit development was produced on the basis of documentation produced by the architects for the RIPL Project Two spaces. Identification of the support workers' office and the location of units are indicated, however identifying features have been removed to protect the privacy of tenants.

### *Modification Plans*

Modification Plans were prepared on the basis of the Base Plans. These include annotations highlighting discrepancies between the Base Plans and the measurements taken on site resulting in 'pre-move modifications' such as changes to construction details or joinery installations. Post-move modifications were also recorded to indicate those changes made by the participant following their move to RIPL Project Two. These include minor customizations as well as significant modifications such as the installation of grabrails. These modifications were investigated with participants during interviews.

### *Furnished Plans*

The Base Plans also provided the basis for the Furnished Plans. These included the addition of furnishings and their location in each of the inhabited spaces investigated for the study. Representations of furnishings and their location is accurate for scale and location, however generic virtual furnishings or spatial primitives were used to protect participant privacy. Issues related to furniture selection and location were investigated with the participant during interviews. As an additional methodology, representation of changes in furnished plans from time point 1 of data collection, compared with time point 2, were also developed.

### *Traces Of Wear And Tear Plans*

Traces of Wear and Tear are indicated by notes and mark up of the Base Plans. Recording of these observations has informed analysis of travel patterns and resident use of particular spaces or installations. These observations were further investigated with the participant during interviews.



### *Circulation, Thresholds And Privacy*

Key circulation patterns for the participant were represented on the Furnished Plans of their unit in order to identify the spatial patterns for the resident and support workers as implied by the design. The inclusion of a representation of thresholds between public and private spaces, both at the boundary between the building common spaces and the unit interior is on the basis of degrees of bound or unbound space dynamically experienced, and the potential for territorial claim implied by the design (Ching, 2007; McMurtrie, 2012; Stenglin, 2009).

### *Spaces Of Independent / Supported Inhabitation*

Spaces of Independent and Supported Inhabitation are represented on the Furnished Plans, and draw in part on the implications of spatial use suggested by the selection and arrangement of furniture by the resident, as well as observations of participant's behavior in these spaces. Identification of locations for full or some support was informed by observation of participant use of space and equipment, findings from the REIS long form, and researchers' relevant expertise. These observations were further investigated with participants during interviews.

### *Degrees Of Physical Access*

Degrees of Physical Access are represented on the Furnished Plans for each unit. These represent the participant's ability to negotiate and manipulate the furnished unit and its fittings and fixtures. The representations were produced on the basis of measurement of "comfortable reach on a forward path of travel". Comfortable reach was defined by the research group as the ability of a person to reach without strain or strenuous movement whilst seated on their main mobility device (i.e., preferred wheelchair) or in standing (as was applicable for the participant in this project) across several planes (up, down, left, right).

Researchers observed the participant's ability to subtly refine the location of wheelchairs and subsequent reach during visits to the site, therefore these representations should be understood to demonstrate the minimum of 'usual' access. The use of other assistive devices (e.g., long handled pick up sticks) for grasping objects on the floor was similarly observed, and would extend the envelope of comfortable reach when used. In the production of these images, virtual blocks were created to represent relevant dimensions and radii of reach to inform the placement of fills and curves.

### *Projective diagrams*

The research team developed a new methodology within POE of RIPL Project Two, as noted above. Projective Diagrams – Degrees of Physical Access draw on 'example tenant' scenarios extracted from RIPL Projects One and Two. These diagrams project information regarding reach and access of these 'exemplars' onto the dwelling floor plans delivered in RIPL Project Two. Architectural furnishings are used to examine projections of reach on the various plans, in contrast to actual furnished spaces of 'real' tenants.



It should be noted that the focus of the E-EEF is on the experience of residents evaluated against the criteria identified through Phase One of the RIPL Project One study, and refined in further studies. Clearly the research team could not review client experiences and perspectives in spaces they did not inhabit, however valuable learnings were still available by considering implications of physical access for these 'tenant examples'. This approach has allowed researchers to consider and present issues for residents with differing physical needs and abilities who may inhabit these designed environments.

Consistent with the Degrees of Physical Access in the homes actually occupied by residents, and noted there, the representations were produced on the basis of measurement of "comfortable reach on a forward path of travel". Please refer to that methodology for more detail. The standard architectural furnishing arrangements presented in design drawings are used for this analysis, noting that these inform the location of many fittings and fixtures of the home including electrical power outlets as required by the RIPL Design Specifications documents (DS, s9.2) as well as for data and phone points (DS, s9.4, s9.5), and lighting installations (DS, s9.3). The location of these fittings and fixtures, in turn, influence furnishing decisions by subsequent inhabitants. For these reasons, the Projective Diagrams are not presented as large scale plans, but rather as a matrix of diagrams that are most useful as comparisons rather than detailed descriptions. The matrix presents projected degrees of physical access of different 'example tenants' in columns from left to right (example tenants A – D), and different unit types on the RIPL Project Two site (type 1 - 3) in rows from top to bottom.

### Data Collection Methods – Qualitative approaches

#### *Semi-structured interviews with residents*

At approximately five months following their move in to the RIPL Project Two development, the Phase 2 study participant undertook an initial semi-structured interview with researchers. A follow up, final interview was completed with participants at approximately nine months post move.

For the first interview, a semi-structured interview schedule designed to explore and address the research project aims was developed. Topic areas included: resident experience of built space, resident experience of assistive technologies provided in the built space, resident experience of built design within the community precinct and other resident perspectives. Refer to Appendix X for the semi-structured interview schedule. Published and customised measures (listed above) were completed and analysed prior to semi-structured interviews, so that initial findings, including identified enablers and limitations within the built and technology environment, could be further explored by interview. In addition, the research team reviewed this published / customised measure data against the RIPL stakeholder project criteria. This allowed the researchers to refine questions to explore whether elements of the RIPL stakeholder project criteria had been achieved from the perspective of each participant.

Initial interviews were audio recorded and transcribed verbatim. As outlined in Phase 1 data analysis procedures, interview transcripts were analysed thematically by the research team. Emerging themes and associated verbatim quotes were considered in relation to corresponding items of the RIPL stakeholder project criteria to assess whether these criteria had been achieved, and to aid data linking and reporting as outlined below.

At nine months following the move into RIPL Project Two, the participant was invited to take part in a second and final semi-structured interview. The follow up interview was also audio recorded and transcribed verbatim. Findings of the thematic analyses of the first semi-structured interview, and associated quantitative data, were used to develop areas of investigation for the second interview. Changes made to the environment, such as any user-specific modification or adaptations recommended by a treating occupational therapist, movement of existing, or new, furnishings, and changes in use of the environment by the resident were also explored during the interview. Findings from the data logging, such as frequency of use of home automation system functions, were reviewed and explored with the resident.

#### *Semi structured interview with the support provider*

At approximately nine months following the move into RIPL Project Two, the support provider nominated by the resident and recruited into the study also participated in a single semi-structured interview. This interview covered similar topic areas to the initial resident interviews, explored from the support provider perspective and was also audiotaped, transcribed and thematically analysed.

#### *Qualitative research project rigor*

A number of steps were taken to ensure rigor was maintained within the qualitative data collection and analyses (Morrow, 2005; Krefting, 1991). As part of this study, researcher field notes were recorded, as well as a reflective journal. This involved the researcher documenting their observations, reactions and thoughts throughout the project. The reflective journal was used to record and develop areas for further enquiry, enabling the researchers to test emerging themes with participants in subsequent data collection sessions. The variety of methods used, data collection at different time points, and analyses of data between data collection sessions allowed the researchers to feedback and explore developing themes with participants. This process of member checking occurred with each participant during the semi-structured interviews at both time points.

Triangulation is a key strategy for enhancing the quality of the research, particularly credibility, and is based on the idea of convergence of multiple perspectives for mutual confirmation of data to ensure that all aspects of a phenomenon have been investigated (Krefting, 1991). Triangulation of methods was achieved in this project through the intersection of quantitative and qualitative approaches, and a collaborative multidisciplinary research team with professional experience in occupational therapy and architecture. Consultancy from a physiotherapist and exercise physiologist was provided for mobility tracking and activity monitoring (refer below). Researchers met regularly during data analyses to ensure group consensus on findings and to avoid bias. Peer support was sought through the project reference group meetings (Braun & Clarke, 2013).

#### *Mobility tracking*

Mobility tracking was undertaken for a period of four days in total, including at least one weekend day. An Adafruit Ultimate GPS connected to an Openlog data logger was used to log the outdoor position of the participant throughout the day. This device was fixed to the clothing (belt loop) of the participant, and was programmed to log data at a rate of 1 sample per minute. These data were transferred to a secure internet site, from which they were downloaded and analysed. Data was reported on a de-identified map, and included reporting of the mode of travel in the community (e.g. public transport vs onroad vehicle) and the type of community service or venue accessed (e.g. church vs shopping centre).

## 2.2 - Evaluation of RIPL Project Two against identified criteria

Researchers prepared for the evaluation of RIPL Project Two by making an initial allocation of data packages against the 39 criteria and subcriteria previously established by the research group (Tregloan et al., 2014b), and allocating this data via researcher consensus. Additional data were collected, and all data sorted, systematically reviewed and re-presented for review by the two principal researchers. The researchers reviewed all criteria and sub-criteria and data collected for each. Initial evaluations were reached by consensus amongst the researchers on the basis of the evidence provided. Evaluation took place at several levels, working from the detail to an overview for clarity. Where relevant, individual units were evaluated against sub-criteria and an overall evaluation for the project identified independently. Evaluation of the project against the criteria was also derived independently, but informed by findings for sub-criteria. Detailed consideration of the enablers and limitations of the inhabited experience of RIPL Project Two were identified for sub-criteria by drawing on the evidence. Conflicts and opportunities were also identified by considering the intersections of data collected, and the relationship of sub-criteria across criteria.

As was the case for RIPL Project One, a small proportion of the sub-criteria identified were considered beyond the scope of this project, or not yet able to be evaluated. These have been included in the reporting for completeness, with relevant notes.

### Phase 3

#### 3.1 - Communication of project findings and recommendations

##### *Report Design and Preparation*

The RIPL Project Two Report is designed primarily as an interactive pdf document, allowing intuitive navigation by readers among key sections of the document, and supporting easy dissemination. This is intended to allow readers to investigate the areas most relevant to their purpose, with the primary intention of informing future design development for a similar client group. Evaluation of RIPL Project Two is embedded in sub criteria reporting. Recommendations from this evaluation are provided at end of interactive pdf document.

The majority of the included material relates directly to the evaluation of RIPL Project Two, and the navigation of the document has been developed to reflect this by using a representation of a colour scale as a key graphic theme. The evaluations, and the presentation of data that have informed them, are presented at a number of levels from an overview Criteria level, and progressing through Sub-Criteria to Detail for the individual participant. The main evaluation is supported by the inclusion of full evidence packages.

Other supporting documents are provided, including an Executive Summary, a RIPL Project Two overview, this Methodology section, Criteria Summary, and supporting Glossary, Document Navigation, Appendices and Reference Sections. Links are also provided to Panoramas, an innovative approach to the communication of spatial findings, detailed below.

### *Panoramas: panoramic photography, filtering of images, 3d modelling*

A new use of technology has been developed in this project to represent occupied space with situated research findings as navigable panoramas. The production of these virtual environments progressed in several stages. Initial images using a digital camera with large viewing angle were taken at 90 degree angles in identified locations and at a field of vision height to match that of the person living in the dwelling. These were 'stitched' to create an image suitable for use in a panorama. In order to protect participant privacy, identifying features were removed, line work adjusted and translucent stamps of matching virtual objects created using digital image adjustment software (Adobe Photoshop CC). A 3D virtual model of the space and main fittings was also created using architectural modelling tools (McNeel's Rhinoceros 3D 5), with virtual blocks representing similar furniture pieces in correct locations. Images of this model were created from a location in the model to match the location in 'real' space, and these images stitched to match the panorama images. These stitched images were overlaid and combined to create a base navigable virtual representation of the occupied unit.

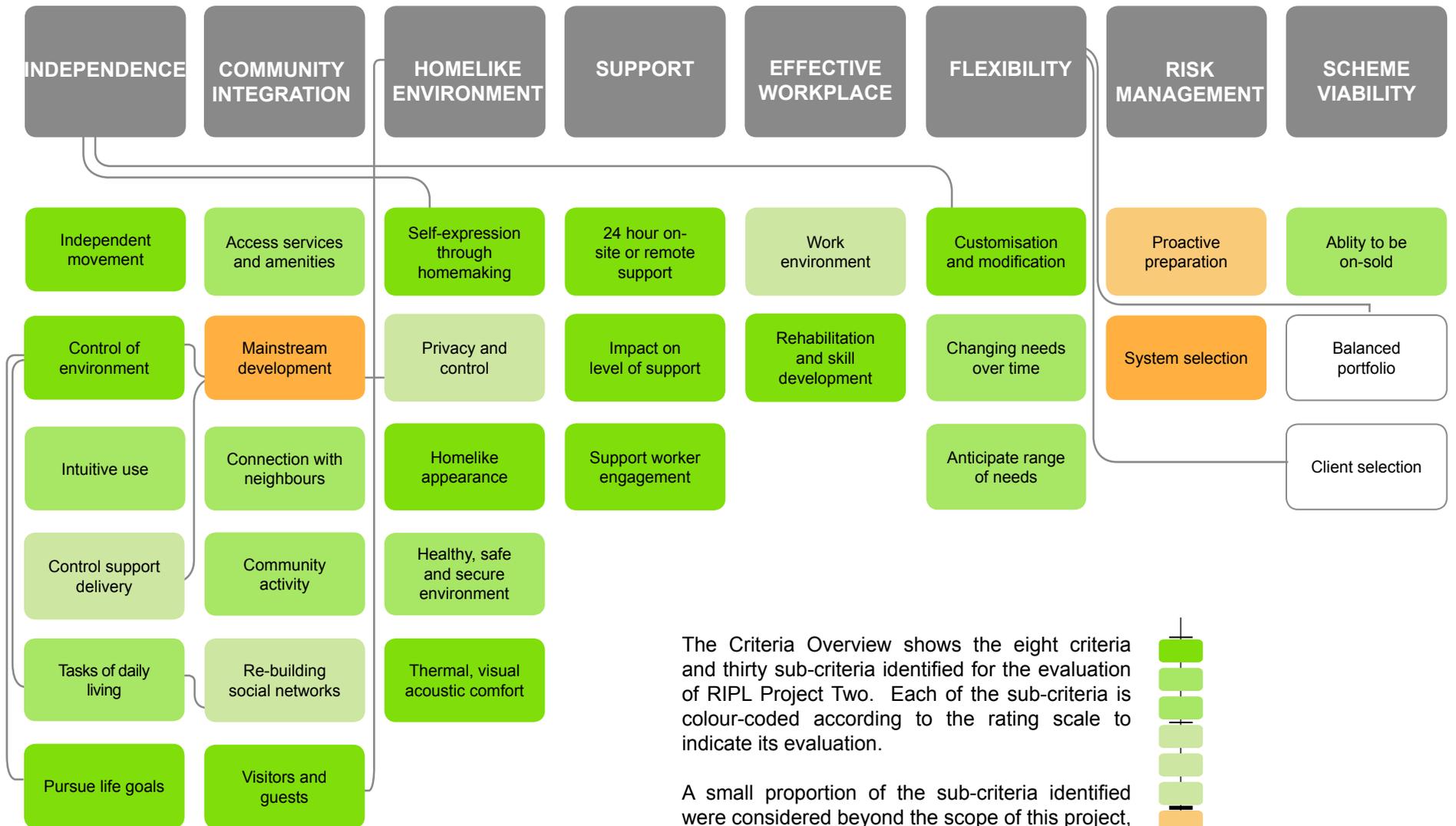
Additional information was also created and imported into the panorama environment. This included indicators for equipment that could be controlled using assistive technology devices – those devices that were enabled in the home and were being controlled by the tenant were marked via solid blue circles whereas those that were able to be home automation technology-enabled via retrofit in the future were marked with a dotted blue circle. Identification of circulation routes and privacy thresholds (marked in white) were indicated on the ground plan in the panoramas.

The provision of a 'slider' to allow users to switch to an overlay view from any position in the panorama environment was also designed and produced. The overlay view represents key elements of a participant's experience within the modelled unit space. This includes zones of extended inhabitation (marked in yellow on the ground plan) and degrees of physical access, to match those represented in plan, but now indicated in 3 dimensions. The representation of degrees of physical access has included a representation of upper and lower comfortable reach throughout the unit, with more complex modelling in focus areas such as kitchen or wardrobe joinery. 'Avatars' to indicate the provision of full (fill) or some (outline) support were located in appropriate locations following the data collected elsewhere.

Explanatory notes were inserted into the images as interactive hotspots to connect with the report content and source materials. The virtual panorama environments produced were reported by room type, rather than within whole unit presentation, in order to further de-identify this data and to focus on key learnings for design development in other projects. In this way, key aspects of the experience of RIPL Project Two have been reintegrated offering researchers additional perspectives on these focus issues, while also producing a navigable environment for clearer communication with relevant stakeholders.

The comprehensive and innovative methodology for this project has been informed at all times by relevant literature and the professional techniques and experience brought to this project by the multidisciplinary research team. It has resulted in a carefully constructed and informed approach to the evaluation framework. This framework responds to the aspirations of the RIPL Trust, in addition to the specific ambitions for RIPL Project Two, with a view to the identification and rich communication of findings that can best inform the briefing, design and development of future projects.

# CRITERIA OVERVIEW



The Criteria Overview shows the eight criteria and thirty sub-criteria identified for the evaluation of RIPL Project Two. Each of the sub-criteria is colour-coded according to the rating scale to indicate its evaluation.

A small proportion of the sub-criteria identified were considered beyond the scope of this project, or not yet able to be evaluated in these early stages of RIPL Project Two operation. These sub-criteria are shown unshaded. Definitions and discussion of all criteria and sub-criteria are provided, accompanied by the relevant evidence. Click each criteria or sub-criteria button to access.



# PANORAMAS

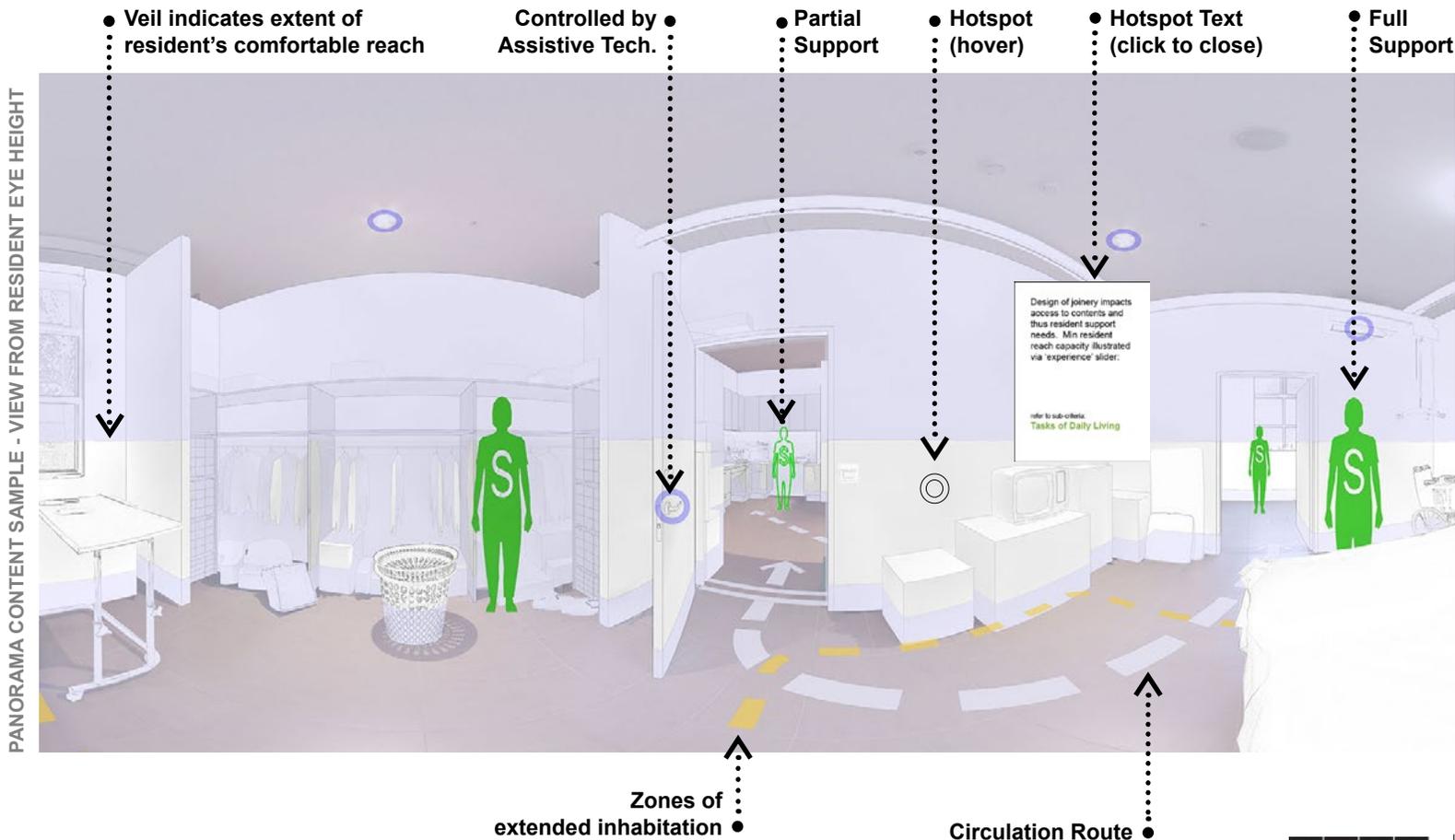
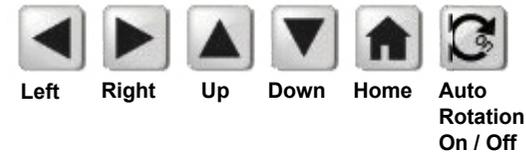
Interactive panoramas are launched from this page in Acrobat or by double clicking the '... panorama' files on the USB card next to the report pdf, or the *panorama.html* files in each panorama folder. They will launch in the default browser for the personal computer in use (Mac or Windows). Control-click to select an alternative browser application if required. They are off-line and do not need an internet connection. Some computers may have pop-up blockers - you will need to agree to the launch of the files. To exit the panoramas, simply close the relevant browser window, and click on the pdf to reactivate.

Navigation is via the buttons illustrated. Home will return to the start view of the tour. Autorotation will commence automatically, click in the window to stop. A, B and C buttons in the tours link to relevant areas of apartment plans represented. The start view represents the apartment view, constructed as a virtual model with non-identifying or virtual furnishings. The slider presents key aspects of a resident's experience. Areas of focus are included as shown in the key below. Hotspot text refers to relevant sub-criteria that offer further detail.

## NAVIGATION BUTTON SAMPLES

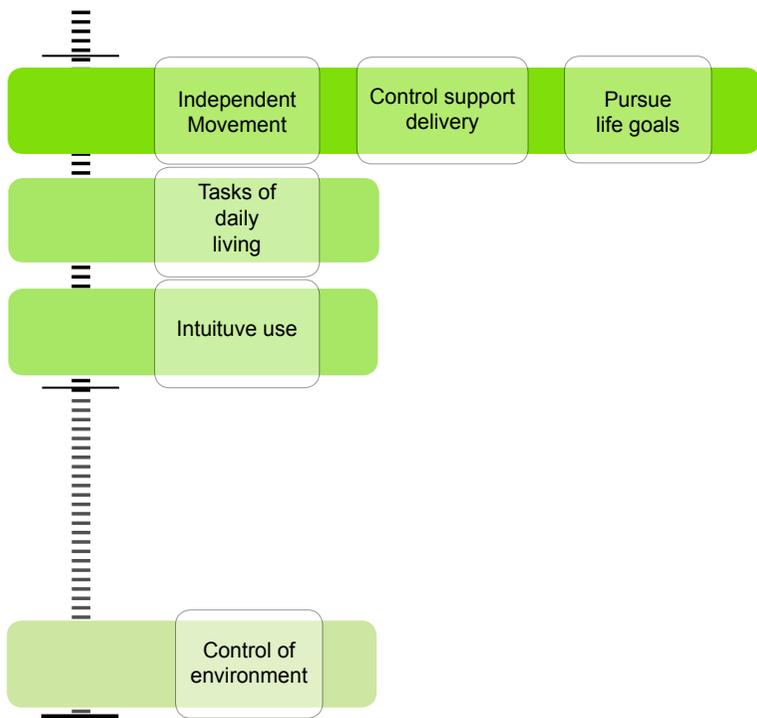


Apartment > Resident Experience Slider



- socialise + relax
- cook + eat
- toilet + bathe
- dress + rest

PANORAMA LAUNCH BUTTONS (FOR ACRABAT)



*...[The participant] is really independent, we don't have to really help with much at all when [they are] in the home...*

**INDEPENDENCE**

The capacity for an individual to engage in daily tasks, activities and life roles with a maximum level of autonomy, agency and control.



D

## Independent Movement

The ability of residents to move easily and independently within the shared and private spaces of the development.

...[We were] trying to get relationships in outdoor spaces to some of the indoor spaces, so we have got access from bedrooms to external areas...

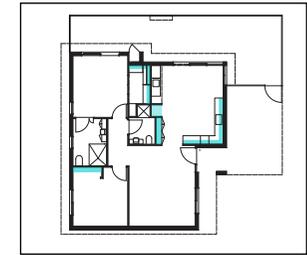
...I think it's the relationships of space. We tried to keep kitchen and meal area open as much as we could to the living area. It was just trying to make it with adequate circulation or appropriate circulation for the space that gives you freedom to move around...

## ENABLER

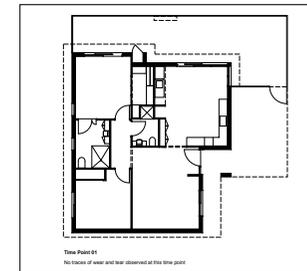
This resident does not require the use of a mobility device. The person is able to walk independently with an altered gait due to a right sided hemiplegia. The participant has also learnt to approach fixtures from the left (functional) side, accommodating this right sided hemiplegia. For this tenant, the open plan kitchen space allows left sided access for this resident, using his functional upper limb. More generally, the built design of the evaluated unit allows approach to most fittings and fixtures from either side of the body, which is useful for people experiencing hemiplegia. This is reflected in the mapping of resident access evident in the Degrees of Physical Access drawing.

Wide hallways have been offered throughout the unit. The relatively straight main paths of indoor circulation and limited occupied areas of this home make independent movement more straightforward and well-practiced for this participant. The resident's responses to the REIS long form indicated that they were able to access all indoor spaces in the home. No traces of wear and tear were noted in the home as shown on the Traces of Wear and Tear Plan. (Continued next page)

PAGE



DEGREES OF PHYS. ACCESS



TRACES, WEAR &amp; TEAR PLAN

RESIDENTIAL ENVIRONMENT IMPACT SURVEY (REIS)									
Information Obtained Via Group Interview of Participants/Residents									
REIS SPACE	Access	Use	Frequency	Comfort	Convenience	Quality	Quantity	Value	Other
Living Area									
Kitchen									
Bathroom									
Bedroom									
Hallway									
Storage									
Other									

REIS LONG FORM: SPACE

RESIDENTIAL ENVIRONMENT IMPACT SURVEY (REIS)									
Information Obtained Via Group Interview of Participants/Residents									
REIS OBJECTS	Access	Use	Frequency	Comfort	Convenience	Quality	Quantity	Value	Other
Living Area									
Kitchen									
Bathroom									
Bedroom									
Hallway									
Storage									
Other									

REIS LONG FORM: OBJECT

D

## Independent Movement

The ability of residents to move easily and independently within the shared and private spaces of the development.

## ENABLER (CONTINUED)

According to the participant's responses, as well as anecdotal reports provided to the research group by family members of other tenants, the ensuite (main) bathroom design has offered good access as grab rails can be installed according to individual need. Furnishings have been arranged to allow ease of access in straight line path of travel. Of note, for those people using a wheelchair for mobility, the increased length of the pan from the cistern on the wall may pose challenges reaching the toilet button for independent flushing.

In the unit examined, there is stepless access to the courtyard – however anecdotal reports to the research group from other tenants' family members indicate some challenges related to changes of level may be experienced in some courtyards. The courtyard access from either the unit and the undercover carport is seen as offering further benefit from the perspective of the participant in this study, who is a keen gardener and thus brings soil and other gardening items directly from the car into the courtyard without needing to go through the unit to do so.

Comments by the participant in this study, and anecdotal notes from family members of other tenants, suggest that the master bedroom walk-in-robe allows full access to shelving and contents.

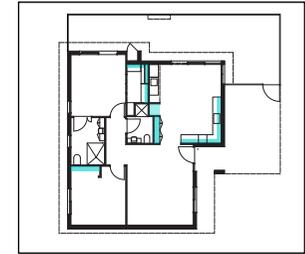
The participant had chosen to replace or change the location of furnishings in the main living space to increase circulation, access and useability from time point 1 to 2. This is evidenced in the Furnished Plans.

## LIMITATION

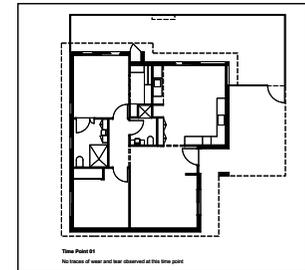
The resident does not use the second bathroom for personal care. The vanity and toilet in that bathroom are accessible for the resident; however, this bathroom does not have grabrails in place and the shower is not stepless. Hence, the resident chooses to use the master bedroom ensuite bathroom for personal care – this ensuite offers full access.

The participant reported that they find the location of the powerpoint away from the vanity area inconvenient for use of an electric shaver at the sink; however it is noted that requirements of the Building Code set distances between water and power supplies for safety.

&lt; PAGE



DEGREES OF PHYS. ACCESS



TRACES, WEAR &amp; TEAR PLAN

RESIDENTIAL ENVIRONMENT IMPACT SURVEY (REIS)									
Information Obtained Via Group Interview of Participants/Residents									
REIS SPACE	Area	Frequency	Severity	Frequency	Severity	Frequency	Severity	Frequency	Severity
Living Area									
Bedroom									
Bathroom									
Kitchen									
Corridor									
Staircase									
Common Area									
Outdoor Area									
Other									

REIS LONG FORM: SPACE

RESIDENTIAL ENVIRONMENT IMPACT SURVEY (REIS)									
Information Obtained Via Group Interview of Participants/Residents									
REIS OBJECTS	Area	Frequency	Severity	Frequency	Severity	Frequency	Severity	Frequency	Severity
Living Area									
Bedroom									
Bathroom									
Kitchen									
Corridor									
Staircase									
Common Area									
Outdoor Area									
Other									

REIS LONG FORM: OBJECT

...Well, very broadly we wanted to achieve - we wanted clients to live more independently by using the assistive technology. As to how we measure that outcome or what aspirations we had - well, I don't think we still understand that [laughs]. It's something that needs to be evaluated...

...We had some broad performance outcomes and objectives that we wanted to achieve, for example, control the lighting from using different user interfaces depending on the tenant's ability...

... It's easier [to operate the air conditioning] with the remote [supplied with the system]...

...We have a special technician who comes out every single time [to repair the home automation and communication technology]...But nothing really gets done, it only gets reset and [we] hope that will help...

D

**Control of Environment**

The ability to easily manipulate, operate or control the home and shared spaces, using fittings, appliances, or installed technology.

...I suppose as far as other people using it and all that the tenants did have two different devices, two different iPads. There was someone that they could be mobile with. Actually, they could be mobile with both the systems...

**ENABLER**

The smart-tablet operated home automation and communication control has capacity to offer flexible support for the tenant, and this participant has learnt to use the range of features offered on the device. The technology company advised that they have undertaken a number of training sessions with both tenants and staff to build skills in home automation use. (Continued next page)

PAGE



Screen should be a 100% zoom that you viewed every one of the 20 items. So, for each word of photos, you are "X" in the appropriate box to show you are able to view the word photo.

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PIADS

Item description	Item type	Item of use	Location	Value
<b>Participant 4 - iPad</b>				
Apple iPad (5th generation) - 128GB - Space Grey	Tablet	Home	Living Room	1
Apple iPad (5th generation) - 128GB - Space Grey	Tablet	Home	Bedroom	1
Apple iPad (5th generation) - 128GB - Space Grey	Tablet	Home	Kitchen	1
Apple iPad (5th generation) - 128GB - Space Grey	Tablet	Home	Bathroom	1
Apple iPad (5th generation) - 128GB - Space Grey	Tablet	Home	Garage	1
Apple iPad (5th generation) - 128GB - Space Grey	Tablet	Home	Office	1
Apple iPad (5th generation) - 128GB - Space Grey	Tablet	Home	Study	1
Apple iPad (5th generation) - 128GB - Space Grey	Tablet	Home	Living Room	1
Apple iPad (5th generation) - 128GB - Space Grey	Tablet	Home	Bedroom	1
Apple iPad (5th generation) - 128GB - Space Grey	Tablet	Home	Kitchen	1
Apple iPad (5th generation) - 128GB - Space Grey	Tablet	Home	Bathroom	1
Apple iPad (5th generation) - 128GB - Space Grey	Tablet	Home	Garage	1
Apple iPad (5th generation) - 128GB - Space Grey	Tablet	Home	Office	1
Apple iPad (5th generation) - 128GB - Space Grey	Tablet	Home	Study	1
Apple iPad (5th generation) - 128GB - Space Grey	Tablet	Home	Living Room	1
Apple iPad (5th generation) - 128GB - Space Grey	Tablet	Home	Bedroom	1
Apple iPad (5th generation) - 128GB - Space Grey	Tablet	Home	Kitchen	1
Apple iPad (5th generation) - 128GB - Space Grey	Tablet	Home	Bathroom	1
Apple iPad (5th generation) - 128GB - Space Grey	Tablet	Home	Garage	1
Apple iPad (5th generation) - 128GB - Space Grey	Tablet	Home	Office	1
Apple iPad (5th generation) - 128GB - Space Grey	Tablet	Home	Study	1
Apple iPad (5th generation) - 128GB - Space Grey	Tablet	Home	Living Room	1
Apple iPad (5th generation) - 128GB - Space Grey	Tablet	Home	Bedroom	1
Apple iPad (5th generation) - 128GB - Space Grey	Tablet	Home	Kitchen	1
Apple iPad (5th generation) - 128GB - Space Grey	Tablet	Home	Bathroom	1
Apple iPad (5th generation) - 128GB - Space Grey	Tablet	Home	Garage	1
Apple iPad (5th generation) - 128GB - Space Grey	Tablet	Home	Office	1
Apple iPad (5th generation) - 128GB - Space Grey	Tablet	Home	Study	1
Apple iPad (5th generation) - 128GB - Space Grey	Tablet	Home	Living Room	1
Apple iPad (5th generation) - 128GB - Space Grey	Tablet	Home	Bedroom	1
Apple iPad (5th generation) - 128GB - Space Grey	Tablet	Home	Kitchen	1
Apple iPad (5th generation) - 128GB - Space Grey	Tablet	Home	Bathroom	1
Apple iPad (5th generation) - 128GB - Space Grey	Tablet	Home	Garage	1

**ENABLER (CONTINUED)**

This resident is able to use their left hand to control standard remote controls and wall mounted switches for home appliances and reported that, for this person, this is a more efficient control option than the iPad control. The participant is able to open and close most windows and doors, noting difficulties with the lounge room windows below.

It is noted that the participant in this study may have more facility to operate the interface than other anticipated RIPL residents.

**LIMITATION**

The resident and support worker both reported ongoing issues with the reliability and functioning of the home automation technology. The participant's dissatisfaction with ongoing maintenance and support provided for the home automation technology was highlighted on the QUEST and within an interview.

D

**Control of Environment**

**The ability to easily manipulate, operate or control the home and shared spaces, using fittings, appliances, or installed technology.**

The participant estimated that in an average week the technology will not be functioning for around a quarter of the time. Reported lack of reliability of technology and timely service and maintenance significantly impacts this sub-criteria.

The resident reported concerns about the running cost of some appliances (e.g. split system heating and cooling system). As a result, the resident chose to use pedestal fans rather than the split system for cooling, in order to manage costs.

This individual reported difficulty independently opening and closing windows in the lounge room of the home. These were not operated via home automation technology but rather needed to be raised and lowered manually using bilateral hooks on each side of the window. This participant was pursuing options to modify the window opening system to allow independent control.

The support worker at this site reported that there are also issues with the staff support unit door control failing at times, and it has needed a number of technician calls for repair.

quest manual for it is a measure that you scored every one of the 20 items. So, for each word of ability, you'll see the appropriate box to show how you are affected by using the word please.

Item	1	2	3	4	5
1) independence					
2) confidence					
3) self-reliance					
4) self-control					
5) self-discipline					
6) self-reliance					
7) self-reliance					
8) self-reliance					
9) self-reliance					
10) self-reliance					
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12) self-reliance					
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16) self-reliance					
17) self-reliance					
18) self-reliance					
19) self-reliance					
20) self-reliance					

PIADS

Item	1	2	3	4	5
1) independence					
2) confidence					
3) self-reliance					
4) self-control					
5) self-discipline					
6) self-reliance					
7) self-reliance					
8) self-reliance					
9) self-reliance					
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16) self-reliance					
17) self-reliance					
18) self-reliance					
19) self-reliance					
20) self-reliance					

QUEST

DATA UNAVAILABLE.

ASSISTIVE TECH LOG

... The way the interface works is that there is a standardized interface across platforms so whether it's an IOS or it's an Android device. There is no re-having to learn how it operates on different devices...

D

**Intuitive Use**

The ability to use fittings and fixtures, appliance and smart technology installed. The design of these has an impact on efficient access and navigation by users.

...We did organise two rounds of training prior to them moving in, and I think what we've learnt further...There's a third round coming up, of refresher training, and particularly to really focus on well, are you using the technology? Why aren't you, what are the barriers that are stopping you, do we need to alter it to better suit your needs?...

...I think one of the challenges we've had is I think - I think the training is really important and the familiarisation with it, and I don't think you can understate the importance of the support staff understanding the training, knowing how to use it and ... encouraging, showing and reinforcing. A couple of one-hour training sessions is only going to get people so far. One of the things I've got in mind is we need to put more effort upfront into the support staff and really get them to do it. I think they need to be advocates for it...

**ENABLER**

During the interviews, the tenant appeared to display sound learning ability and this was demonstrated by the person's observed ability to use fittings, fixtures and the technology installed. The resident reported that the user interface on the home automation technology – which has simplified when compared to the interface offered in RIPL Project 1 – is intuitive and that they found it easy to learn. (Continued next page)

PAGE

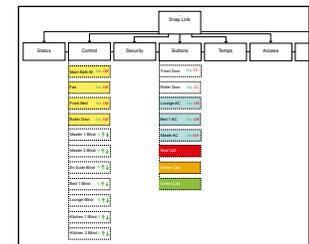


PIADS

QUEST

DATA UNAVAILABLE.

ASSISTIVE TECH LOG



INTERFACE NAVIGATION



D

Intuitive Use

The ability to use fitting and fixtures, appliance and smart technology installed. The design of these has an impact on efficient access and navigation by users.

ENABLER (CONTINUED)

In relation to kitchen appliances, it was reported that the resident does not use the kitchen oven for cooking – rather the resident most often uses the stove top, microwave or a slow cooker thus this style of cooking has limited the use of appliances and new learning required. On the PIADS, the resident rated that the home automation technology reduced their sense of confusion and frustration and significantly increased their sense of control.

LIMITATION

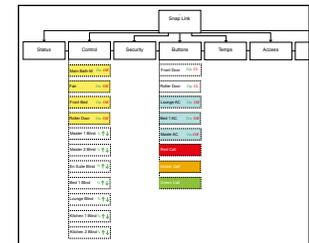
There were no limitations observed for this resident in relation to intuitive use and none were reported. It is noted, however, that there are buttons within the provided interface that were not used, or did not work, as observed by the researchers. This may be distracting to residents.

PIADS

QUEST

DATA UNAVAILABLE.

ASSISTIVE TECH LOG



INTERFACE NAVIGATION

D

## Control Support Delivery

Ability to access support at a time, and in a delivery format, of a resident's choosing.

...Just for help, [Participant D] just comes and knocks on the [support staff unit] door...

...If there is an issue, then they've still got that flexibility of call back and call people in if they want, set it up so they've actually got a three-stage system, so green, amber and red obviously being a priority with red being the highest then green...

## ENABLER

The close proximity of this participant's unit to the support staff unit is an enabler for control of support delivery. The participant is independent in mobility without the need for use of a mobility device.

For this individual, moving from living in shared supported accommodation where line-of-sight support was available in case of need, to the person's own home with access to on-call support when required, has allowed a greater ability to access support when needed, rather than having staffing support in place in the home environment regardless of the person's individual level of need. This resident is making decisions to use key skilled support for targeted support delivery (e.g. domestic support for fortnightly cleaning tasks; the participant is currently recruiting an attendant care worker with gardening experience).

This person uses a lanyard with single button control to call staff in case of emergency (e.g. falls). The PIADS data indicated that, when operational, the home automation and communication technology increases the person's sense of independence.

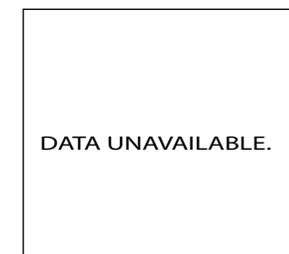
## LIMITATION

The lack of reliability of technology and timely service and maintenance impacts this subcriteria. Unfortunately we were unable to access reliable assistive technology logs given the issues with technology reliability, so were unable to track actual use.

Open manual for a response that you served every one of the 20 calls. No. for each word of phone, put an "X" in the appropriate box to show how you are affected by using the word phone.

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PIADS



ASSISTIVE TECH LOG







D

## Pursue Life Goals

Elements of the home and shared environment that have capacity to impact engagement in meaningful activities and development of valued life roles.

*...I am still wanting someone who I can garden with. Yeah that would be good. Just someone one day a week who could ... who knows what they are talking about with gardening...*

## ENABLER

A key life role for this participant is the hobbyist role, specifically as a gardener. The Furnished Plans provide evidence of the changes made to the courtyard and carport spaces between data collection time points one and two. This person is developing an extensive garden and maintaining and developing this is a key area of time use. The north-facing courtyard assists the growing of produce, and access from the carport to the courtyard allows the person to take gardening items directly from the car into the courtyard for use. Addition of a shed and varied height shelving added undercover in the courtyard has further facilitated this gardening role. The participant has planted out the front nature strip of the development, and shared front spaces between units. As demonstrated over the two time points of data collection in the Furnished Plans, the resident has made many changes to satisfy a keen interest in gardening, and this is the main focus of the resident's time use and requirement for support from others – the person is currently recruiting a new attendant care worker with specific skills in gardening. (Continued next page)

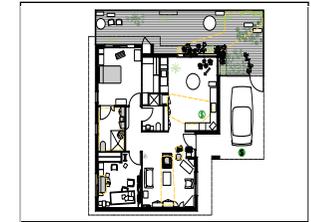
PAGE



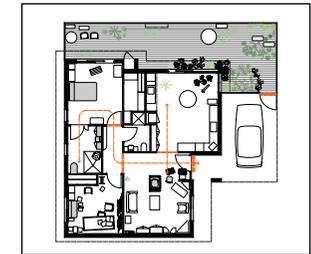
NOTE: Please list all the elements that you assess every one of the 10 items. For each item of the items, please use 'C' in the appropriate box to show how you are affected by using the space plan.

Item	1	2	3	4	5	6	7	8	9	10
01. accessibility										
02. layout										
03. maintenance										
04. safety										
05. privacy										
06. production										
07. security										
08. flexibility										
09. functionality										
10. adaptability										
11. usability										
12. capacity										
13. ability of use										
14. production										
15. safety of person										
16. noise control										
17. ventilation										
18. adaptability to change										
19. ability to manage										
20. capacity to hold things										
21. ability to adapt to the										

PIADS



INDEPENDENT LIVING PLAN



FURNISHED PLANS

Pursue Life Goals

Elements of the home and shared environment that have capacity to impact engagement in meaningful activities and development of valued life roles.

ENABLER (CONTINUED)

The participant also volunteers once per month, some distance from home. The ability to drive facilitates this, and also facilitates the person's ability to travel to purchase gardening and other items. The participant stores a recumbent bicycle in the vehicle, and drives to a local bike path to undertake cycling with attendant care worker support.

The resident reports that family members now visit the new home more regularly than when the person was living in shared supported accommodation. The participant suggested that this is in part due to the privacy offered in this unit, in comparison to a shared residential setting with a large number of co-residents.

Home automation technology facilitates greater independence in life goals, as evidenced by this participant's positive ratings on items including quality of life, productivity, and ability to take advantage of opportunities in the PIADS.

LIMITATION

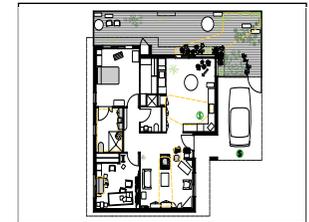
The resident reports they do not drive to visit family in the family members' neighbourhood (located in another region of Melbourne) due to the distance required to travel and the traffic to be negotiated. As noted above, family are now more likely to visit the person in their home.

The person reports that it is necessary to drive to a suitable location to use the recumbent bicycle, as the hilly location of the unit makes bike riding challenging in the street within which the units are located.

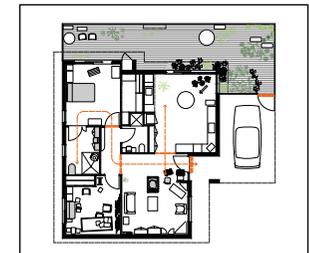
Scale: 100mm = 1m. It is important that you answer every one of the 27 items. For each item or phrase, place an 'X' in the appropriate box to show how much you are able to do using the unit plan.

Item	1	2	3	4	5	6	7	8	9	10
1) convenience										
2) happiness										
3) independence										
4) privacy										
5) efficiency										
6) self-reliance										
7) productivity										
8) security										
9) freedom										
10) self-confidence										
11) control										
12) ability to adapt to the										
13) quality of life										
14) sense of peace										
15) sense of control										
16) self-reliance										
17) ability to manage										
18) capacity to deal with stress										
19) ability to adapt to the										

PIADS

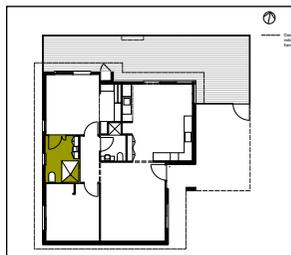


INDEPENDENT LIVING PLAN

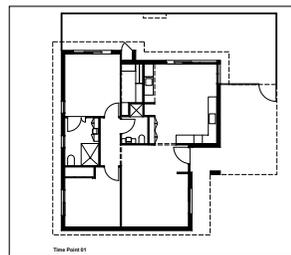


FURNISHED PLANS

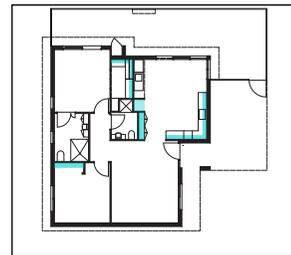




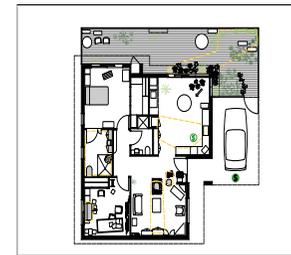
BASE PLAN



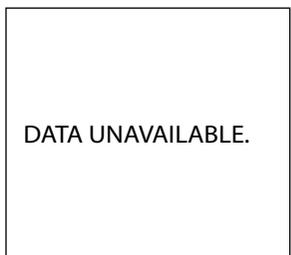
TRACES, WEAR & TEAR PLAN



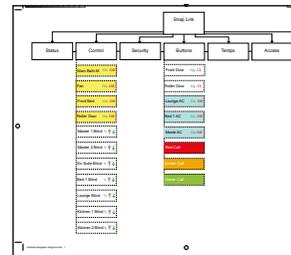
DEGREES OF PHYS. ACCESS



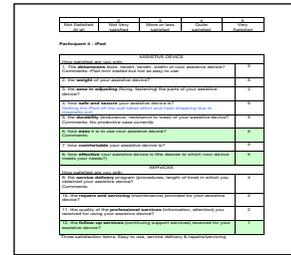
INDEPENDENT LIVING PLAN



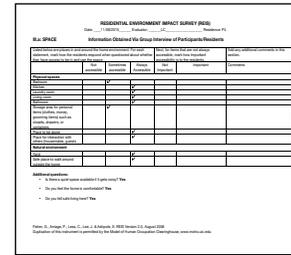
ASSISTIVE TECH LOG



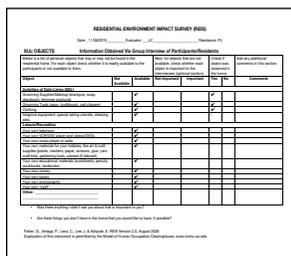
INTERFACE NAVIGATION



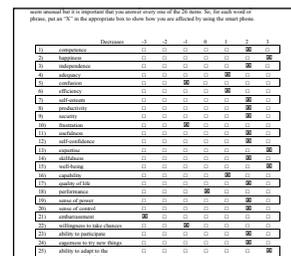
QUEST



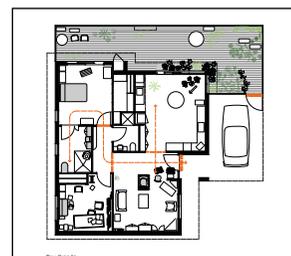
REIS LONG FORM: SPACE



REIS LONG FORM: OBJECT



PIADS



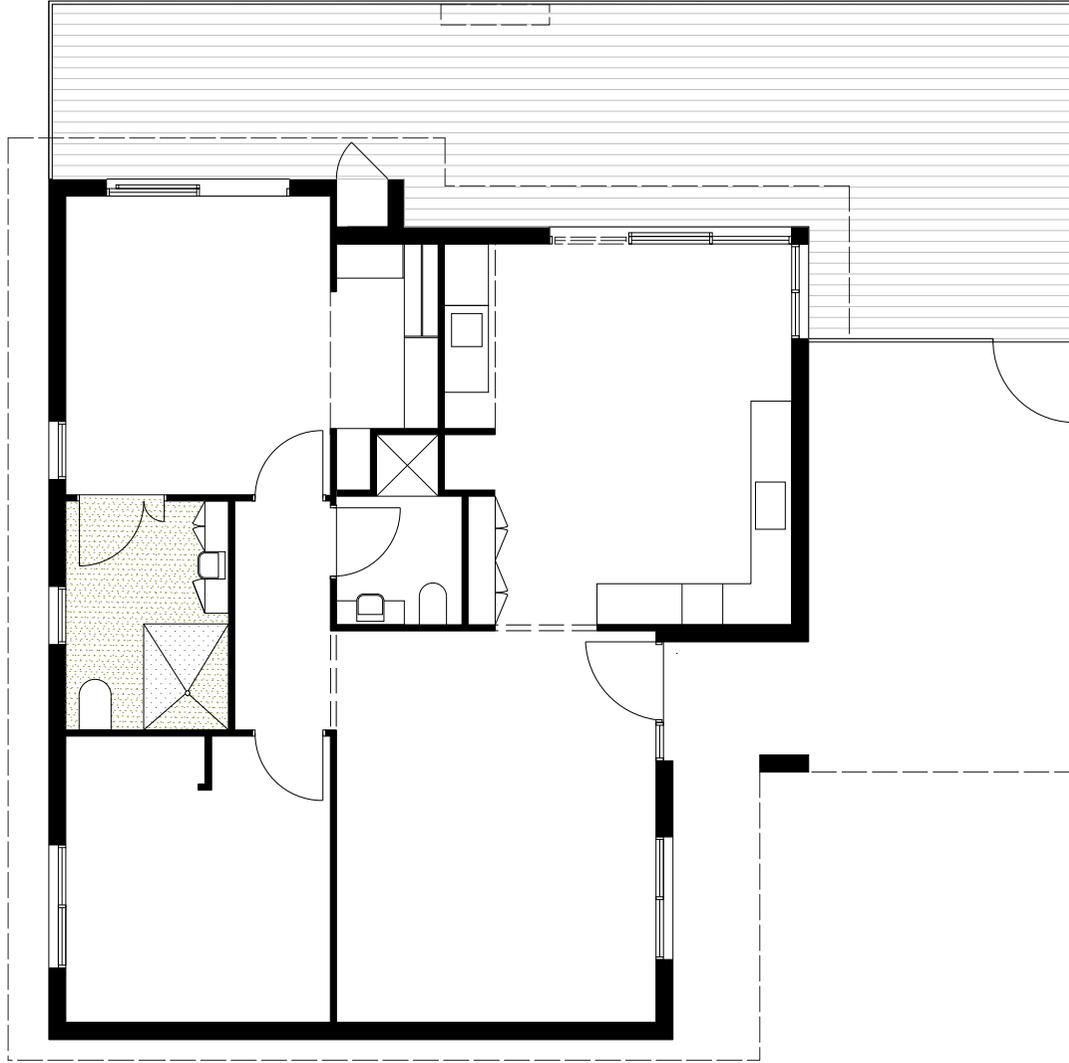
FURNISHED PLANS

The Evidence section includes relevant information for this Criteria. Click on the links above to explore. The up / down keys on the keyboard will scroll through the pages included.

Use the navigation toolbar on the right of the screen to return to the criteria page ('C'). Links to Home, Criteria Overview ('O') and Panoramas ('P') are also provided.

On other pages in this criteria section, you can return to this Evidence ('E') page with the navigation toolbar on the right.



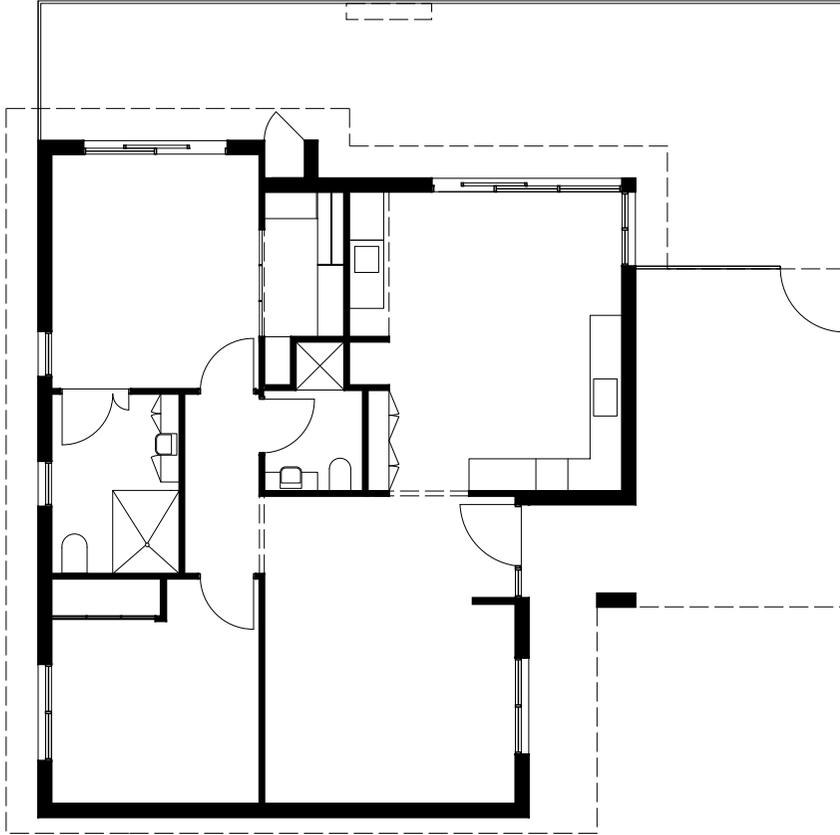


0m 4m



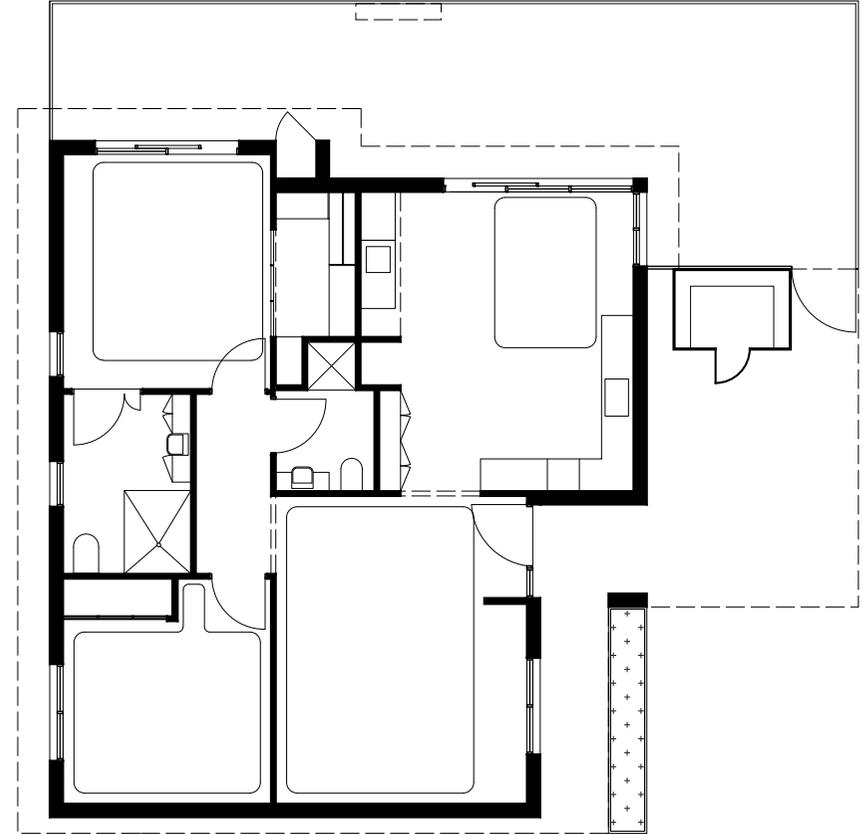
--- Dashed line indicates roof/door frame above





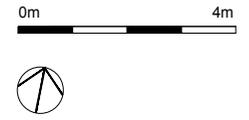
**Time Point 01**

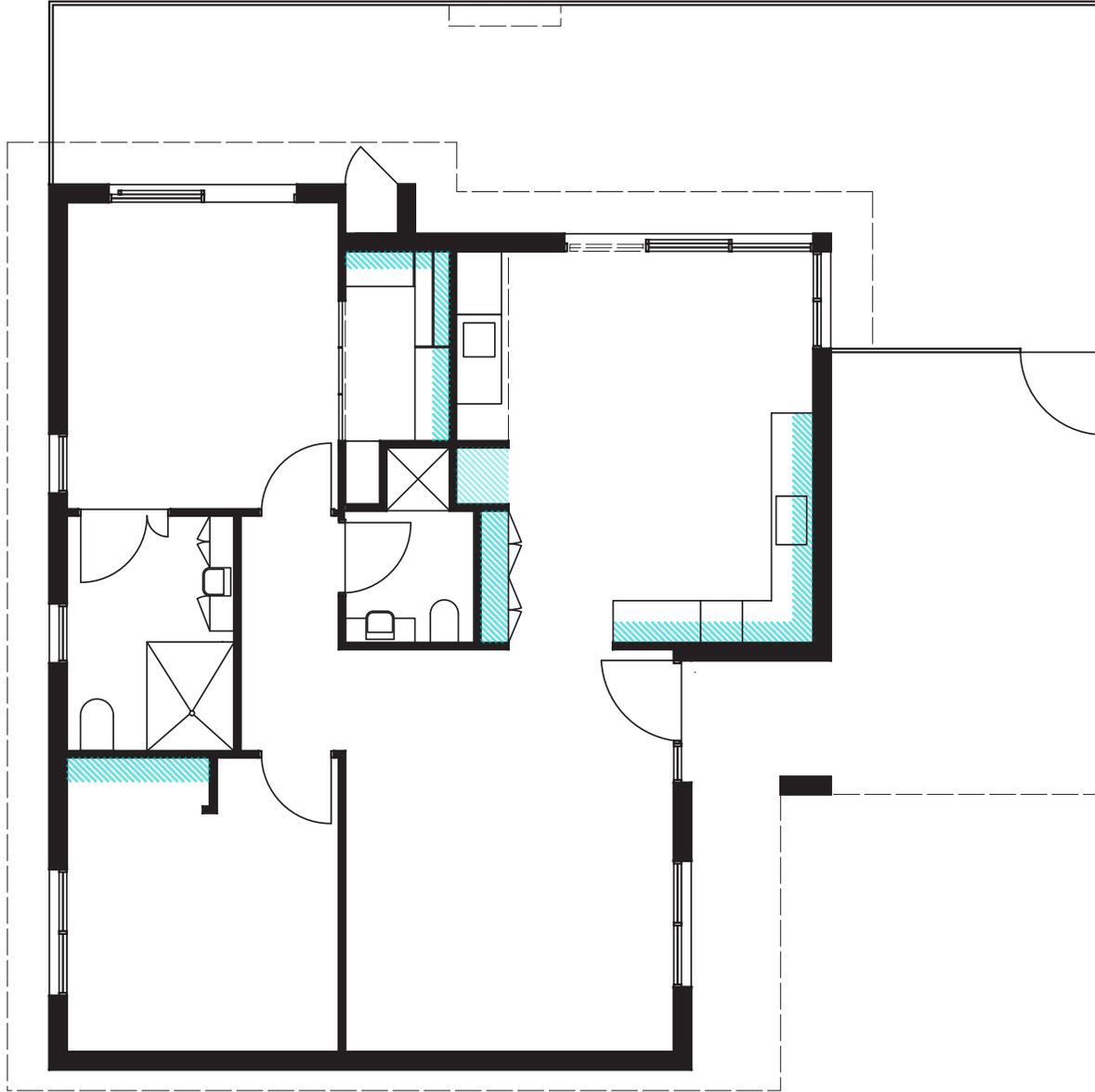
No traces of wear and tear observed at this time point



**Time Point 02**

No traces of wear and tear observed at this time point





0m 4m

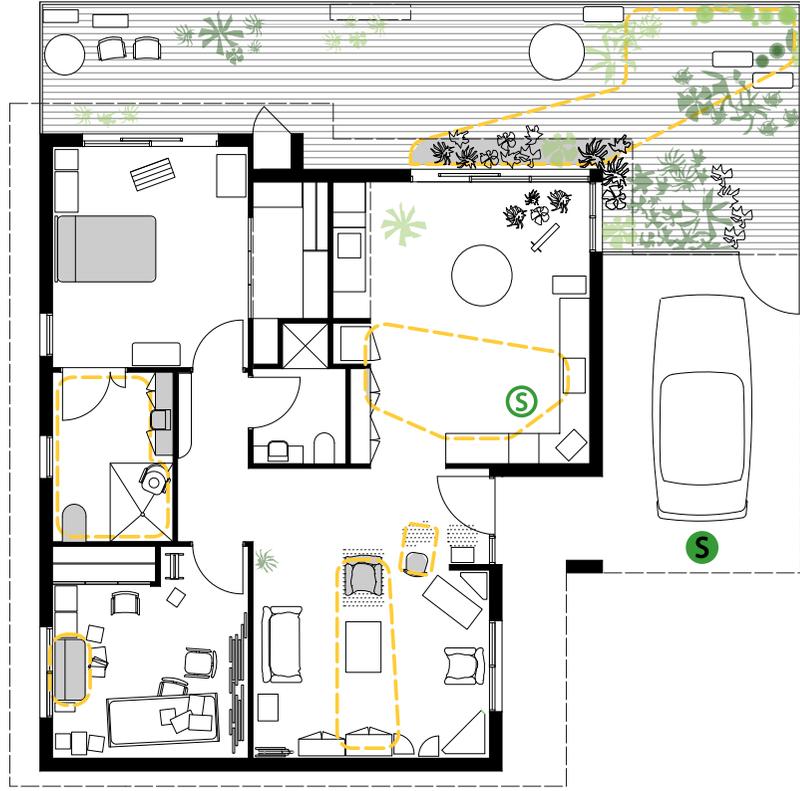


- 360 Degree Access Possible
- Forwards / Backwards movement possible
- Reach Only
- No access
- No access at high level

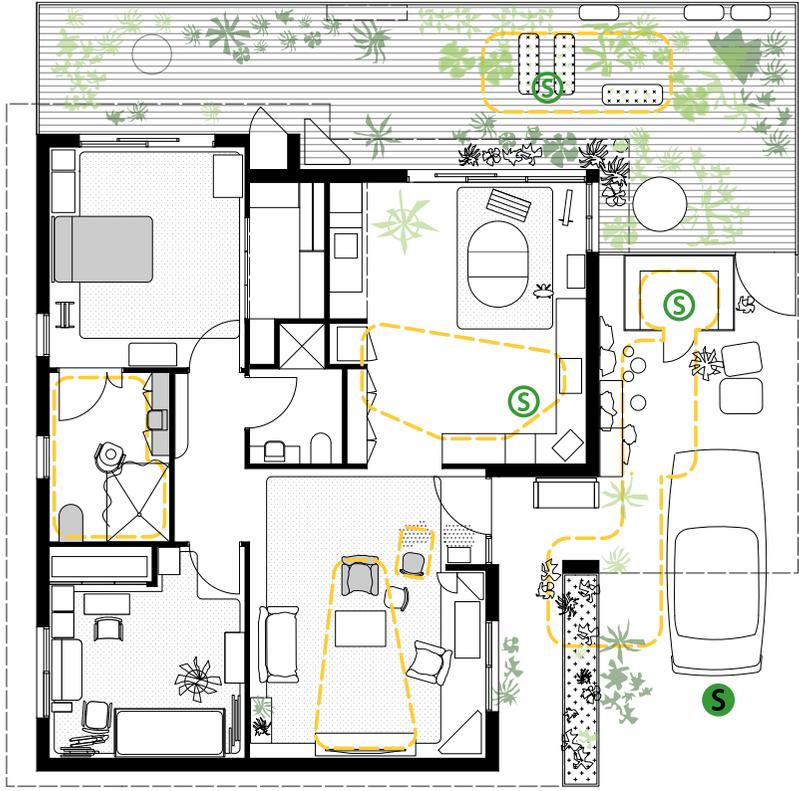


SPACES OF INDEPENDENT / SUPPORTED LIVING PLANS

EVIDENCE



Time Point 01



Time Point 02

0m 4m

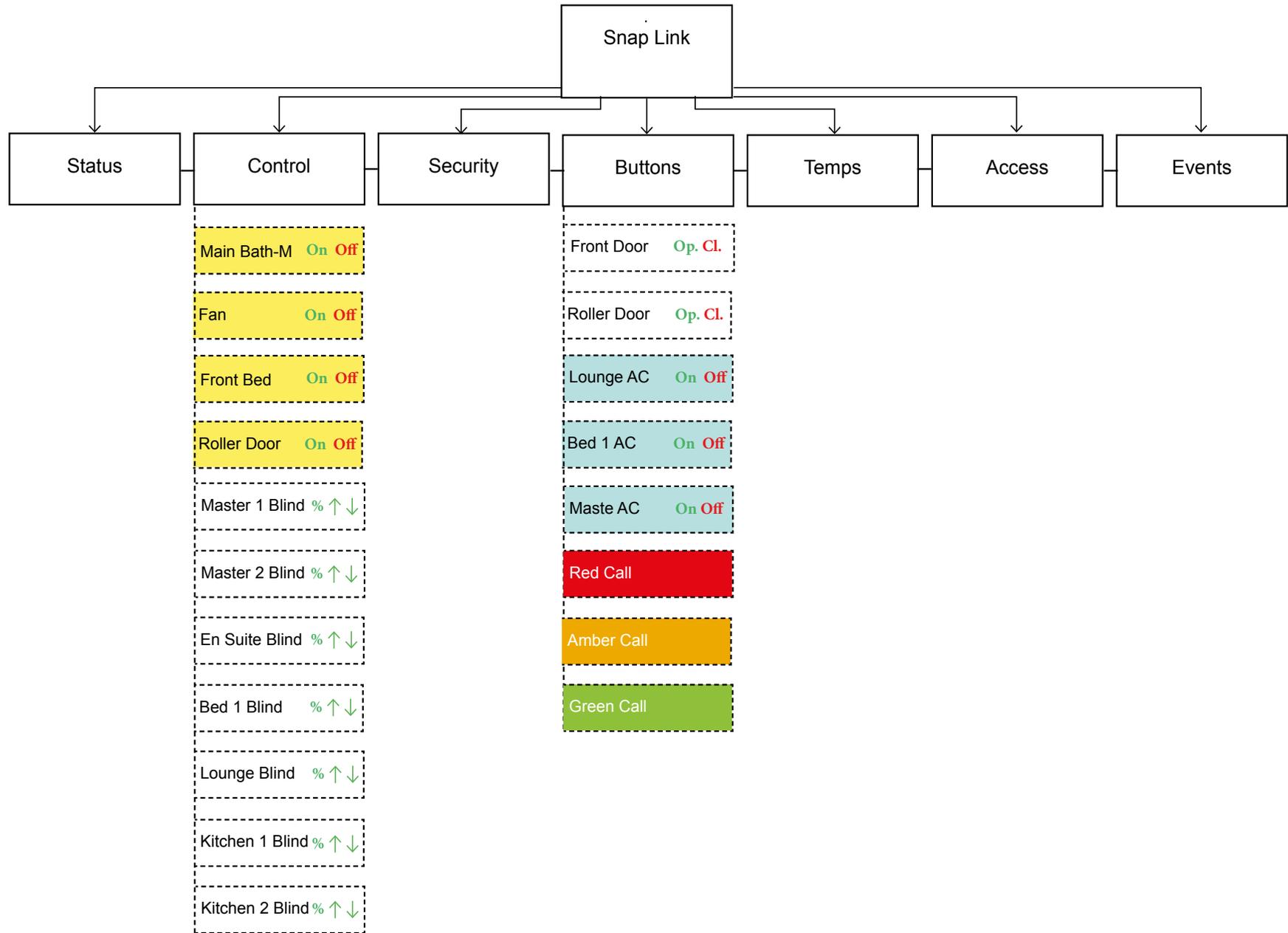


- key zones of inhabitation
- key zones of inhabitation
- S some support provided
- S full support provided



DATA UNAVAILABLE.





	2	3	4	5
Not Satisfied At all	Not Very satisfied	More or less satisfied	Quite satisfied	Very Satisfied

## Participant 4 - iPad

ASSISTIVE DEVICE	
How satisfied are you with,	
1. The <b>dimensions</b> (size, height, length, width) of your assistive device? Comments: <i>iPad mini trialled but not as easy to use</i>	5
2. the <b>weight</b> of your assistive device?	5
3. the <b>ease in adjusting</b> (fixing, fastening) the parts of your assistive device?	4
4. how <b>safe and secure</b> your assistive device is? <i>Getting the iPad off the wall takes effort and risks dropping due to magnetic pull</i>	5
5. the <b>durability</b> (endurance, resistance to wear) of your assistive device? Comments: <i>No protective case currently</i>	5
6. how <b>easy</b> it is to use your assistive device? Comments:	5
7. how <b>comfortable</b> your assistive device is?	5
8. how <b>effective</b> your assistive device is (the degree to which your device meets your needs?)	5
SERVICES	
How satisfied are you with,	
9. the <b>service delivery</b> program (procedures, length of time) in which you obtained your assistive device? Comments:	4
10. the <b>repairs and servicing</b> (maintenance) provided for your assistive device?	2
11. the quality of the <b>professional services</b> (information, attention) you received for using your assistive device?	2
12. the <b>follow-up services</b> (continuing support services) received for your assistive device?	1

Three satisfaction items: Easy to use, service delivery & repairs/servicing

## RESIDENTIAL ENVIRONMENT IMPACT SURVEY (REIS)

Date: \_11/06/2015\_\_\_\_\_ Evaluator: \_\_\_LC\_\_\_\_\_ Residence: P4

## III.b: OBJECTS

## Information Obtained Via Group Interview of Participants/Residents

Below is a list of personal objects that may or may not be found in the residential home. For each object check whether it is readily available to the participants or not available to them.			Next, for objects that are not available, check whether each object is important to the interviewees (optional section).		Check if object was observed in the home.		Add any additional comments in this section
Object	Not Available	Available	Not Important	Important	Yes	No	Comments
<b>Activities of Daily Living (ADL)</b>							
Grooming Supplies/Makeup (shampoo, soap, deodorant, feminine products)		✓			✓		
Grooming Tools (razor, toothbrush, nail clippers)		✓			✓		
Clothing		✓			✓		
Adaptive equipment: special eating utensils, dressing aids.		✓			-		
<b>Leisure/Recreation</b>							
Your own television		✓					
Your own VCR/DVD player and videos/DVDs		✓					
Your own music player or radio		✓					
Your own materials for your hobbies, like art & craft supplies (paints, markers, paper, scissors, glue, yarn, craft kits), gardening tools, camera (if relevant)		✓					
Your own educational materials (worksheets, pencils, workbooks, textbooks)		✓					
Your own money		✓					
Your own books		✓					
Your own photographs		✓					
Your own "stuff"		✓					
<b>Other:</b> _____ _____							

- Was there anything I didn't ask you about that is important to you?
- Are there things you don't have in the home that you would like to have, if possible?

Fisher, G., Arriaga, P., Less, C., Lee, J. & Ashpole, E. REIS Version 2.0, August 2008  
 Duplication of this instrument is permitted by the Model of Human Occupation Clearinghouse, www.moho.uic.edu

**RESIDENTIAL ENVIRONMENT IMPACT SURVEY (REIS)**

Date: \_\_\_11/06/2015\_\_\_ Evaluator: \_\_\_LC\_\_\_ Residence: P4

**III.a: SPACE****Information Obtained Via Group Interview of Participants/Residents**

	Listed below are places in and around the home environment. For each statement, mark how the residents respond when questioned about whether they have access to be in and use the space			Next, for items that are not always accessible, mark how important accessibility is to the residents.		Add any additional comments in this section.
	Not accessible	Sometimes accessible	Always Accessible	Not Important	Important	Comments
<b>Physical spaces</b>						
Bedroom		✓				
Kitchen			✓			
Laundry room			✓			
Living room			✓			
Bathroom			✓			
Storage area for personal items (clothes, money, grooming items) such as closets, drawers, or containers		✓				
Place to be alone			✓			
Place for interaction with others (housemates, guests)			✓			
<b>Natural environment</b>						
Yard			✓			
Safe place to walk around outside the home			✓			

**Additional questions:**

- Is there a quiet space available if it gets noisy? **Yes**
- Do you feel the home is comfortable? **Yes**
- Do you feel safe living here? **Yes**

Fisher, G., Arriaga, P., Less, C., Lee, J. &amp; Ashpole, E. REIS Version 2.0, August 2008

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PAGE



**RESIDENTIAL ENVIRONMENT IMPACT SURVEY (REIS)**

Date: \_\_\_11/06/2015\_\_\_ Evaluator: \_\_\_LC\_\_\_ Residence: P4

**III.a: SPACE (con't)****Information Obtained Via Group Interview of Participants/Residents**

Listed below are features of the environment. For each statement, mark how the residents respond when questioned about whether these features are a problem			Add any additional comments in this section.
	No problem	This is a problem	Comments (describe the problem and the limit/barrier that it presents)
<b>Physical Environment</b>			
Stairs outside home	✓		
Stairs inside home	✓		
Type of furniture	✓		
Amount of furniture in room	✓		
Amount of clutter (a lot of objects in the home)	✓		

**Additional questions:**

- Are there any things about the home like temperature, noise, lighting, smell that affect you, or that bother you? **No**
  
- Are you allowed to change the temperature, lighting, and noise level when you want? **Yes**
  - How important is that to you?
  
- Is the home easy to move around in? (Getting around in the kitchen, living room, bedroom, bathroom, other rooms, opening doors, getting through doorways.) (Note if anyone in the home has a mobility impairment and / or if anyone uses any assistive device such as a cane, walker, or wheelchair). **Yes**
  
- Is the bathroom easy to use and does it feel safe? (Getting on and off the toilet and in and out of the tub/shower)  
**Bathroom issue – Bathroom vanity cupboard door knocks grab rail.**

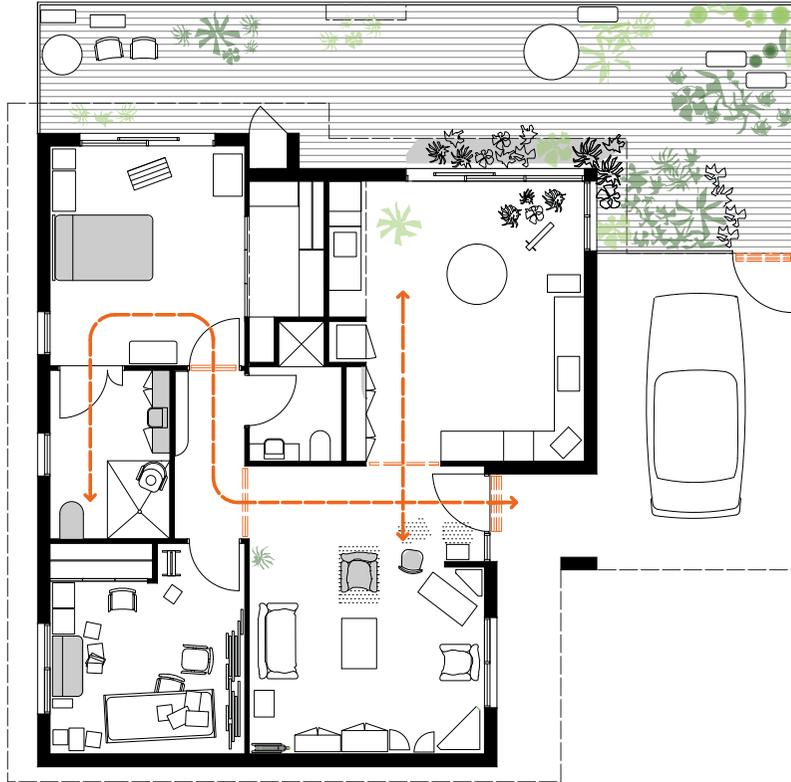
Fisher, G., Arriage, P., Less, C., Lee, J. & Ashpole, E. REIS Version 2.0, August 2008  
 Duplication of this instrument is permitted by the Model of Human Occupation Clearinghouse, www.moho.uic.edu

## Psychosocial Impact of Assistive Devices Scale (PIADS)

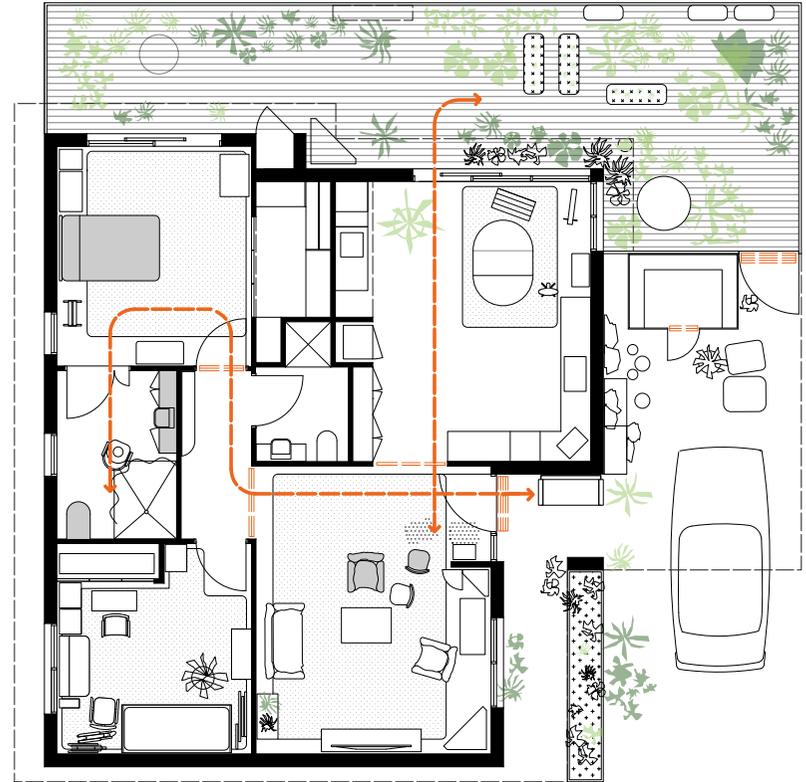
Client Name: Participant

Each word or phrase below describes how using an assistive device may affect a user. Some might seem unusual but it is important that you answer every one of the 26 items. So, for each word or phrase, put an "X" in the appropriate box to show how you are affected by using the smart phone.

	Decreases	-3	-2	-1	0	1	2	3
1) competence	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2) happiness	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
3) independence	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
4) adequacy	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5) confusion	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6) efficiency	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7) self-esteem	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
8) productivity	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
9) security	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
10) frustration	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11) usefulness	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
12) self-confidence	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
13) expertise	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
14) skilfulness	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
15) well-being	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
16) capability	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17) quality of life	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
18) performance	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19) sense of power	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
20) sense of control	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
21) embarrassment	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
22) willingness to take chances	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
23) ability to participate	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
24) eagerness to try new things	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
25) ability to adapt to the activities of daily living	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
26) ability to take advantage of opportunities	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>



Time Point 01



Time Point 02

0m 4m



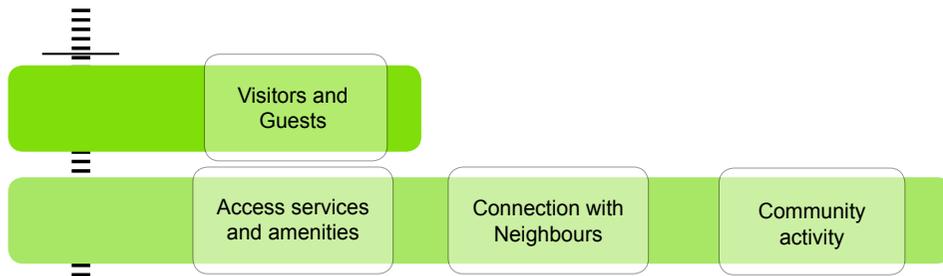
PUBLIC / PRIVATE THRESHOLDS

strong

very strong

main circulation route





*...what constitutes success with connection with neighbours, is it very little or is it a lot?...*



### COMMUNITY INTEGRATION

Access to and participation in cultural, social, educational and productive tasks that offer the development of social relationships, engagement with mainstream services, community presence and connectedness.



D

**Access services and amenities**

**Ability of residents to use local services and amenities as influenced by site selection.**

*...We go to Market Square for shopping...you've got Aldi and Woolworths there...and we have Bunnings of course...*

*... I use online banking ... mostly through the [internet-enabled] TV...*

*...One of the challenges was I think the further you go away from metropolitan Melbourne is that shops become the local street-type shops with steps and difficulty accessing those shops rather than your larger shopping centre plaza-type development...*

**ENABLER**

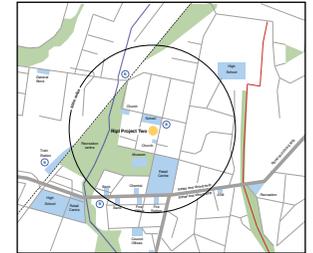
The participant is able to drive a car, thus has capacity to travel into local neighbourhood and surrounding suburbs by private vehicle. The participant reported that public transport is not used to local travel. This individual uses a range of local community services, which are in local driving distance. The participant reports they have benefited from input from support workers for identification of local service providers including a dentist and GP. The unit development is in close (driving) proximity to outdoor recreational spaces allowing the participant to use a recumbent bicycle on local bicycle paths, as evidenced in the Context Plan.

This participant is able to use an internet-enabled television for some online service access, negating the need to go out to local services including a bank and post office to pay bills. Key staff working with RIPL at the TAC worked with local council to improve community access including the building of footpaths, which has improved walking access to shops and amenities.

PAGE



MOBILITY TRACKING DATA



CONTEXT PLAN



D

Access services and amenities

Ability of residents to use local services and amenities as influenced by site selection.

LIMITATION

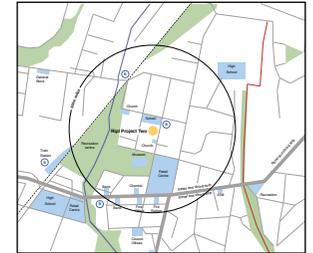
RIPL Project Two is set at the top of a rise approximately 500m from the local shopping centre and main street and 1.3km to the closest train station – this may pose some access and community mobility issues for people using a manual wheelchair for mobility, or lead to the requirement for motorised wheelchair or scooter access. The quality of local footpaths may also pose access challenges. (Refer Context Plan)

The participant in this study can walk household and short community distances but may experience difficulty with longer distance community walking e.g. from the housing site to the main street and shopping centre. However, as the person is able to drive, this does not pose access issues to local community settings.

Given the location of RIPL project two in an outer suburb of metropolitan Melbourne, the site context for this development may necessitate driving to some local amenities (e.g. medical or dental centre). Although not an issue for the participant in this study, this type of site selection may lead to the need for additional support or specialised transport for some residents.



MOBILITY TRACKING DATA



CONTEXT PLAN



**ENABLER**

Design of the street appearance of RIPL project two has been developed to offer an 'open' front entrance to the group of units and avoid the appearance of a gated precinct. In contrast to some of the other unit developments in close proximity the inclusion of a wide driveway and central parking and circulation zone, ungated opening in the front fence, offers a sense of connection to the street frontage for the project. The scale and materiality is typical of good quality suburban unit developments, rather than perhaps indicating 'disability housing' design.

**LIMITATION**

RIPL Project Two is not a mixed development, rather it is a cluster model for people with disability as shown in the Development Plan. The development is separated from the road by a 'front fence' forming a sense of division, however, this is not inconsistent with the manner in which neighbouring houses / units relate to the street. As noted above, the inclusion of a wide ungated opening in the fence moderates this separation.

(Continued next page)

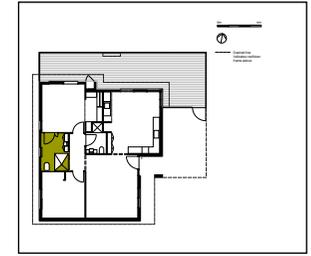
*...I think it's fair to say that the cluster model that RIPL has at the moment, given that we needed to do this ourselves, is somewhat of a compromise. Ideally, it would be good to have these people - if we could have achieved this, salt and peppered throughout the building so there's not a nexus or a hub so to speak of accessible accommodation...*

D

**Mainstream Development**

**Foster inclusion and avoid segregation through the integration of housing for people with disabilities with other types of social and private residential housing.**

PAGE

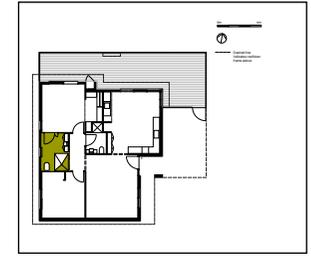


BASE BUILDING PLAN

**LIMITATION (CONTINUED)**

A series of vertical screening elements facing the street increase the sense of separation of the dwelling from the street – however, again it should be noted that in this suburban environment most houses are set back from the street and there is little apparent interaction between dwellings and other houses on the street. The research team observed little street pedestrian activity, generally car transport was observed to be more common in the area. The options for direct connection and inclusion with street neighbours is somewhat limited as a result.

Clustered housing around a central open space has led to an inward facing environment and some level of segregation, particularly given that all units are tenanted by TAC clients. The cluster nature of these units does not allow for the broader unit development to offer integrated living. Interview data elicited that this model was initially considered for progression to a keyring model which would build transition of tenants from this cluster model to mainstream developments; however, this is now not currently being pursued.



BASE BUILDING PLAN

D

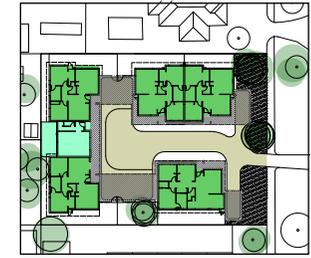
**Mainstream Development**

**Foster inclusion and avoid segregation through the integration of housing for people with disabilities with other types of social and private residential housing.**

D

**Connection with Neighbours**

**Interactions between residents, neighbours and community members, occurring within the development and community precinct.**



DEVELOPMENT PLAN

*...Well, I think what we've learned is true independent living and what's important to the RIPL tenants is that they just want to have their own social interaction with families and friends. A lot of tenants don't want to get to know their neighbours or have anything to do with their other neighbours on the site...*

**ENABLER**

The Development Plan indicates that the central driveway located in RIPL project two offers opportunity to meet neighbours living on the same site, however the participant reported he chooses not to socialise with neighbours at RIPL Project Two beyond general greetings upon incidental meetings.

The design of the units encourages independence of inhabitation for residents, with the option to invite people into one's home or outdoor private courtyard if desired.

**LIMITATION**

Given this participant drives a vehicle and does not walk community distances for leisure, there is reduced opportunity for this person to meet neighbours in the local area.

Individual unit entrances do not have a 'shared-space' focus – the decision was made in the design phase to remove a shared outdoor recreational area onsite, however it seems there may be some residents interested in a retrofit now. The participant in this study did not see that retrofit as necessary.

D

**Opportunity for community activity**

**Meaningful connection to culture, religion, social networks, education and employment within the community precinct.**

*... Through talking to our key stakeholders, mainly our clients and clinicians, it was thought that close proximity to shops and services was more important than transport...*

**ENABLER**

As shown in the Context Plan, this development offers opportunity to access a range of community activities within 500m of RIPL project two. This participant is engaged in a range of local community activities and roles, including volunteering on a monthly basis, accessing shops (particularly in relation to specific hobbies), and using local bicycle pathways for recumbent cycling (weather permitting, and with support from another person). The individual has a preferred group of shops in the local area that he accesses using his own vehicle.

**LIMITATION**

In the suburban shopping area closest to the participant's home, the research group noted that some of the local retail and dining options do not offer wheelchair access. Although not an issue for the participant in this study, this will pose access barriers for some tenants.

Diary were collected for four days from each of the participants, including at least one weekend day. The original plan was to collect data for 7 days, however the diaries were incomplete or missing data for more than 2 days without notifying. Consequently we performed 2 separate data collection visits with a recharging session in the middle to ensure that battery life was sufficient.

Both participants spent some time outdoors on most days (Table 1 & 2). Most outdoor time appeared to be leisure and not rehabilitation related. Multiple trips to shopping centres/shops were performed, some by wheelchair and others by car to the closest station to the outdoor location (both locations and the safety of movements). Both participants recorded outside the shops, including trips to shopping centres and a church in adjacent suburbs. A full list of the outdoor activity performed by the participants is provided in Tables 1 & 2.

Table 1. Participant 1 Community based activity

DATE	DETAILS
14/01/2014	No outdoor activity, the participant stayed inside the residence all day.
15/01/2014	Departed the residence at 12pm. The participant travelled by car to a bike shop approximately 2.2km away in an adjacent suburb. They stayed there for 1.5 hours before arriving back at the residence at 1:30pm. They stayed inside for the remainder of the day.
16/01/2014	Departed the residence at 9:30am and travelled to the closest shopping centre approximately 400m away by wheelchair. They stayed there for approximately 20 minutes before returning back to the residence and not leaving the building for the rest of the day.
18/01/2014	Travelled from the residence to a church in an adjacent suburb approximately 1.6km away by wheelchair, where they stayed for 1 hour.

MOBILITY TRACKING DATA





D

**Visitors and Guests**

The ability for residents to have visitors or guests in their home.

*...My family visit for the day but doesn't stay overnight...*

*...They've all entertained friends and family, some overnight. They've all done a lot of - they've used it in the way we anticipated, but whether they live there. Certainly I know people stay overnight, they have people over for dinners and all this kind of stuff, so they are using the space as such...*

**ENABLER**

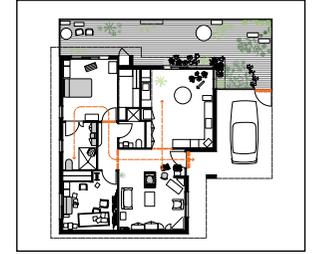
A range of two- and three-bedroom unit plans (4 x two-bedroom units and 1 x three-bedroom unit) were included in this development to allow for visitors, guests and accommodation of family members in each unit. Currently, RIPL staff advise the three-bedroom unit has been converted to two bedrooms to allow greater circulation space for the single tenant living there.

As noted above, the main social network is family for the participant in this study, particularly siblings, and maintenance of this network is undertaken primarily by family members' visiting the tenant's home. Visiting has reportedly been improved by the move from shared supported accommodation to the person's own home, offering more privacy in the current home and thus, from the participant's perspective, a greater likelihood that family will now visit. RIPL project two is located some distance from siblings, and the tenant is hesitant to drive these longer distances, thus increasing the likelihood that family will visit the person at RIPL project two.

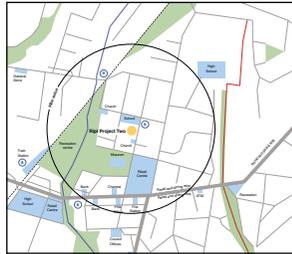
The home offers a second, spare bedroom and a visitors' bathroom allowing for overnight guests. However, the participant reports they have not had overnight visitors to date. Given the low mobility equipment needs of this tenant, there may be the option to consider co-residence in the home, potentially to include sub-leasing rooms.

**LIMITATION**

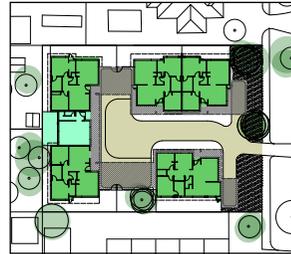
None observed for this participant.



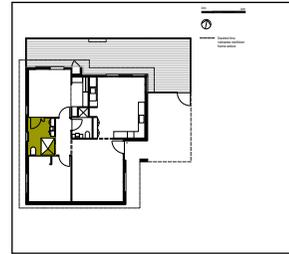
FURNISHED PLANS



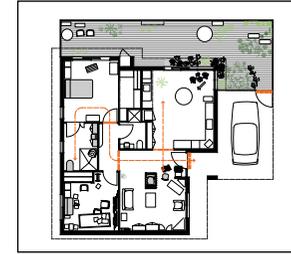
CONTEXT PLAN



DEVELOPMENT PLAN



BASE BUILDING PLAN



FURNISHED PLANS

Diary were collected for their diary from each of the participants, including at least one weekend day. The original plan was to collect data for 7 days, however the diaries were completed at a point where the most than 3 days without exchanging. Consequently we performed 2 separate data collection periods with a recharging session in the middle to ensure that battery life was sufficient.

Both participants spent some weekends on motor bikes (Table 1.3). Most outdoor time appeared to be leisure and not rehabilitation related. Multiple trips for shopping and other errands were performed, walking to school and other by bike to the bus station to the residence (aided by both location and the safety of movements). Both participants mentioned outside the study, including trips to shopping centres and a church or religious service. A full list of the outdoor activity performed by the participants is provided in Tables 1.4-5.

Table 1. Participant 1 community based activity

DATE	DESCRIPTION
15/03/2014	No outdoor activity, the participant spent inside the residence all day.
16/03/2014	Departed the residence at 12pm. The participant travelled by car to a fitness centre approximately 2.5km away in an adjacent suburb. They spent time for 1.5 hours before arriving back at the residence at 2.0pm. They spent time in the residence all day.
17/03/2014	Departed the residence at 9.0am and travelled to the nearest shopping centre (approximately 10km away) by wheelchair. They spent time for approximately 30 minutes, before returning back to the residence and not leaving the building for the rest of the day.
18/03/2014	Departed from the residence at 9.30am in an adjacent suburb (approximately 10km away) by wheelchair, where they stayed for 1.5 hours.

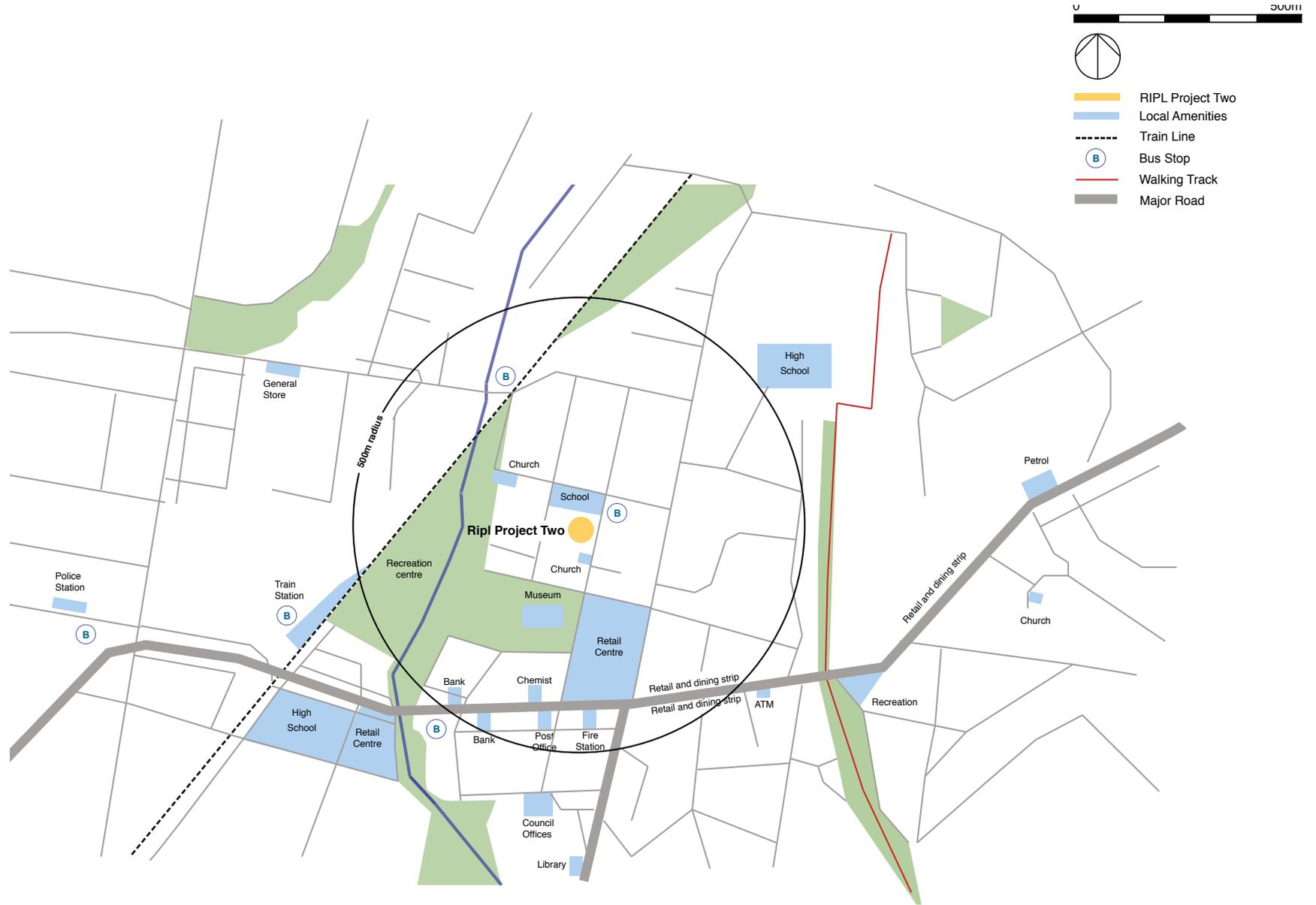
MOBILITY TRACKING DATA

The Evidence section includes relevant information for this Criteria. Click on the links above to explore. The up / down keys on the keyboard will scroll through the pages included.

Use the navigation toolbar on the right of the screen to return to the criteria page ('C'). Links to Home, Criteria Overview ('O') and Panoramas ('P') are also provided.

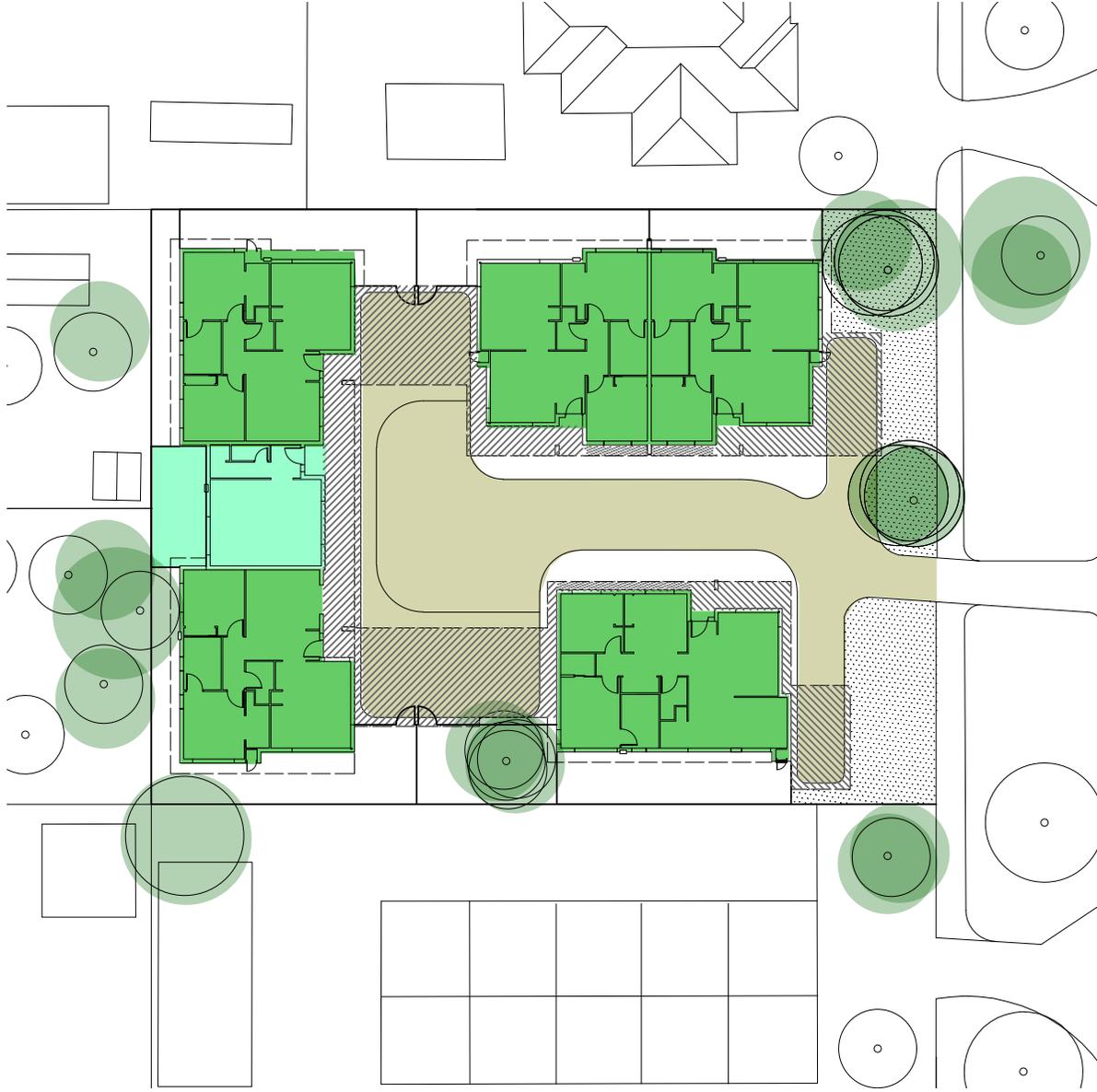
On other pages in this criteria section, you can return to this Evidence ('E') page with the navigation toolbar on the right.





# GROUND FLOOR DEVELOPMENT PLAN

# EVIDENCE

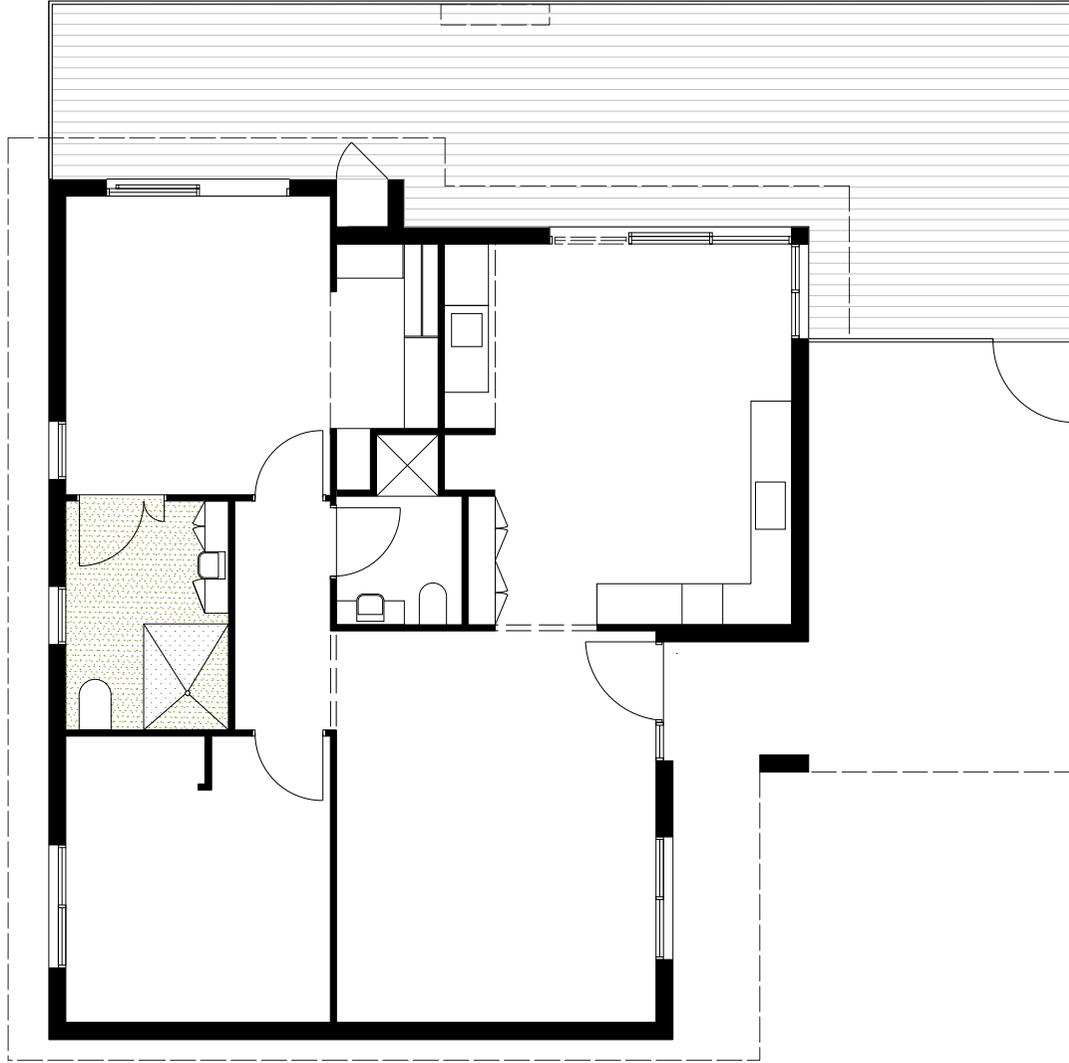


0m 10m



- Common Driveway
- Individual units within development
- Support Worker Unit
- Covered circulation zones



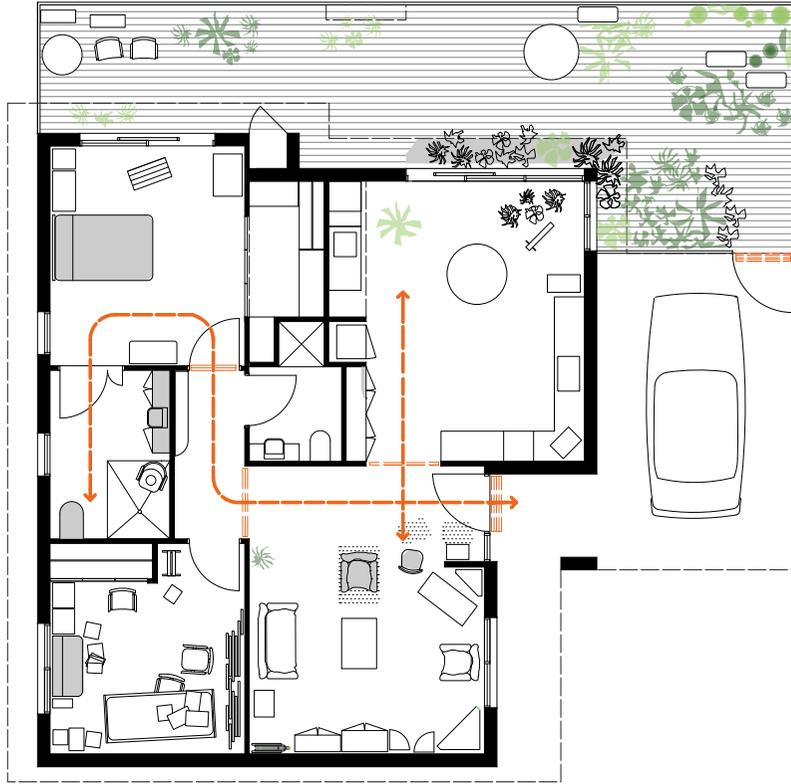


0m 4m

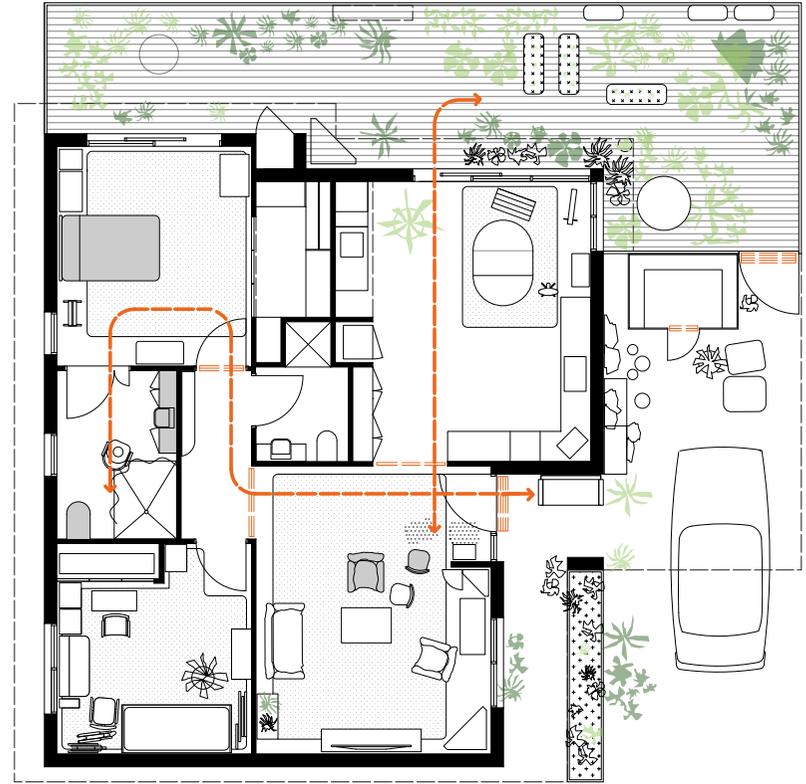


--- Dashed line indicates roof/door frame above





Time Point 01



Time Point 02

0m 4m



PUBLIC / PRIVATE THRESHOLDS

strong

very strong

main circulation route





# Mobility Tracking and Activity Monitoring

RIPL Project One post-occupancy built and technology design evaluation

Dr Ross Clark PhD

Associate Professor Gavin Williams PhD FACP

PAGE



### GPS Report for P4

GPS Unit: Adafruit Ultimate GPS connected to an Openlog data logger.

Overview: The subject wore the device for a total of 8 days. There did not appear to be any walking to areas outside of the home, with all transport occurring at speeds that exceeded a walking pace. The only places visited were local shopping centres, a leisure centre and what appears to be a home. The following is a breakdown of the places visited.

#### Daily Breakdown:

**Day 1:** The subject visited the closest small shopping centre twice within the space of half an hour, the first time at approximately 7:15pm and the second time at approximately 7:30pm. This appears to be a motorised trip given the speeds exceed walking capability. The total distance of these trips was approximately 2km, as the centre is approximately 500m from the home.

**Day 2:** Did not leave the house.

**Day 3:** The GPS signal went directly from the person's home to a house in a neighbouring suburb. It was likely to be a trip in a motorised vehicle such as a car or bus. The subject left the house at approximately 5:35pm and arrived at a local shopping centre at approximately 5:55pm, where they stayed for approximately 30mins before returning home.

**Day 4:** Did not leave the house.

**Day 5:** The subject stayed in the house until they visited a retail outlet in a neighbouring suburb at approximately 5:30pm. They stayed there for approximately one hour, arriving back at the residence at 6:35pm.

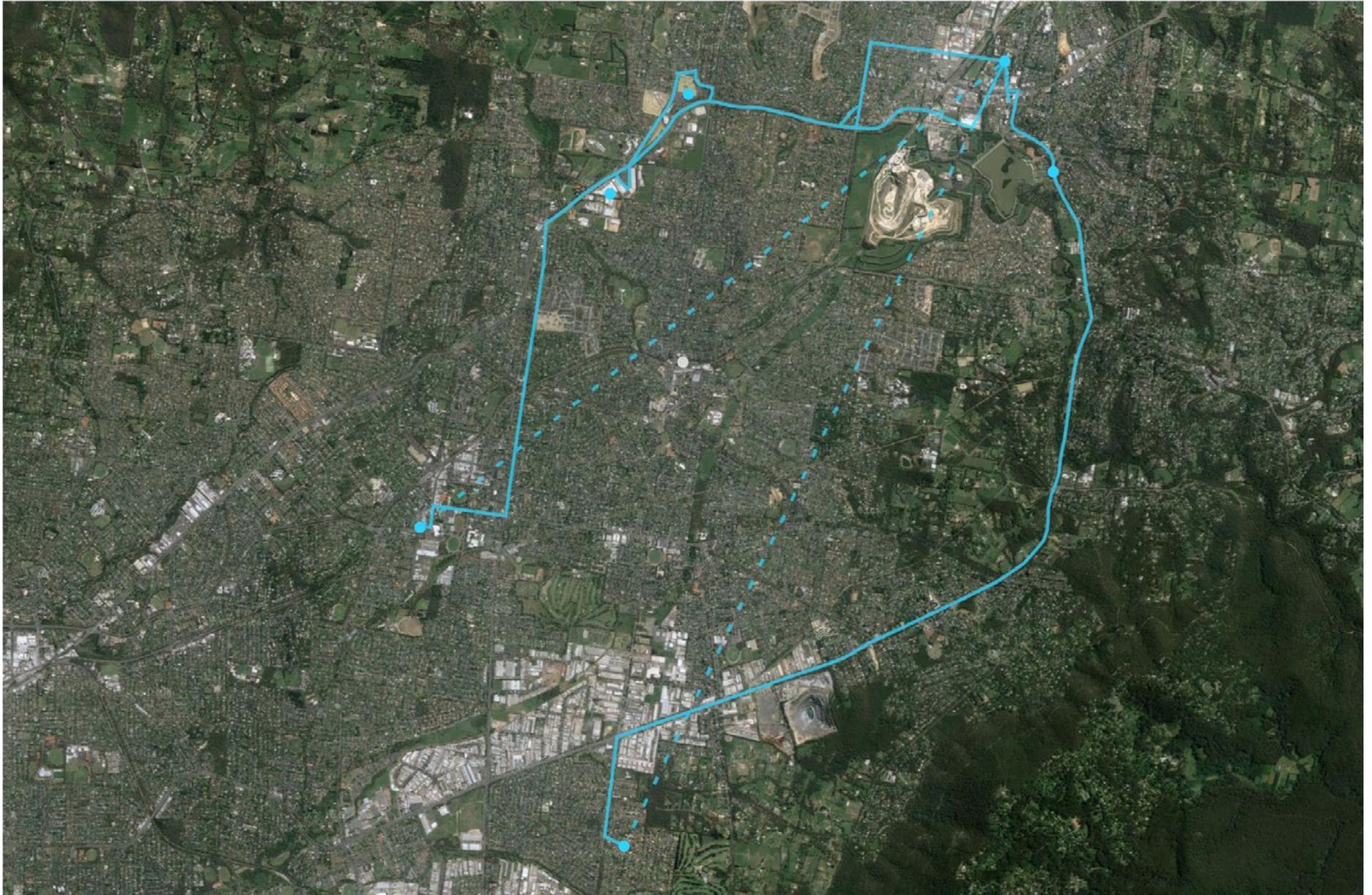
**Day 6:** Did not leave the house.

**Day 7:** The subject visited three separate shopping precincts all very close to each other from 4:30pm until 6:15pm. These were located in a retail hub in a large shopping centre. The subject then returned home at 6:23pm.

**Day 8:** The subject visited a local Aquatic and Leisure Centre on this day, however the actual arrival time cannot be ascertained as the GPS was cut-off, implying travel in a well-covered vehicle. The subject left this centre at 4:30pm and visited a local retail outlet (20mins) and supermarket (15mins). The subject then arrived back at the residence at 5:15pm.

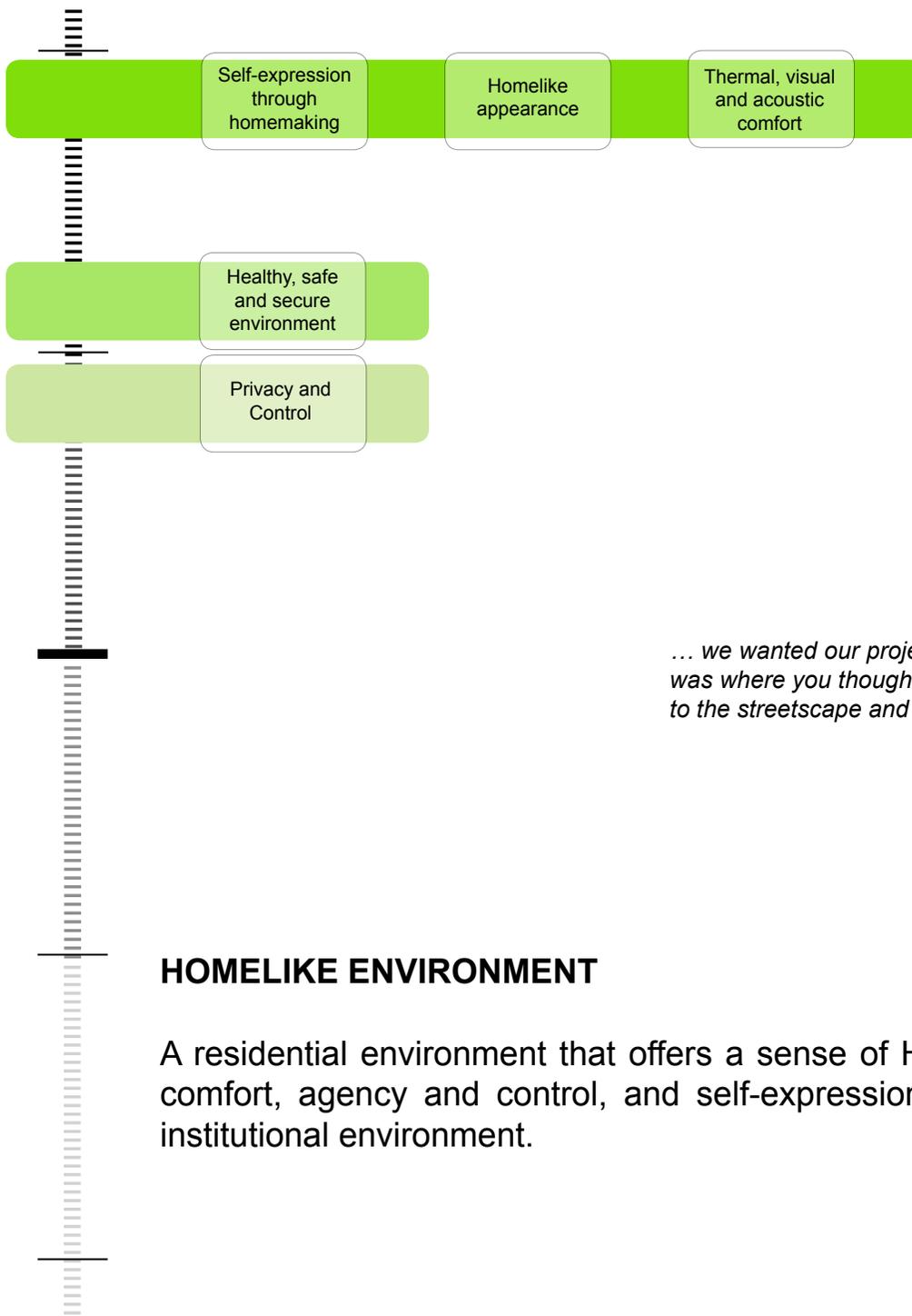
### Steps Per Day

For the duration of the sampling period, namely eight days, the average steps per day were recorded as 3,367. This assumes that the subject wore the activity monitor (an accelerometer attached to the ankle) during all physical activity.



NOTE: *The dotted line denotes tracks which are incorrect. These are the two occurrences where GPS data was not acquired while travelling between the participant's home and their subsequent location.*





*... we wanted our projects to be built in an environment and an urban landscape which was where you thought I would like to live here ... So yeah, we took particular attention to the streetscape and the surrounding houses...*

**HOMELIKE ENVIRONMENT**

A residential environment that offers a sense of Home that responds to issues of security and comfort, agency and control, and self-expression. Primarily considered as a contrast to an institutional environment.



D

**Self-expression through homemaking**

The ability for residents to express their individuality through the furnishing and inhabitation of their home.

*...Just having their own place. It's that sense of independence... it's almost pride that it's their own place...*

**ENABLER**

The individual highlighted the benefit of living in an independent home verses shared living as improved opportunity to furnish and inhabit the home according to personal preferences.

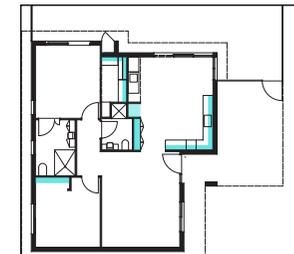
The main focus of self-expression for the participant is through gardening. The resident has been able to rearrange furniture, build an impressive garden, installed equipment and storage spaces for this, raised garden beds and planting shelves of varying height. Participant has put in place a shed under the carport area to store items for outdoor homemaking. Individual has established an extensive outdoor gardening space, with a range of off the shelf and specialised equipment to assist with gardening and maintenance and which offers produce for consumption as well as flowering vegetation for aesthetics. The development of this over time is clear from the shift in Furnished Plans between time points 1 and 2.

Changing furnishings and the installation of internet enabled television has enabled preferred use of the spaces of the home. The participant has also purchased a range of personalised furniture items as well as floor coverings to reconfigure living space to improve a sense of homeliness, as well as mobility and sensory aspects. Installation of carpeting in selected areas makes the home easier to navigate and is preferred by the resident, as it offers a greater sense of homeliness to the individual.

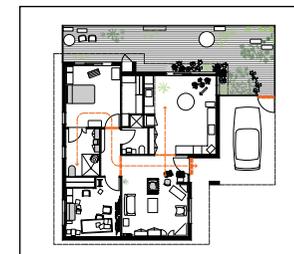
The resident has developed a list of changes to make and is working through these with assistance.

**LIMITATION**

Nil.



DEGREES PHYS. ACCESS



FURNISHED PLANS

RESIDENTIAL ENVIRONMENT IMPACT SURVEY (REIS)									
Information Obtained Via Group Interview of Participants/Residents									
REIS SPACE	Yes	No	Other	Not	Other	Other	Other	Other	Other
1. Access to outdoor space (e.g. balcony, courtyard, garden, etc.)									
2. Access to indoor space (e.g. living area, bedroom, etc.)									
3. Access to storage space (e.g. wardrobe, cupboard, etc.)									
4. Access to kitchen facilities (e.g. stove, sink, etc.)									
5. Access to bathroom facilities (e.g. toilet, shower, etc.)									
6. Access to laundry facilities (e.g. washing machine, dryer, etc.)									
7. Access to parking space (e.g. carport, garage, etc.)									
8. Access to outdoor furniture (e.g. table, chairs, etc.)									
9. Access to indoor furniture (e.g. sofa, bed, etc.)									
10. Access to electrical appliances (e.g. TV, fridge, etc.)									

REIS LONG FORM: SPACE

RESIDENTIAL ENVIRONMENT IMPACT SURVEY (REIS)									
Information Obtained Via Group Interview of Participants/Residents									
REIS OBJECTS	Yes	No	Other	Not	Other	Other	Other	Other	Other
1. Access to outdoor objects (e.g. garden, etc.)									
2. Access to indoor objects (e.g. furniture, etc.)									
3. Access to electrical appliances (e.g. TV, fridge, etc.)									
4. Access to outdoor furniture (e.g. table, chairs, etc.)									
5. Access to indoor furniture (e.g. sofa, bed, etc.)									
6. Access to electrical appliances (e.g. TV, fridge, etc.)									
7. Access to outdoor furniture (e.g. table, chairs, etc.)									
8. Access to indoor furniture (e.g. sofa, bed, etc.)									
9. Access to electrical appliances (e.g. TV, fridge, etc.)									
10. Access to outdoor furniture (e.g. table, chairs, etc.)									

REIS LONG FORM: OBJECT

D

**Privacy and Control**

**Residents' sense of privacy and personal control within their home, and its contribution to sense of 'home' in the environment.**

*...Because of the nature of the design, in that cluster environment, things like window furnishings, treatment of glazing, orientation, have become very important...*

*...The callback feature I suppose it gives them privacy where they don't have to be checked on constantly...*

*...Leave the fences off [at the front of the set of units], but we'll identify something at the entry to keep it open and deliberately not create the cage around it...*

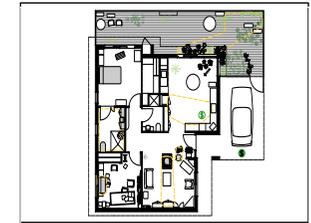
**ENABLER**

The participant described the greater general sense of privacy offered through living in an independent home, versus shared living. There are a range of options for call of or communication with staff, including pendant, visual and auditory alert for staff and use of tablet. There is no overlooking in other areas, in the case of the unit investigated.

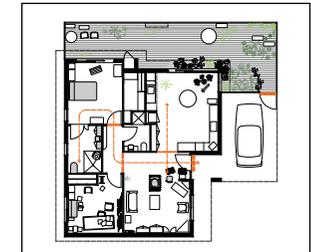
The location of the unit is surrounded by backyards or sheds of neighbouring properties so there is limited disruption to the view. This is also assisted by the elevated decking installed to 'level' the sloping site, meaning that this rear unit is somewhat higher than neighbouring properties. The resident therefore has views over neighbouring small sheds and outbuildings beyond the fence.

Via the provision of glazing next to the front door, there is good ability to see outside of the unit when going to answer the doorbell. The spatial design and layout within the unit implies a clear distinction between public and private spaces (which is also typical of a unit of this type) – the level of support and location of its delivery is consistent with this. Some of the conflicts between private spaces and support delivery seen in other developments, particularly in the delivery of support to the bathroom, are not evident here. (Continued next page)

PAGE



INDEPENDENT LIVING PLANS



FURNISHED PLANS



CONTROL ACCESS POINTS



**ENABLER (CONTINUED)**

This is primarily because the resident does not require support in the bathroom. The location of the television (previously identified for other residents as one of the few 'private' spaces for those in need of more extensive support worker input) is separated from the main circulation routes and the kitchen, offering further privacy. This is also demonstrated by the General Development Layout Plan – control of access and also location of thresholds.

D

**Privacy and Control**

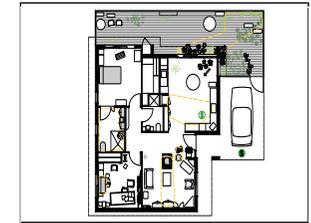
**Residents' sense of privacy and personal control within their home, and its contribution to sense of 'home' in the environment.**

**LIMITATION**

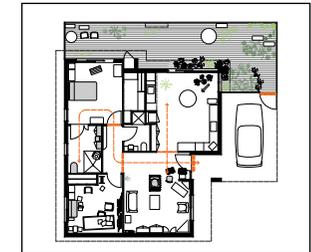
The view into lounge rooms from of across the central drive of the development, particularly in the evenings when lighting may be switched on inside was of concern for the resident interviewed. Anecdotal reports provided by family members of other residents noted the same concern. The resident is investigating options for blackout blinds to be fitted to the lounge windows facing the public / courtyard thoroughfare to improve privacy. This change was not considered necessary elsewhere.

Anecdotal reports provided by family members of other residents expressed some concern that the visitor bathroom was not fitted with a lock for privacy.

Home automation and communication technology has been highly unreliable, leading to reliance on the back up call systems as primary options for contacting staff. This has had an impact on resident experiences with regards privacy and control. Anecdotal reports also noted that the technology controls have failed to operate blinds on several occasions, meaning that resident privacy has been impacted significantly on these occasions. Refer to PIADS & QUEST data.



INDEPENDENT LIVING PLANS



FURNISHED PLANS



CONTROL ACCESS POINTS



D

**Homelike appearance**

The appearance of the environment primarily as 'home' rather than as an 'institution'.

*...There's no question that that is a big measure of success, to look at the completed environment and say would I like to live here, is this institutionalised in any way?...*

*...[Separating public shared spaces] was just to keep that as really that more friendly, welcoming home environment...*

**ENABLER**

The participant reports a very high level of satisfaction with the home-like appearance of his unit, and has furnished it based on personal preferences. Anecdotal reports provided by family members of other residents also expressed great satisfaction with the appearance of the units and the interior spaces. A range of personal objects have been arranged in both the spare bedroom and living spaces.

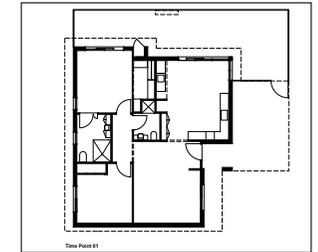
The resident has furnished the home as preferred – the resident's ability to walk without a gait aid allows little conflict between 'typical' homelike appearance and needs for access etc. The development itself uses typical residential materials and construction methods for a suburban area.

Limited 'aids' are in evidence except in the bathroom, and work on garden increases the sense of home in contrast to an institutional appearance. In addition, mainstream products have been used to assist with access (e.g. dolly trolleys to move planters)

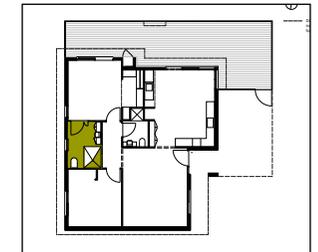
The housing design accommodates specialised mobility equipment needs, including storage and charging of items such as motorised wheelchairs or hoists, if required, although this was not observed in the unit that was investigated for this study.

**LIMITATION**

Nil.



TRACES, WEAR & TEAR PLANS



BASE BUILDING PLANS

D

**Healthy, Safe and Secure Environment**

*...From upstairs [in the support staff space] it actually does give you quite a good passive supervision spot. You can see who is coming and going and all of those sort of things...*

*...to make sure that we maintain that homelike environment and meet our [TAC's] security obligations or needs...*

*...Each unit has got a private, open space which is secure ...*

*...The system will actually make the phone callout and then it will through an automated voice prompt will tell the caregiver what type of priority it is. They can see if they need assistance things like that. I suppose in a situation where they might be looking after someone else, and then need to finish that. Yes, they can do that and move onto that person if it's not a high priority or it might be drop everything quick and run...*

**ENABLER**

While it is clear from the Control of Access Plan that installation of locks and formal controls for security to the apartments is limited to the front doors and gates, the location of the unit toward the rear of the development site increases passive security by virtue of overlooking by other residents and the staff.

The self-closing courtyard gate increases security of dwelling, although it may prove challenging for wheelchair users. It is notable that PIADS rating that tech does increase sense of security.

PAGE



REIS LONG FORM: SPACE

REIS LONG FORM: OBJECT

PIADS

D

**Healthy, Safe and Secure Environment**

**LIMITATION**

Visibility to the interior of the home by passers by, or by pedestrians in the driveway of the development is mentioned above. This is an issue because shade blinds become translucent at night, when lighting in the home is brighter than the exterior, leading to security concerns for residents. This concern has also been raised by anecdotal reports from family members of residents, who have also noted concerns for security as well as privacy when unreliable electronic controls of blinds result in residents being unable to close blinds.

Participant D experiences altered gait due to hemiplegia and reported floor boards did not offer adequate traction under foot for safety in walking in high traffic areas (lounge room and bedroom). The hemiplegia experienced by this resident may increase the risk of slipping or falls if the resident is walking in socks, rather than with soled shoes, when on floorboards. To address this, the resident chose to install carpeted rugs in the main living area and bedroom, which would assist to offer traction underfoot in this case.

Anecdotal reports provided by family members of other residents expressed concern that transfers on wet floorboards, for example from a shower commode to a wheelchair, may present a safety risk.

Anecdotal reports provided by family members of other residents also expressed concern that floor to ceiling glazing may present safety concerns for residents who experience falls.

There were some concerns regarding floor surfaces and grading or steps that were reported anecdotally. Inadequate grading of shower recess floors led to lack of water drainage and pooling of water. There were some concerns that the graded slope would be suitable for use by residents in wheelchairs. Anecdotal concerns were also expressed for residents in wheelchairs at some locations, for example at the gate entries to garden spaces, where a step in the ground surface may increase the danger of overturning of the wheelchair. The regrading and tiling of bathroom floors to all units impacted the commencement of research of the project.

RESIDENTIAL ENVIRONMENT IMPACT SURVEY (REIS)  
 Date: 11/06/2015 Evaluation: AC Resident: PT  
 Information Obtained Via Group Interview of Participants/Residents

Space	Frequency	Frequency	Frequency	Frequency	Frequency
Living Area					
Bedroom					
Bathroom					
Kitchen					
Driveway					
Garage					
Staircase					
Corridor					
Entry					
Other					

Method of collection:  
 1. In-home (not been available for group interview)  
 2. In-home (not been available for group interview)  
 3. In-home (not been available for group interview)

Form: D. Arupac Pty. Ltd., C. Ltd., A. Arupac Pty. Ltd. & Arupac Pty. Ltd. August 2008  
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REIS LONG FORM: SPACE

RESIDENTIAL ENVIRONMENT IMPACT SURVEY (REIS)  
 Date: 11/06/2015 Evaluation: AC Resident: PT  
 Information Obtained Via Group Interview of Participants/Residents

Object	Frequency	Frequency	Frequency	Frequency	Frequency
Living Area					
Bedroom					
Bathroom					
Kitchen					
Driveway					
Garage					
Staircase					
Corridor					
Entry					
Other					

Method of collection:  
 1. In-home (not been available for group interview)  
 2. In-home (not been available for group interview)  
 3. In-home (not been available for group interview)

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REIS LONG FORM: OBJECT

PIADS

PIADS	Frequency	Frequency	Frequency	Frequency	Frequency
1) Competence	0	0	0	0	0
2) Independence	0	0	0	0	0
3) Safety	0	0	0	0	0
4) Satisfaction	0	0	0	0	0
5) Health	0	0	0	0	0
6) Function	0	0	0	0	0
7) Self-confidence	0	0	0	0	0
8) Appearance	0	0	0	0	0
9) Self-esteem	0	0	0	0	0
10) Well-being	0	0	0	0	0
11) Capabilities	0	0	0	0	0
12) Health of feet	0	0	0	0	0
13) Self-esteem	0	0	0	0	0
14) Sense of power	0	0	0	0	0
15) Sense of control	0	0	0	0	0
16) Self-esteem	0	0	0	0	0
17) Ability to manage	0	0	0	0	0
18) Ability to manage	0	0	0	0	0
19) Ability to manage	0	0	0	0	0
20) Ability to manage	0	0	0	0	0

PIADS

D

**Thermal, visual and acoustic comfort**

**Maintenance of the environment at a comfortable temperature, without excessive glare, or problems related to noise.**

*...Knowing that the type of client that's going in here is probably going to spend a fair bit of time in bed, so to have that ability to open up from bedrooms ... We tried to keep main bedrooms a bit quiet away from the access in the middle of the site...*

**ENABLER**

The unit offers good level of natural light and ventilation, and is well oriented for passive heating and lighting. The inclusion of appropriate overhangs and screening offer a good base for occupation and limited need for adjustment. The orientation of the home also allows suitable light penetration and planning allows for good cross ventilation.

As the unit is located to the rear of the development site, the external noise from the street is minimised.

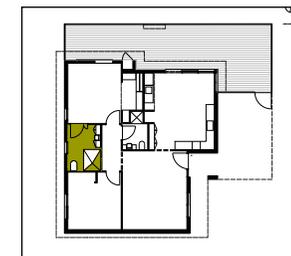
**LIMITATION**

The participant in this study reported running costs of split system heating and cooling are high and therefore they attempt to minimise use of this appliance, using free-standing fan in Summer and wearing additional clothing for warmth in winter.

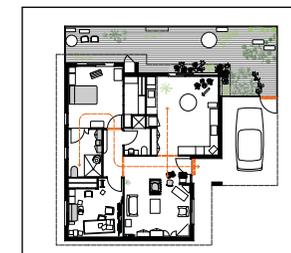
Front lounge windows can only be opened manually using bilateral finger hooks. The participant only has use of one upper limb and thus cannot open these windows themselves, although they can close them using their non-affected limb. Some modifications are underway to further enable the independent control of ventilation in this way.

Anecdotal reports provided by family members of other residents included reports that air conditioning was too cold for particular residents, and that the controls made adjustment difficult. This outcome is reported in Independence – Intuitive Use.

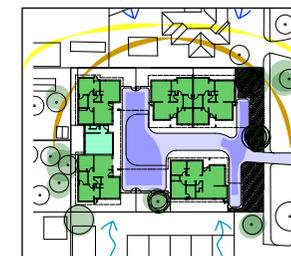
Anecdotal reports provided by family members of other residents have also expressed concern that the roller door to the laundry is very noisy, as well as taking a long time to operate.



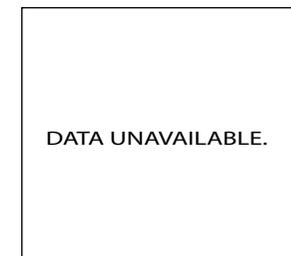
BASE BUILDING PLANS



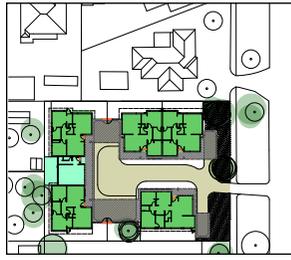
FURNISHED PLANS



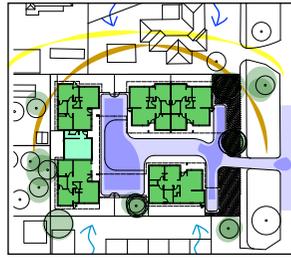
SITE ANALYSIS



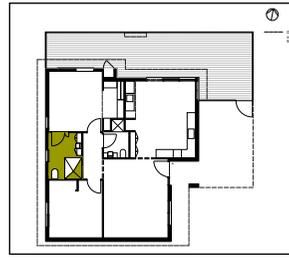
ASSISTIVE TECH LOG



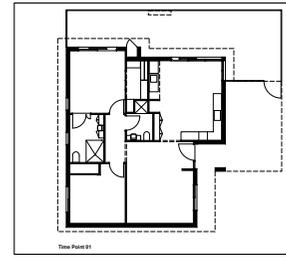
CONTROL ACCESS POINTS



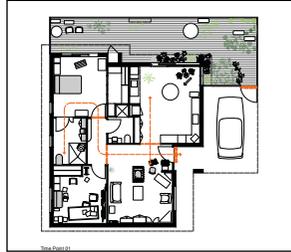
SITE ANALYSIS



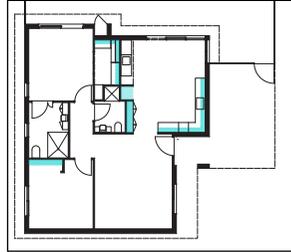
BASE BUILDING PLAN



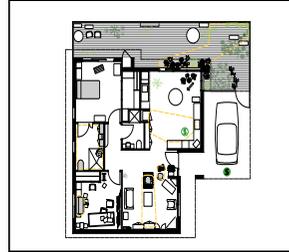
TRACES, WEAR & TEAR PLANS



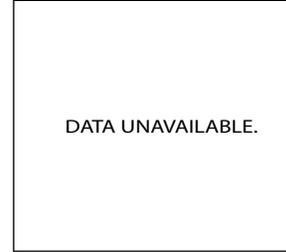
FURNISHED PLANS



DEGREES PHYS. ACCESS



INDEPENDENT LIVING PLANS



ASSISTIVE TECH LOG

NOTE: ensure that it is important that you attend every one of the 26 items, too, for each world of phase, put an "X" in the appropriate box to show how you are affected by using the smart phone.

Discussion	1	2	3	4	5	6	7	8	9	10
01. communication										
02. independence										
03. safety										
04. confidence										
05. self-esteem										
06. dignity										
07. health										
08. well-being										
09. self-confidence										
10. confidence										
11. self-esteem										
12. dignity										
13. health										
14. well-being										
15. self-confidence										
16. confidence										
17. self-esteem										
18. dignity										
19. health										
20. well-being										
21. self-confidence										
22. confidence										
23. self-esteem										
24. dignity										
25. health										
26. well-being										

PIADS

RESIDENTIAL ENVIRONMENT IMPACT SURVEY (REIS)

Information Obtained Via Group Interview of Participants/Residents

Area	Space	Object	Other	Other	Other
Accessibility					
Appearance					
Availability					
Condition					
Control					
Cost					
Cleanliness					
Comfort					
Convenience					
Design					
Flexibility					
Functionality					
Health					
Information					
Location					
Privacy					
Quality					
Security					
Service					
Support					
Usability					
Value					
Visual Quality					
Wayfinding					

REIS LONG FORM: SPACE

RESIDENTIAL ENVIRONMENT IMPACT SURVEY (REIS)

Information Obtained Via Group Interview of Participants/Residents

Area	Space	Object	Other	Other	Other
Accessibility					
Appearance					
Availability					
Condition					
Control					
Cost					
Cleanliness					
Comfort					
Convenience					
Design					
Flexibility					
Functionality					
Health					
Information					
Location					
Privacy					
Quality					
Security					
Service					
Support					
Usability					
Value					
Visual Quality					
Wayfinding					

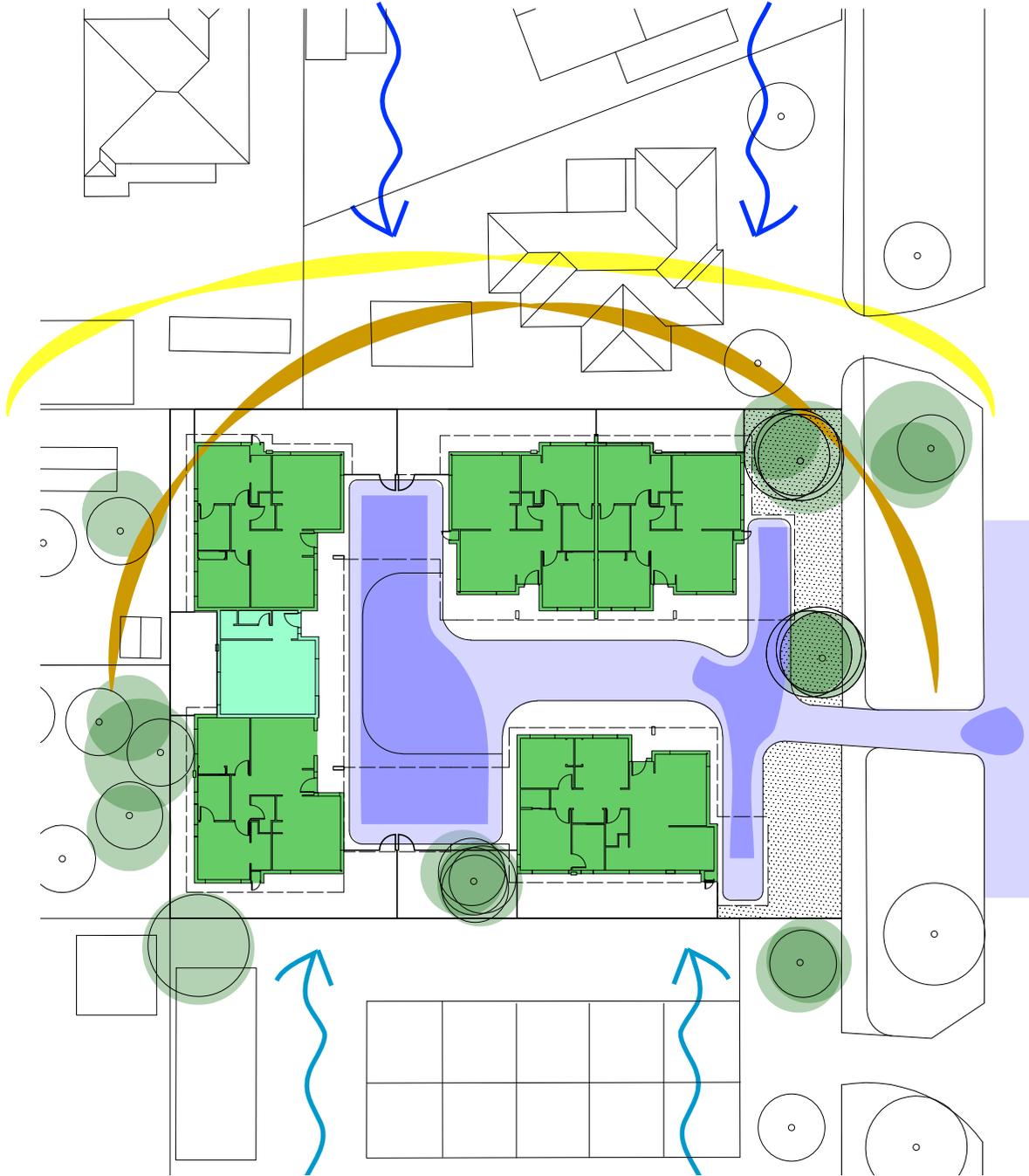
REIS LONG FORM: OBJECT

The Evidence section includes relevant information for this Criteria. Click on the links above to explore. The up / down keys on the keyboard will scroll through the pages included.

Use the navigation toolbar on the right of the screen to return to the criteria page ('C'). Links to Home, Criteria Overview ('O') and Panoramas ('P') are also provided.

On other pages in this criteria section, you can return to this Evidence ('E') page with the navigation toolbar on the right.



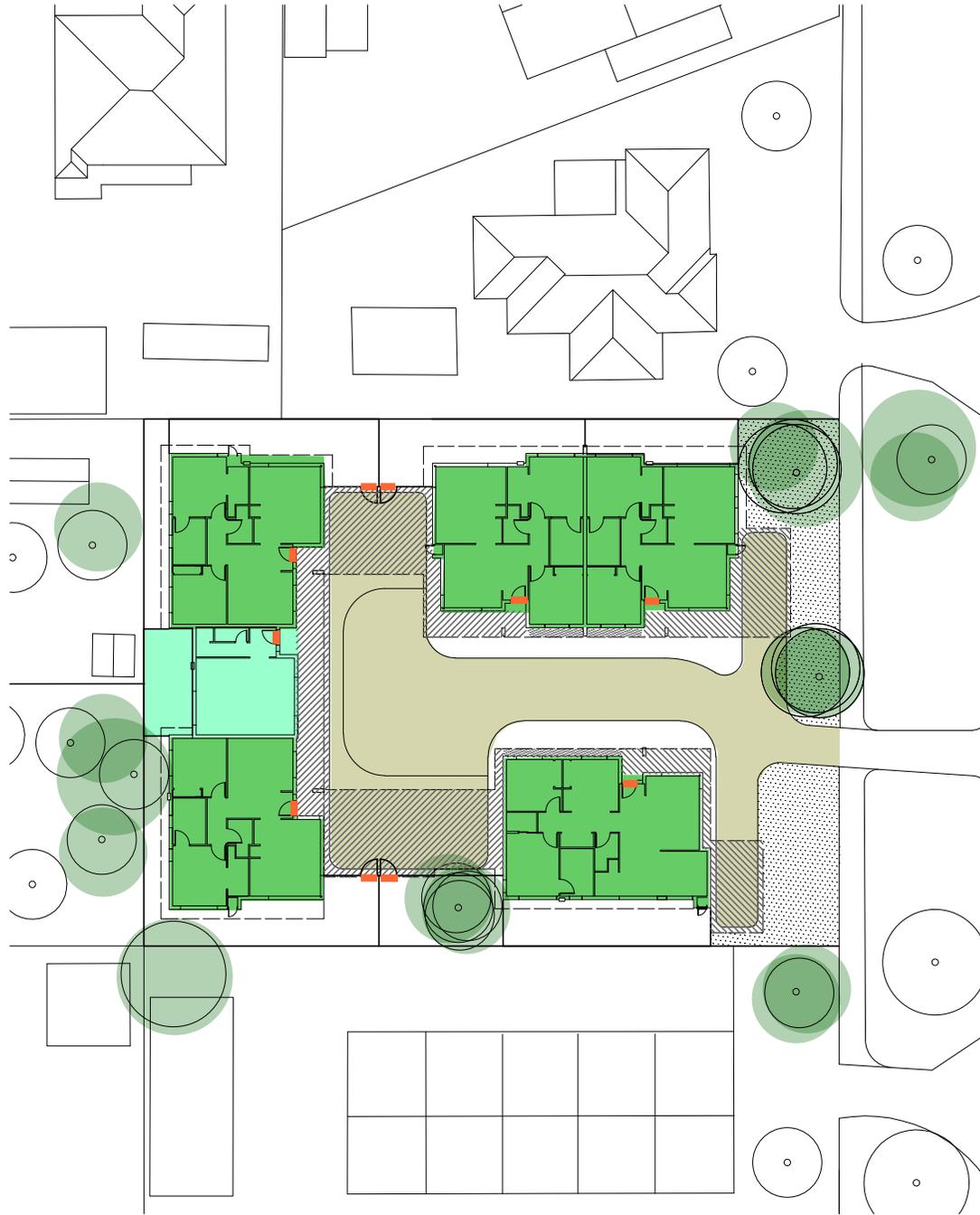


0m 10m



- Summer Sun Path
- Winter Sun Path
- Summer Winds
- Winter Winds
- Noise Level One
- Noise Level Two



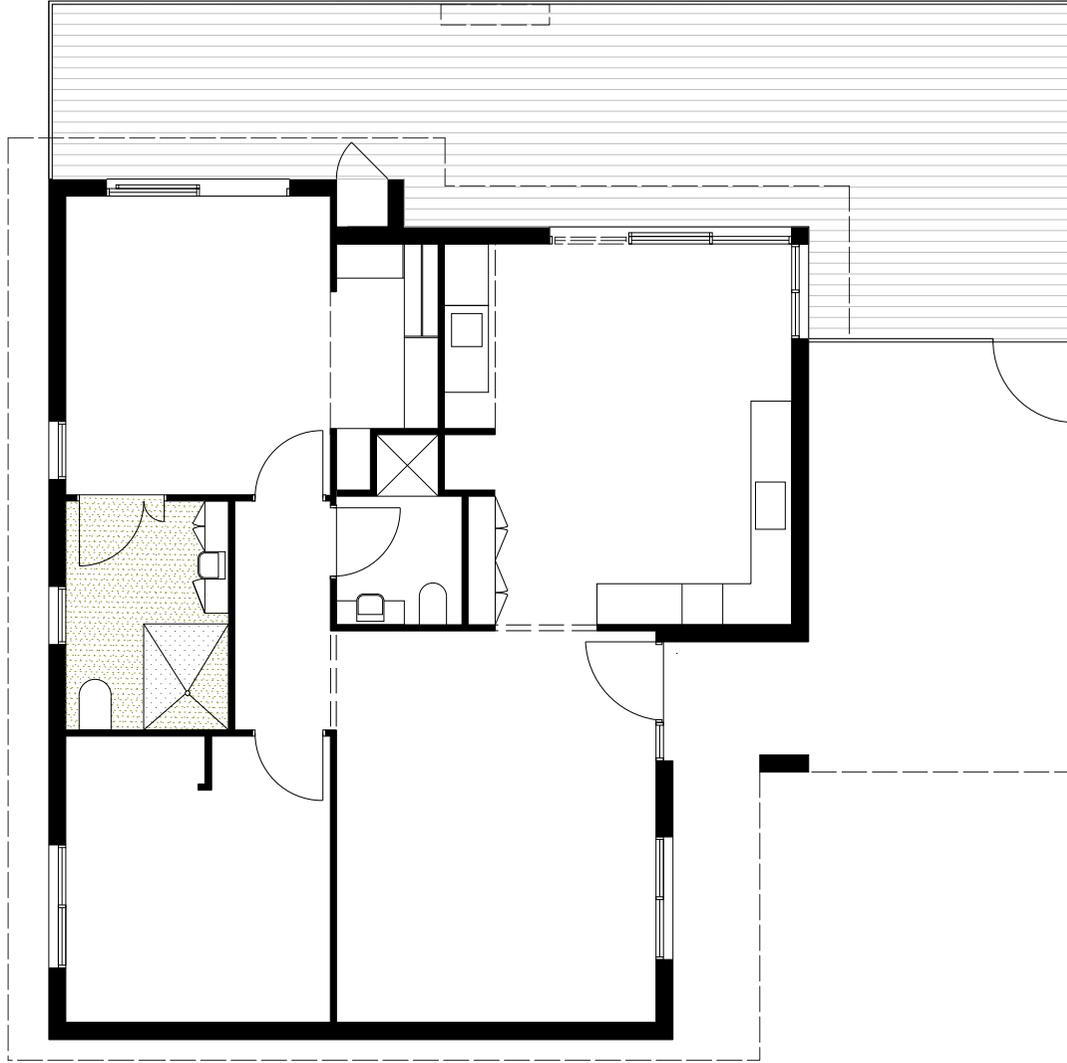


0m 10m



- Common Driveway
- Individual units within development
- Support Worker Unit
- Covered circulation zones
- Client and Support worker access point



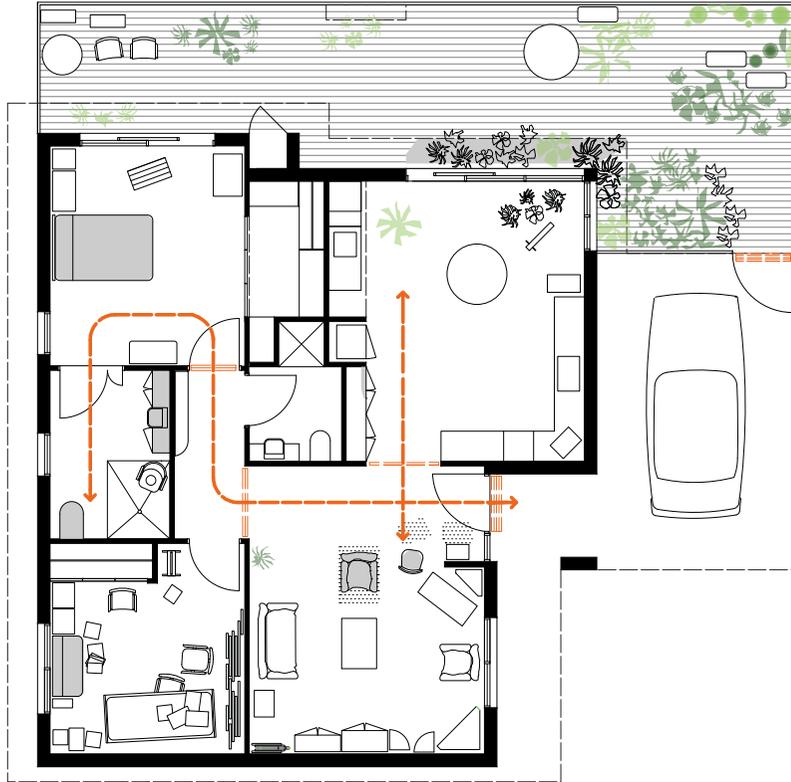


0m 4m

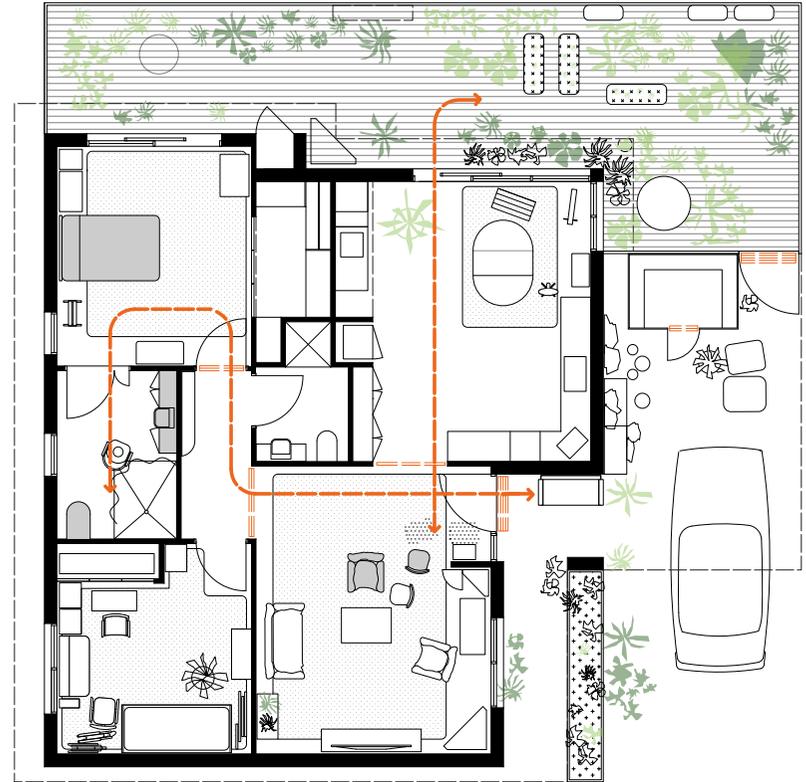


--- Dashed line indicates roof/door frame above



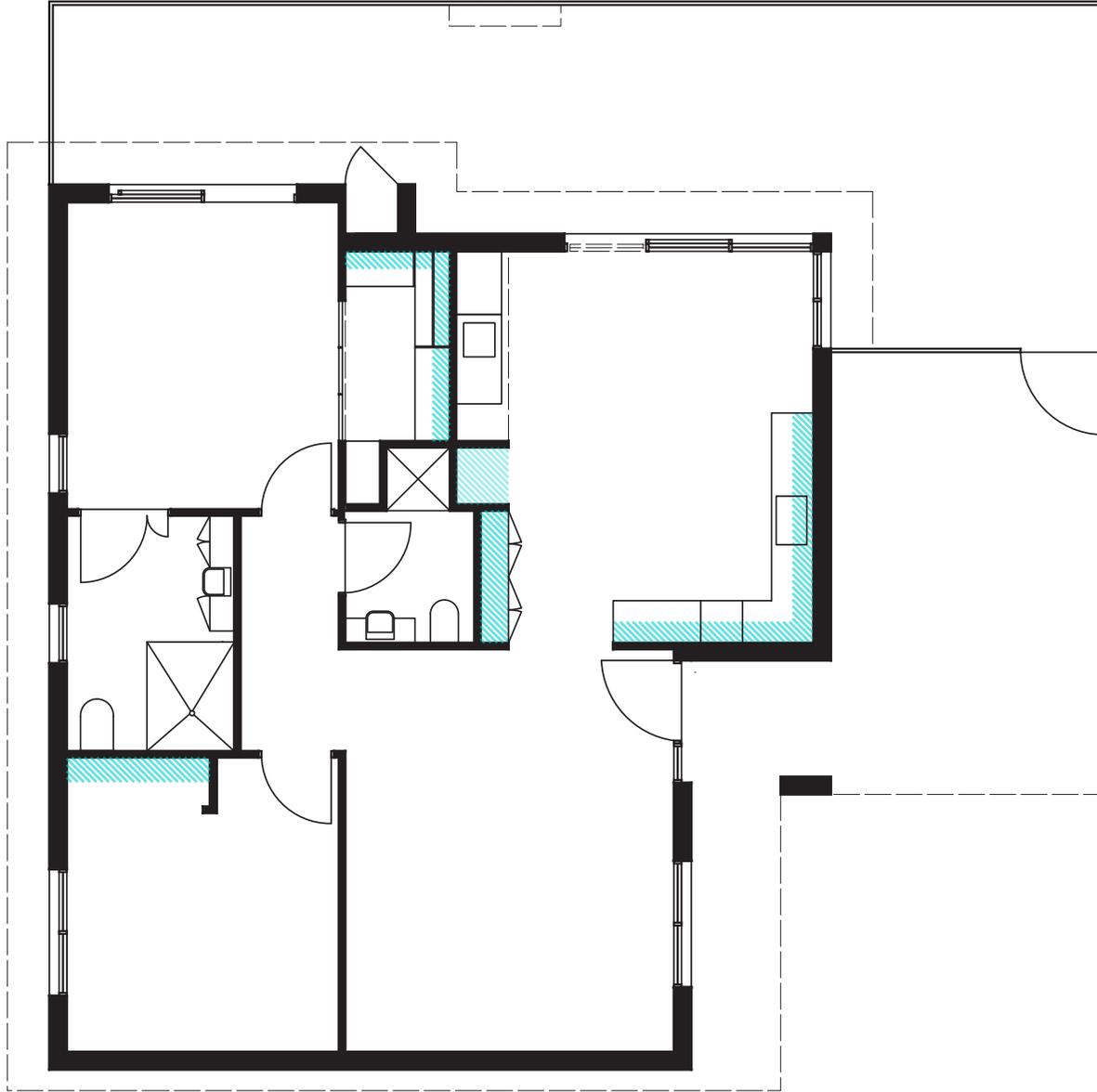


Time Point 01



Time Point 02



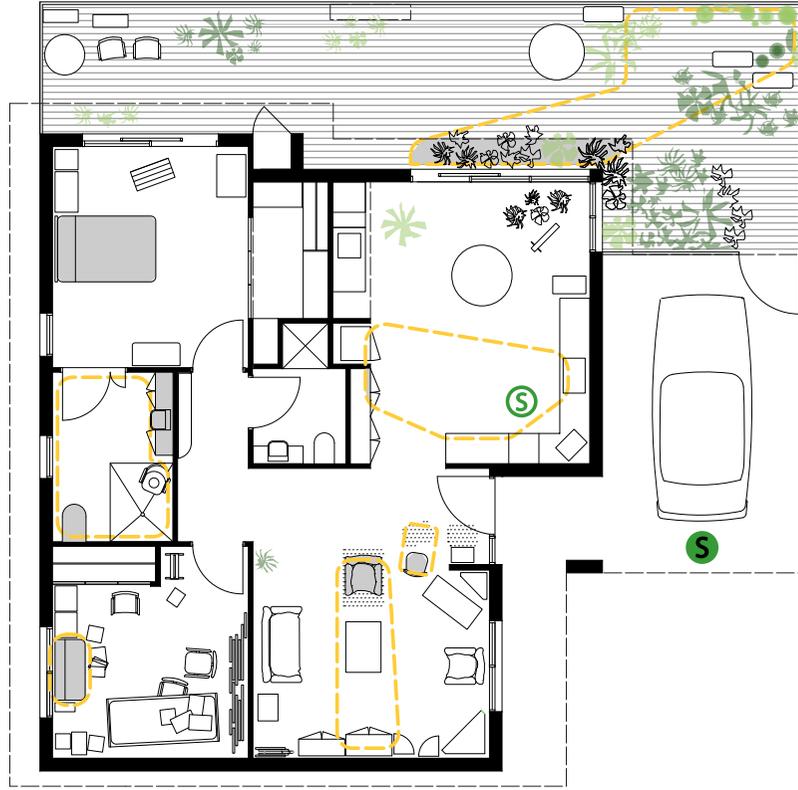


0m 4m

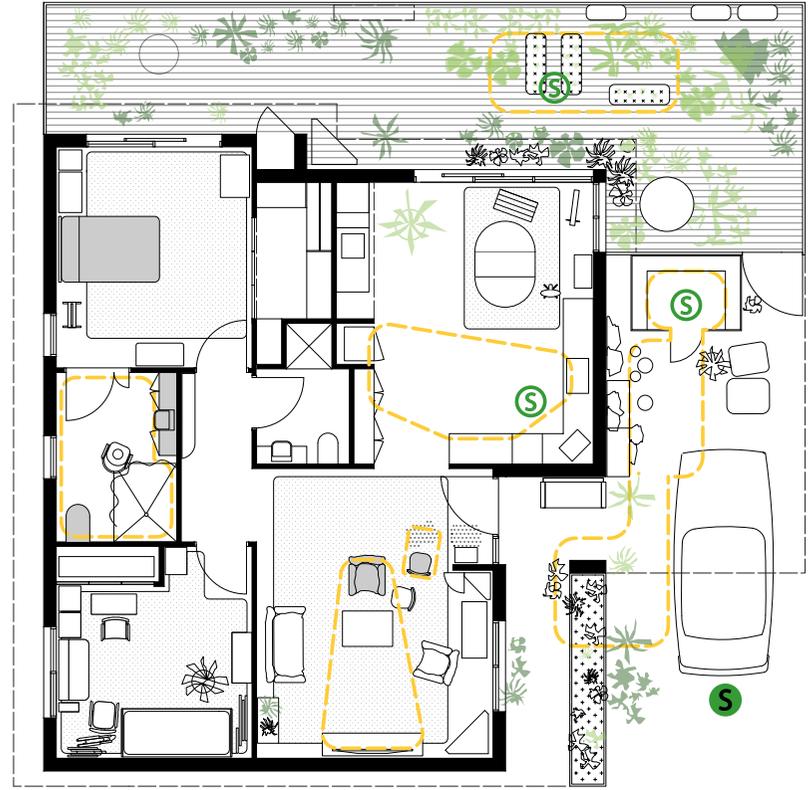


- 360 Degree Access Possible
- Forwards / Backwards movement possible
- Reach Only
- No access
- No access at high level





Time Point 01



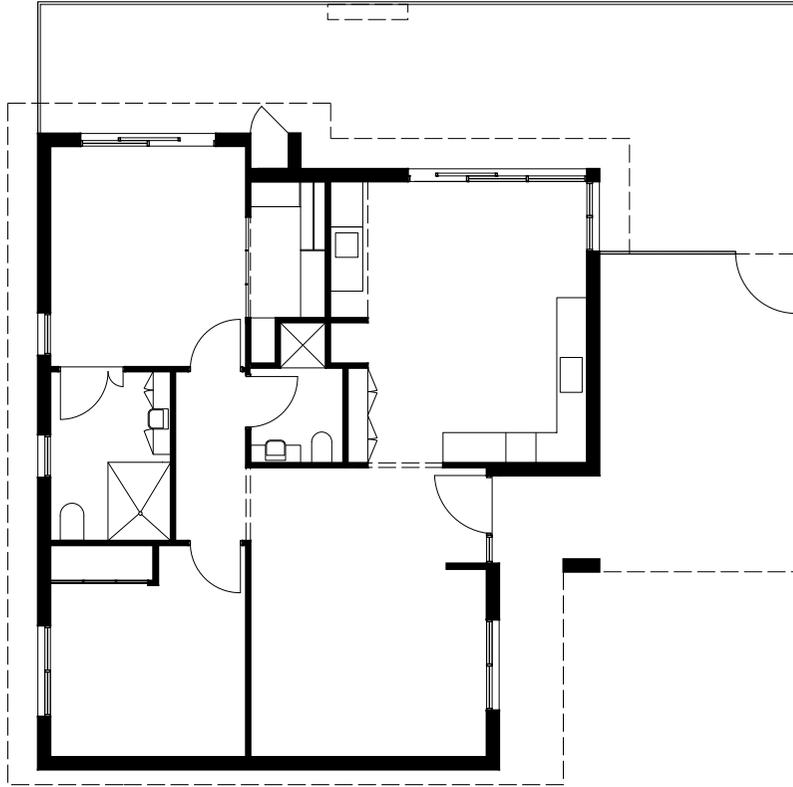
Time Point 02

0m 4m



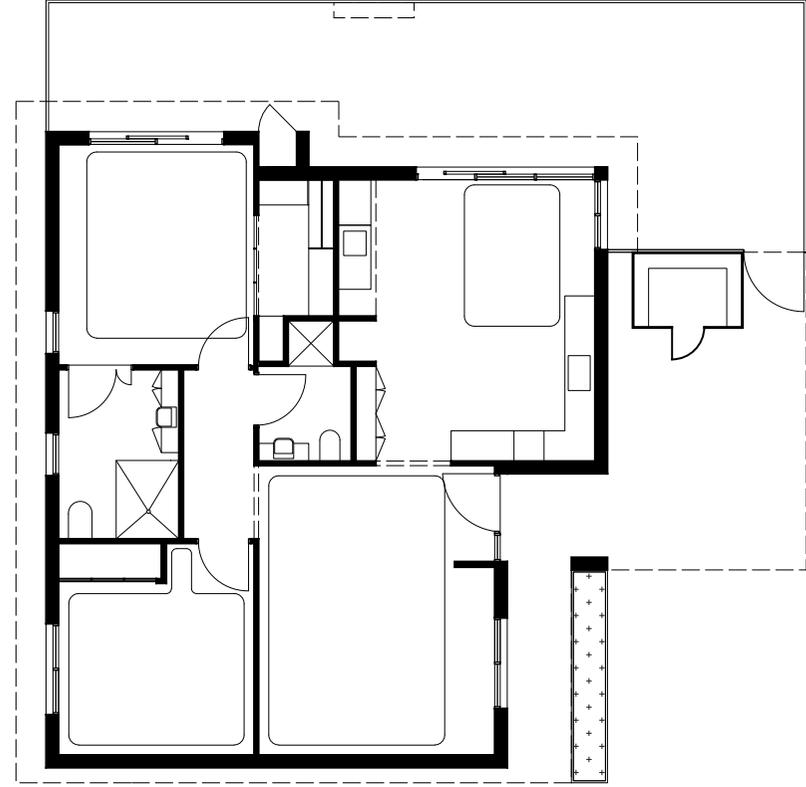
- key zones of inhabitation
- key zones of inhabitation
- S some support provided
- S full support provided





**Time Point 01**

No traces of wear and tear observed at this time point



**Time Point 02**

No traces of wear and tear observed at this time point



DATA UNAVAILABLE.



**RESIDENTIAL ENVIRONMENT IMPACT SURVEY (REIS)**

Date: \_\_\_11/06/2015\_\_\_ Evaluator: \_\_\_LC\_\_\_ Residence: P4

**III.a: SPACE****Information Obtained Via Group Interview of Participants/Residents**

Listed below are places in and around the home environment. For each statement, mark how the residents respond when questioned about whether they have access to be in and use the space				Next, for items that are not always accessible, mark how important accessibility is to the residents.		Add any additional comments in this section.
	Not accessible	Sometimes accessible	Always Accessible	Not Important	Important	Comments
<b>Physical spaces</b>						
Bedroom		✓				
Kitchen			✓			
Laundry room			✓			
Living room			✓			
Bathroom			✓			
Storage area for personal items (clothes, money, grooming items) such as closets, drawers, or containers		✓				
Place to be alone			✓			
Place for interaction with others (housemates, guests)			✓			
<b>Natural environment</b>						
Yard			✓			
Safe place to walk around outside the home			✓			

**Additional questions:**

- Is there a quiet space available if it gets noisy? **Yes**
- Do you feel the home is comfortable? **Yes**
- Do you feel safe living here? **Yes**

Fisher, G., Arriaga, P., Less, C., Lee, J. &amp; Ashpole, E. REIS Version 2.0, August 2008

Duplication of this instrument is permitted by the Model of Human Occupation Clearinghouse, www.moho.uic.edu

PAGE



**RESIDENTIAL ENVIRONMENT IMPACT SURVEY (REIS)**

Date: \_\_\_11/06/2015\_\_\_ Evaluator: \_\_\_LC\_\_\_ Residence: P4

**III.a: SPACE (con't)****Information Obtained Via Group Interview of Participants/Residents**

Listed below are features of the environment. For each statement, mark how the residents respond when questioned about whether these features are a problem			Add any additional comments in this section.
	No problem	This is a problem	Comments (describe the problem and the limit/barrier that it presents)
<b>Physical Environment</b>			
Stairs outside home	✓		
Stairs inside home	✓		
Type of furniture	✓		
Amount of furniture in room	✓		
Amount of clutter (a lot of objects in the home)	✓		

**Additional questions:**

- Are there any things about the home like temperature, noise, lighting, smell that affect you, or that bother you? **No**
  
- Are you allowed to change the temperature, lighting, and noise level when you want? **Yes**
  - How important is that to you?
  
- Is the home easy to move around in? (Getting around in the kitchen, living room, bedroom, bathroom, other rooms, opening doors, getting through doorways.) (Note if anyone in the home has a mobility impairment and / or if anyone uses any assistive device such as a cane, walker, or wheelchair). **Yes**
  
- Is the bathroom easy to use and does it feel safe? (Getting on and off the toilet and in and out of the tub/shower)  
**Bathroom issue – Bathroom vanity cupboard door knocks grab rail.**

Fisher, G., Arriage, P., Less, C., Lee, J. & Ashpole, E. REIS Version 2.0, August 2008  
 Duplication of this instrument is permitted by the Model of Human Occupation Clearinghouse, www.moho.uic.edu

## RESIDENTIAL ENVIRONMENT IMPACT SURVEY (REIS)

Date: \_11/06/2015\_\_\_\_\_ Evaluator: \_\_\_LC\_\_\_\_\_ Residence: P4

## III.b: OBJECTS

## Information Obtained Via Group Interview of Participants/Residents

Below is a list of personal objects that may or may not be found in the residential home. For each object check whether it is readily available to the participants or not available to them.			Next, for objects that are not available, check whether each object is important to the interviewees (optional section).		Check if object was observed in the home.		Add any additional comments in this section
Object	Not Available	Available	Not Important	Important	Yes	No	Comments
<b>Activities of Daily Living (ADL)</b>							
Grooming Supplies/Makeup (shampoo, soap, deodorant, feminine products)		✓			✓		
Grooming Tools (razor, toothbrush, nail clippers)		✓			✓		
Clothing		✓			✓		
Adaptive equipment: special eating utensils, dressing aids.		✓			-		
<b>Leisure/Recreation</b>							
Your own television		✓					
Your own VCR/DVD player and videos/DVDs		✓					
Your own music player or radio		✓					
Your own materials for your hobbies, like art & craft supplies (paints, markers, paper, scissors, glue, yarn, craft kits), gardening tools, camera (if relevant)		✓					
Your own educational materials (worksheets, pencils, workbooks, textbooks)		✓					
Your own money		✓					
Your own books		✓					
Your own photographs		✓					
Your own "stuff"		✓					
<b>Other:</b> _____ _____							

- Was there anything I didn't ask you about that is important to you?
- Are there things you don't have in the home that you would like to have, if possible?

Fisher, G., Arriaga, P., Less, C., Lee, J. & Ashpole, E. REIS Version 2.0, August 2008  
 Duplication of this instrument is permitted by the Model of Human Occupation Clearinghouse, www.moho.uic.edu

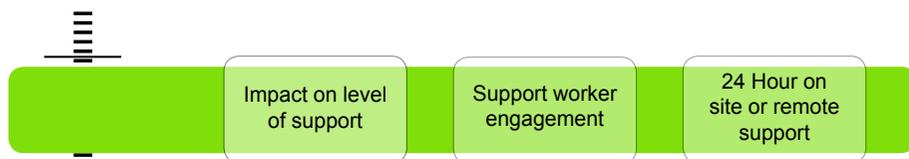
**Psychosocial Impact of Assistive Devices Scale (PIADS)**

**Client Name: Participant**

Each word or phrase below describes how using an assistive device may affect a user. Some might seem unusual but it is important that you answer every one of the 26 items. So, for each word or phrase, put an "X" in the appropriate box to show how you are affected by using the smart phone.

	Decreases	-3	-2	-1	0	1	2	3
1) competence		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2) happiness		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
3) independence		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
4) adequacy		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5) confusion		<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6) efficiency		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7) self-esteem		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
8) productivity		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
9) security		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
10) frustration		<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11) usefulness		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
12) self-confidence		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
13) expertise		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
14) skilfulness		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
15) well-being		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
16) capability		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17) quality of life		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
18) performance		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19) sense of power		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
20) sense of control		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
21) embarrassment		<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
22) willingness to take chances		<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
23) ability to participate		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
24) eagerness to try new things		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
25) ability to adapt to the activities of daily living		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
26) ability to take advantage of opportunities		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>





*...[The aim is for] flexibility of support and flexibility of the model...*

*...One of the workers working for that support provider has I guess engaged with one of the particular tenants and gone bike-riding with him outside of their normal responsibility and duty, because they wanted to go for a bike ride with him...*

## SUPPORT

Scheme-funded assistance that is delivered onsite or via remote support, which is both effective (offering the type and amount of support required by residents), and efficient in the way it is delivered (such that support can be shared by residents across dwellings).

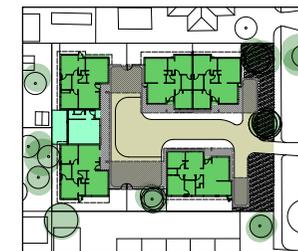
D

## 24 hour on-site or remote support

Infrastructure in place allows 24/7 support delivery, whether this support be delivered face to face or via remote communication and access to assistive technology.

*...So [the communication technology has] actually got a three-stage system, so green, amber and red obviously being a priority with red being the highest...*

*...The callback feature ... gives them privacy where they [tenants] don't have to be checked on constantly...*



DEVELOPMENT PLAN



INDEPENDENT LIVING PLAN

## ENABLER

The participant interviewed reported they were satisfied with the support received, reporting 'good help' was available and provided when needed. This participant does not require personal care or mobility support, and has developed a range of strategies to build independence or participation in daily living tasks. Some tasks have been adapted so as receipt of support is no longer need e.g. the person chooses to use a clothes horse and clothes dryer to dry clothing as they are unable to reach the clothes line or hang clothing without support. At the second data collection time point, the participant advised they had secured access to weekly domestic cleaning services, funded by the TAC, to ensure cleaning was adequately completed on a regular basis.

The close proximity of this individual's unit to the support staff unit has allowed further flexibility in how the person receives support. For non-urgent matter, the person reported they will more likely walk up to the staff unit. In contrast, the person provided an example of when they had a fall at home and used the call pendant to contact staff for urgent assistance. (Continued next page)

PAGE



D

## 24 hour on-site or remote support

Infrastructure in place allows 24/7 support delivery, whether this support be delivered face to face or via remote communication and access to assistive technology.

**ENABLER (CONTINUED)**

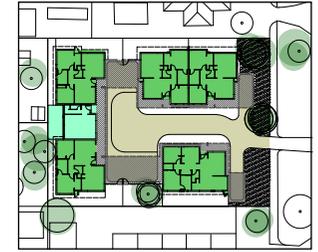
The call system for support staff provides an indication of the level of need / urgency of the call through a colour coded response, which is useful in prioritising the delivery of shared support. The user interface and indicator that the call for staff is simplified and obvious to the user.

It is important to note that this tenant's support needs are not as high as other TAC clients who may need transfer and personal care assistance. Thus, the model of 24-hour onsite or remote support has not been comprehensively tested in this evaluation. For those people with lower daily support needs, monitoring of the amount of support provided as the person's skills progress, and options for clients with lower support needs to receive outreach support in more independent living models within a 'keyring' or 'hub and spoke' design, may be considered.

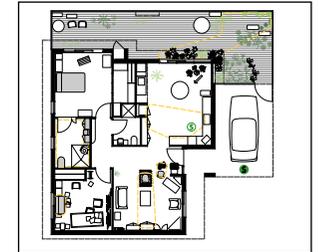
**LIMITATION**

The ongoing lack of reliability of the home automation and communication technology controls is a current significant limitation in the support model and was reported as highly frustrating for the participant in this study. This lack of reliability leads to higher dependence on the single-call button pendant to notify staff of the need for assistance.

The participant and support staff reported a lack of confidence in the technology system, or servicing responses of the supplier. This was further reinforced through the Quebec User Evaluation of Satisfaction with Assistive Technology ratings of satisfaction with repairs and services, professional and follow up services which the participant rated at a 1-2, indicating they were not at all / not very satisfied with these areas.



DEVELOPMENT PLAN



INDEPENDENT LIVING PLAN



PAGE



D

## Impact on Level of Support

The model of support delivered seeks to maximize client independence. When coupled with the installation of reliable remote communication systems, on-site supports may be reduced over time, where suitable.

*...We're hearing examples – because the support provider is a local organisation – there's interaction outside of the cluster setting [in the local area]. For example, at the supermarket there's further engagement and support, very informally...[a tenant met a staff member at the supermarket and staff said] 'I'm here I'll show you, I'm very familiar with the supermarket, I'll show you where everything is so it will be easier for when you come next time'...*

**ENABLER**

The close location of the participant's unit to support staff unit has the potential to lead to over-reliance of tenants on paid staff, but for the participant in this study does not appear to have done so. Given the suburban location of this housing, incidental contact with support workers in local community may allow for skill development / building independence in community tasks of daily living.

For this resident the model of support delivery appears to have allowed for further building of skills and reduction in provision of 'line of sight support'. As residents' independence developed, it would be useful to examine the level of support they are using and how it can continue to be graded over time, or natural community supports may replace paid one. (Continued next page)

PAGE



D

## Impact on Level of Support

The model of support delivered seeks to maximize client independence. When coupled with the installation of reliable remote communication systems, on-site supports may be reduced over time, where suitable.

**ENABLER (CONTINUED)**

When responding to items on the Quebec User Evaluation of Satisfaction with Assistive Technology, the participant reported a very high level of satisfaction with the assistive device supplied for home automation and communication purposes, however reliability and servicing of the device was an ongoing issue that impacted user experience and is detailed further below.

**LIMITATION**

As detailed in other sub-criteria, the lack of reliability and operational function of the home automation and communication technology is a key limitation in the current support model reported by the participant. Unfortunately, due to lack of reliability of the technology during the data collection periods, it was deemed not possible to gather assistive technology logs of 'actual use' as has been done in other post-occupancy evaluation work by this research group.



PAGE



D

## Support Worker Engagement

Engagement of support staff in active and integrated delivery of support across residences, rather than segregating staff to the support worker office space.

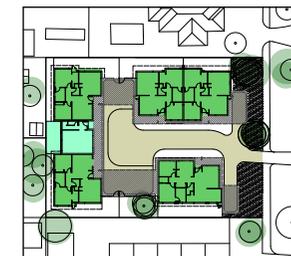
*... From upstairs [in the support staff unit] it actually does give you quite a good passive supervision spot. You can see who is coming and going and all of those sort of things. It was part of the brief to have a space where ... Downstairs it's really just an open living space. I suppose it's a meeting room really...*

### ENABLER

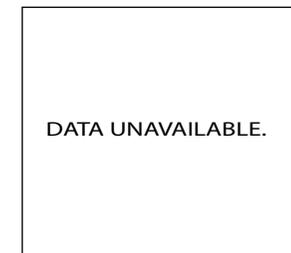
For the participant in this study, there appears to be good engagement of support workers with the individual, whilst also offering opportunity for the person to maintain privacy and maximise independent living. As indicated in the General Development Plan, design of the units allows ease of informal as well as formal access and engagement with the various residents. The central location of support worker unit is effective for supervision of the site – design of the support worker unit has limited the possibility that this becomes overbearing.

### LIMITATION

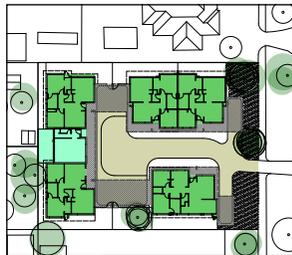
The participant is seeking recruitment of a new worker who has shared hobby interest, as current workers cannot offer a level of skill in the particular hobby that the individual actively pursues.



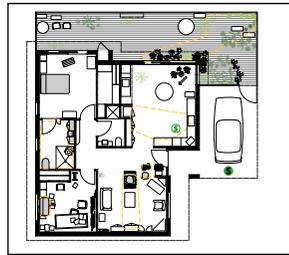
DEVELOPMENT PLAN



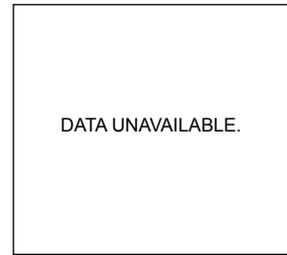
ASSISTIVE TECH. LOG



DEVELOPMENT PLAN



INDEPENDENT LIVING PLAN



ASSISTIVE TECH LOG

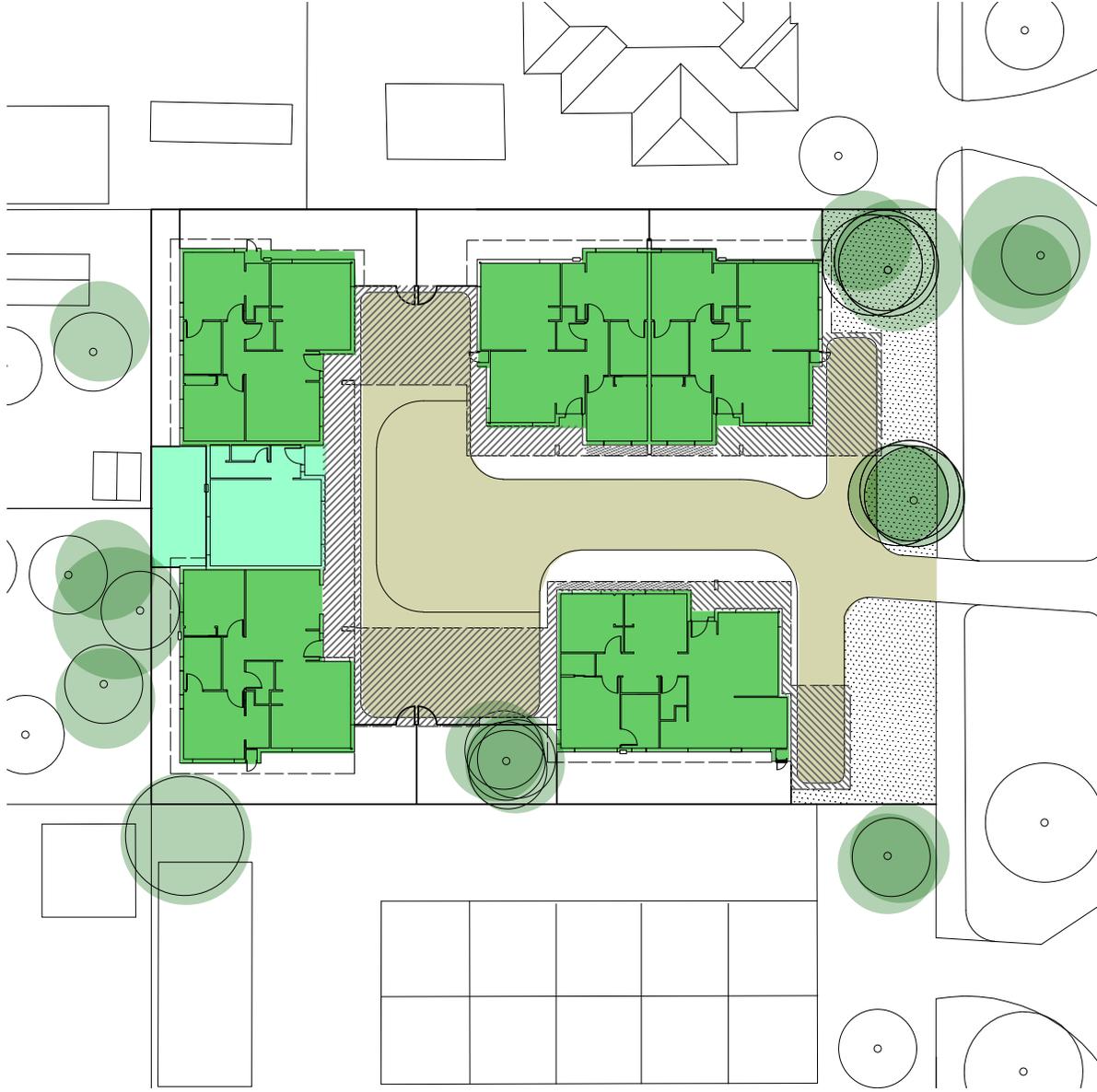
The Evidence section includes relevant information for this Criteria. Click on the links above to explore. The up / down keys on the keyboard will scroll through the pages included.

Use the navigation toolbar on the right of the screen to return to the criteria page ('C'). Links to Home, Criteria Overview ('O') and Panoramas ('P') are also provided.

On other pages in this criteria section, you can return to this Evidence ('E') page with the navigation toolbar on the right.

# GROUND FLOOR DEVELOPMENT PLAN

# EVIDENCE



0m 10m

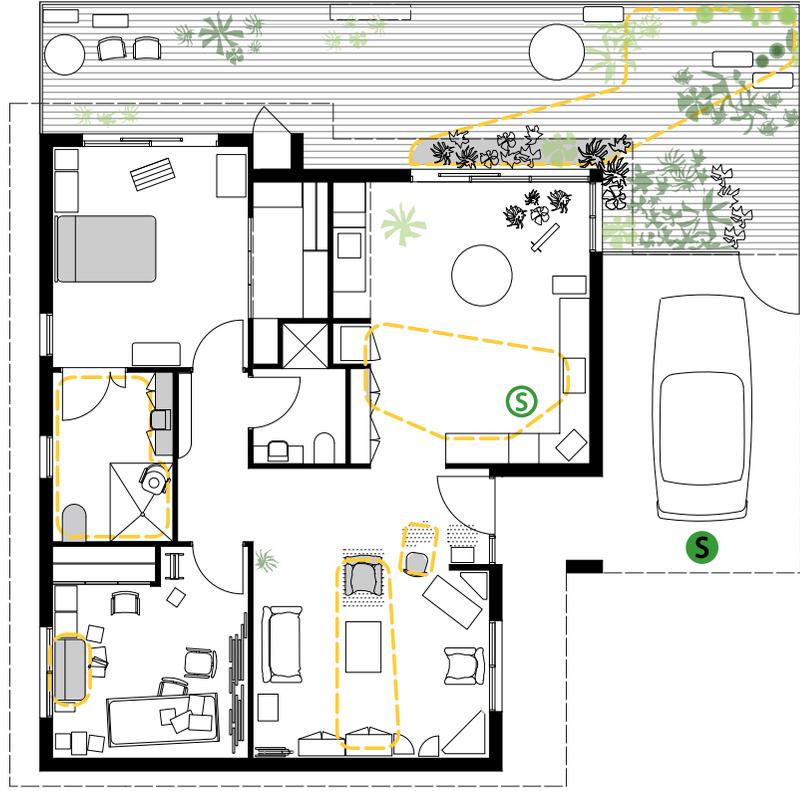


- Common Driveway
- Individual units within development
- Support Worker Unit
- Covered circulation zones

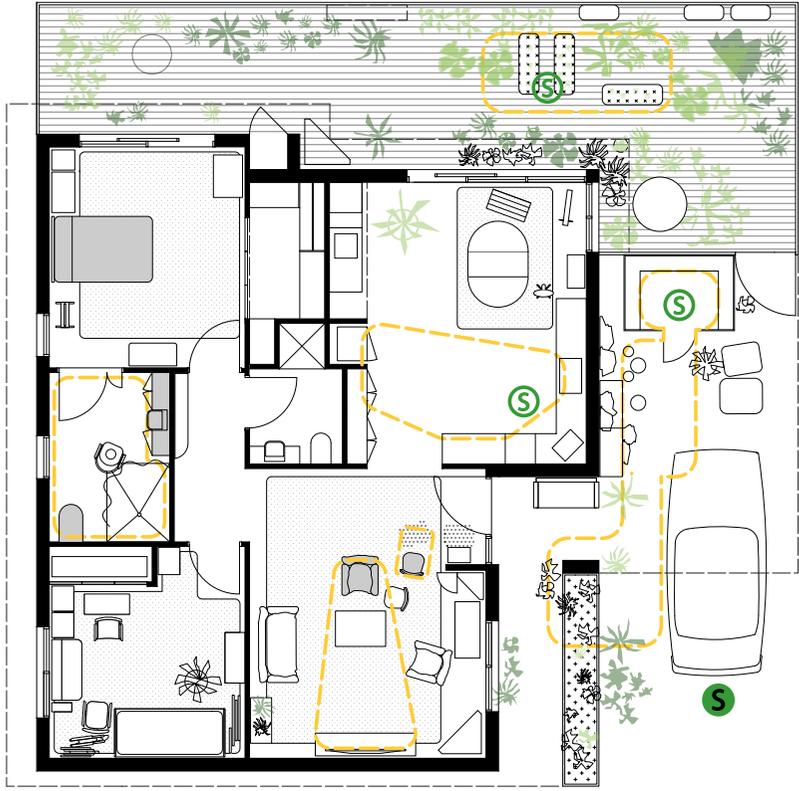


SPACES OF INDEPENDENT / SUPPORTED LIVING PLANS

EVIDENCE



Time Point 01



Time Point 02

0m 4m

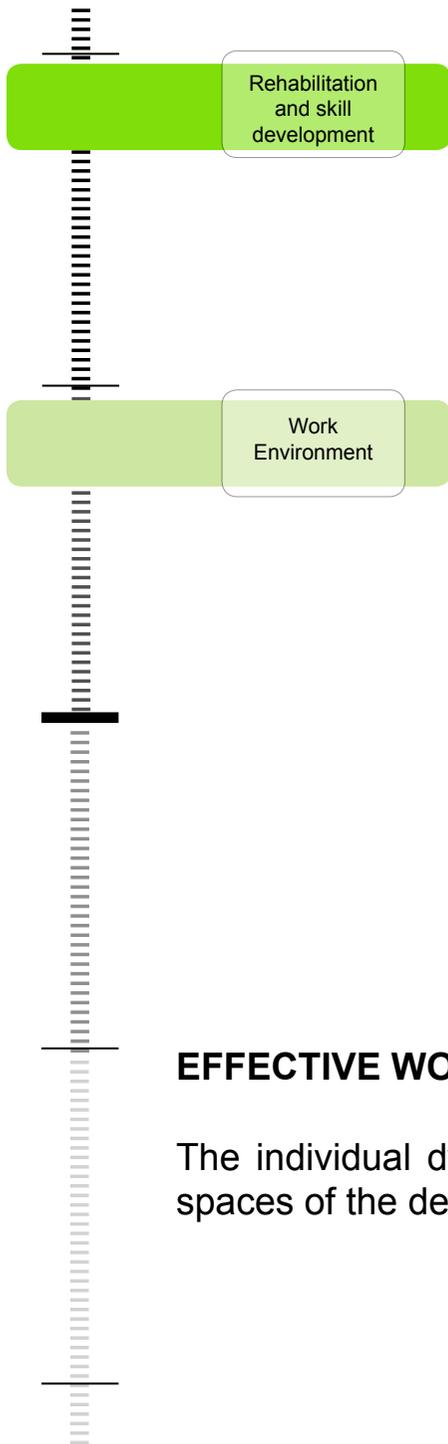


- key zones of inhabitation
- key zones of inhabitation
- S some support provided
- S full support provided



DATA UNAVAILABLE.





*...The system will actually make the phone call out and then it will, through an automated voice prompt, will tell the caregiver what type of priority it is. They can see if they need assistance things like that. I suppose in a situation where they might be looking after someone else, and then need to finish that. Yes, they can do that and move onto that person if it's not a high priority or it might be 'drop everything quick and run'...*

**EFFECTIVE WORKPLACE**

The individual dwellings, support worker space, and internal and external shared or common spaces of the development that form an effective work environment for RIPL support staff.



D

**Rehabilitation and Skill Development**

Community-based therapy programs can be implemented either at home, or through utilisation of available resources within the community precinct.

*...He's really independent, we don't have to really help him with much at all when he's in the home. ... Other than that he is very independent in his home, it's very rare that he comes to us for anything...*

Of note, the participant in this study had limited need for physical rehabilitation at the time of the assessment. The person was accessing some community based allied health services, most often by the therapists visiting the person's home.

**ENABLER**

The housing is located in close proximity to a range of health and rehabilitation services if required by an individual. The open plan of the unit design, and private indoor and outdoor open spaces, allows the deliver of rehabilitation and skill development services in the home as required.

The participant in this study was in receipt of targeted disability supports to build skills in gardening, which was a key interest area. The individual had the opportunity to be actively involved in and direct recruitment of support workers with the background necessary to build chosen skills.

**LIMITATION**

There were no limitations noted in relation to this sub-criteria for the participant.

D

**Work Environment****Promotion of the health and wellbeing of workers, within the support delivery environment.**

*...There's low-level lighting around the landscape and we thought that was enough to get access, and there's lights at the entries to units. We thought that was sufficient for the carers to get around...*

*...Some of the other staff are nervous about walking up to the front unit in the early morning, because it is dark and the unit is open to the street...*

*...Some of the so-called "visitor car parks" could be theoretically staff, and we did agree that some staff could park at the front...*

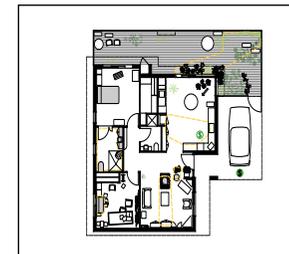
**ENABLER**

The two-story unit, current used solely as a support staff hub for outreach to the residents' units, offers two bedrooms, a study and bathroom upstairs and a kitchen, dining, living and powder room downstairs. This is a significant space for the staff rostered on at any one time and the downstairs area is used as a meeting space for the team of workers. It would appear that over time there may be opportunity to reconfigure use of this space e.g. to allow tenancy for one TAC client who may state a preference for living in this arrangement.

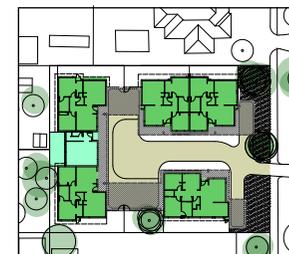
Car parking for staff is provided onsite or at the front of the block.

**LIMITATION**

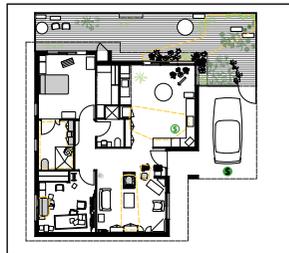
Staff interviewed reported some staffs' concerns with walking around the open development overnight or early in the morning, and the potential risk to personal safety. Lack of reliability and break down of technology is an issue for the staff and their work environment, as well as residents' ability to flexibly access support. Currently the model provides one inactive overnight support staff shift, and an active overnight shift and the service provider has stated a preference to change this to two active overnight shifts.



INDEPENDENT LIVING PLANS



DEVELOPMENT PLAN



INDEPENDENT LIVING PLAN



DEVELOPMENT PLAN

The Evidence section includes relevant information for this Criteria. Click on the links above to explore. The up / down keys on the keyboard will scroll through the pages included.

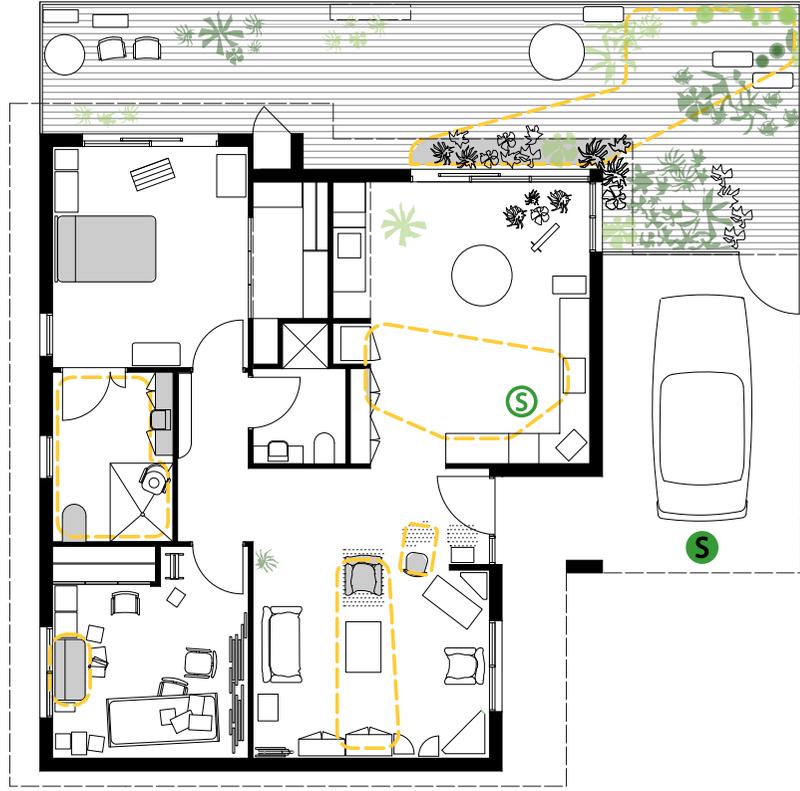
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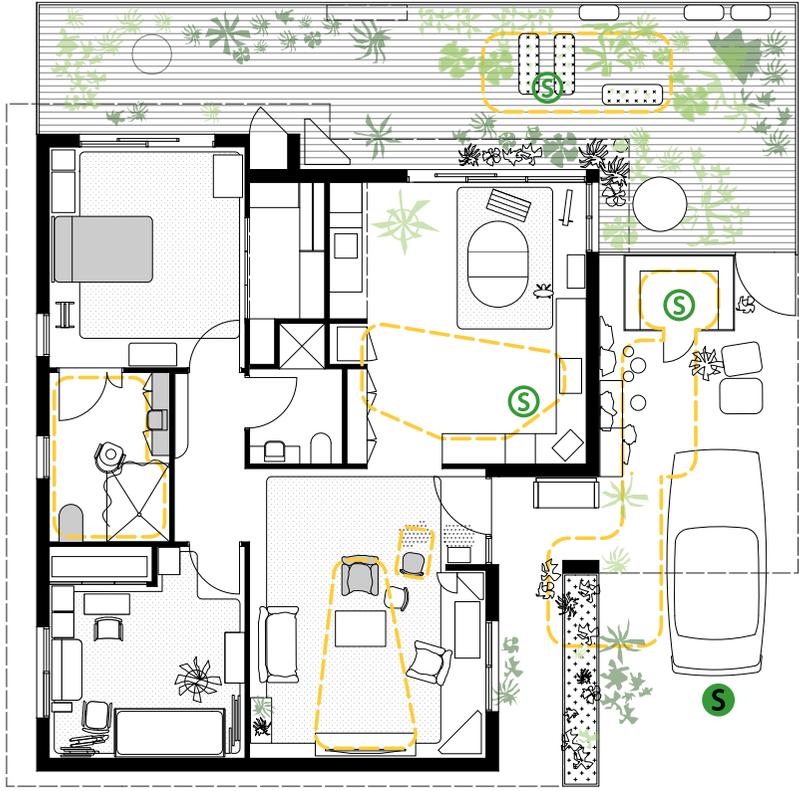


SPACES OF INDEPENDENT / SUPPORTED LIVING PLANS

EVIDENCE



Time Point 01



Time Point 02

0m 4m

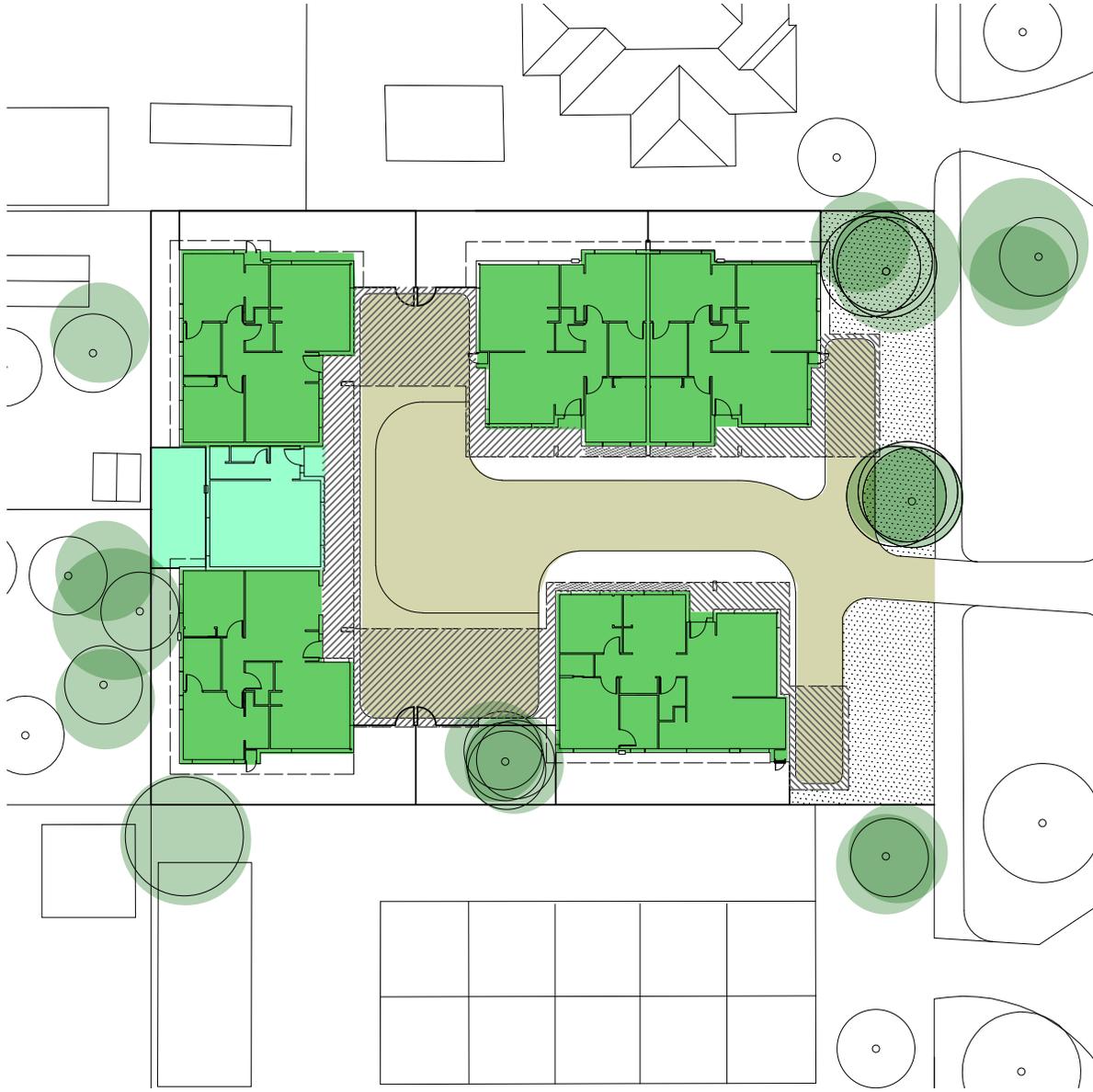


- key zones of inhabitation
- key zones of inhabitation
- S some support provided
- S full support provided



# GROUND FLOOR DEVELOPMENT PLAN

# EVIDENCE

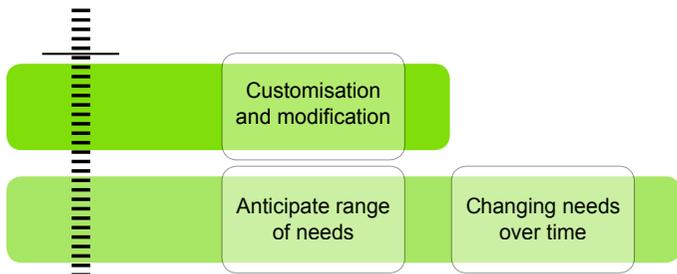


0m 10m



- Common Driveway
- Individual units within development
- Support Worker Unit
- Covered circulation zones





*...Early on we made the decision not to automate the front doors of the units, but we were to put power to them. There is power on every window and every door, and we made the decision not to automate the windows, the opening part of the window. There is power to every window as well, so all of those things do add cost. ... The other thing we tried to do with the bathroom, the en-suite, is fully lined with plywood rather than studs and noggings. It's got heavy plywood so any grab rails or anything like that can go on anywhere. That was left until we knew what client was going into which unit...*

*...You're trying to plan a generic unit that can cope with anybody... We tried to make it as flexible as possible but there's a limitation to that. What do you do? We don't know whether the person has got any movement or to what extent the disability affects their lifestyle...*

**FLEXIBILITY**

The design of built and technology environments such that they allow for customisation and modification, adjust to and anticipate individual residents' current or future needs.





## Customisation and Modification

The capacity to adjust and adapt elements within built and technological environments to meet a resident's current needs, via his or her compensation claim.

### ENABLER (CONTINUED)

Installation of a low-friction flooring surface that can accommodate a range of mobility needs has been suitable, but has also offered further scope to suit individual preferences or needs. For this individual a preference for carpet led to the addition of rugs in the main living and bedroom spaces.

This participant was able to introduce a range of other customisations to meet specific needs and interests. These included the installation of a raised garden bed and a garden shed with both internal and external shelving to assist gardening tasks completed in standing.

The user interface for the smart home and communication technology was reported to be intuitive for this participant. The QUEST rating indicated that the participant was quite satisfied with the ease of adjusting this device.

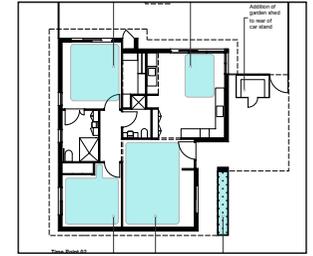
Anecdotal reports provided by family members of other residents include the note that additional shelving has been installed into the laundry, for example, for the storage of regularly used items within the reach of a person when seated in a wheelchair.

### LIMITATION

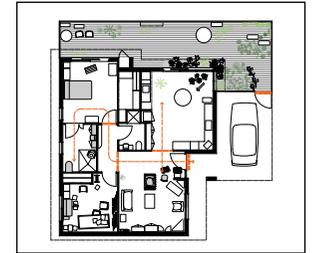
Fixed height shelves in joinery design posed some limitations for individual customisation and access, particularly relevant given this participant's height.

The decision to offer only manual operation of windows, when coupled with the hardware selected, posed challenges for this participant. The participant's restricted upper limb function meant this person is unable to open living room windows and some customisation will be required to increase independence in this activity.

While the user interface for the smart home and communication technology was reported to be intuitive for this participant, the interface cannot be further graded or customised for an individual's specific cognitive and visual support needs.



MODIFICATIONS PLAN



FURNISHED PLANS

Participant	Age	Gender	Occupation	Income	Education	Health	QUEST
Participant 1 (Male)	65	Male	Retired	\$15,000	High School	Good	4.5
Participant 2 (Female)	72	Female	Retired	\$12,000	High School	Fair	3.5
Participant 3 (Male)	68	Male	Retired	\$18,000	High School	Good	4.0
Participant 4 (Female)	70	Female	Retired	\$10,000	High School	Fair	3.0
Participant 5 (Male)	63	Male	Retired	\$16,000	High School	Good	4.0
Participant 6 (Female)	75	Female	Retired	\$14,000	High School	Fair	3.5
Participant 7 (Male)	67	Male	Retired	\$17,000	High School	Good	4.0
Participant 8 (Female)	71	Female	Retired	\$11,000	High School	Fair	3.0
Participant 9 (Male)	69	Male	Retired	\$19,000	High School	Good	4.5
Participant 10 (Female)	73	Female	Retired	\$13,000	High School	Fair	3.5

QUEST

D

## Changing Needs Over Time

The built and technology environment has the capacity to respond to the needs of a resident in a flexible and customised manner over time.

*...Basic things like controlling your heating, your cooling, your lights, your doors and everything. The basic idea and the function will stay pretty much the same for a certain amount of time. What rapidly changes is the device that you use to interface with that control system so the ability and the flexibility later on to add to the newest iPad or the android device, which that does have built-in system flexibility for the future upgrades...*

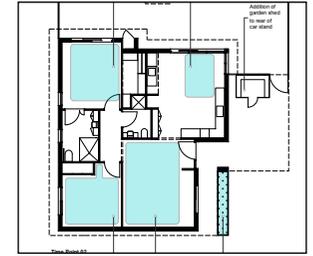
*...You might have someone going in there that has to be in a wheelchair. You might have someone going in there that doesn't have to be in a wheelchair, but needs assistance to walk with a frame or something like that. They're all changes, like does that person in the frame, need to go in a wheelchair two years down the track? Or ten months down the track? ... It doesn't matter what you do, this person's needs always change. I'm thinking it's best to go to the highest point and work back or build everything so you can use it for a different type of client. All kinds of people can just walk in and use it...*

### ENABLER

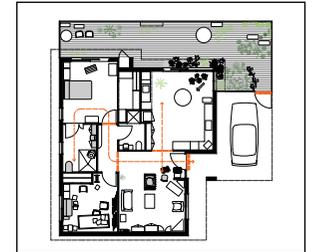
While there was not the opportunity to observe any changes in the use of the home over an extended period (given the project timeframe of 12 months), some comments are offered below.

Offering a home with two bedrooms may accommodate changes in this participant's relationship status (e.g. establishment of a partner relationship; having a child) or social living environment (e.g. addition of a house mate) which a one-bedroom home would not. The participant in this study did not however express any anticipation of such changes in the short to medium term. (Continued next page)

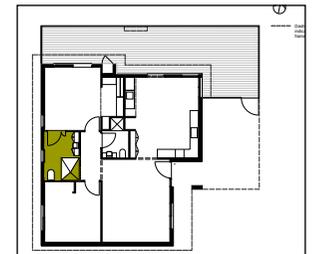
PAGE



MODIFICATIONS PLAN



FURNISHED PLANS



BASE BUILDING PLANS

D

## Changing Needs Over Time

The built and technology environment has the capacity to respond to the needs of a resident in a flexible and customised manner over time.

### ENABLER (CONTINUED)

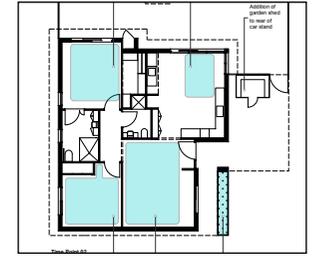
The base build offers flexibility for customisation and modification in the case that the participant's needs increase with the aging process, by the inclusion of ply lining to bathrooms and power provision to windows and doors which may then be automated at a later date. The spatial layout of the home offers some flexibility to the arrangement of furniture, and the use of the second bedroom as an office or other activity space.

The installation of cabling and power supply for technology enablement anticipates changes to needs as well as changes to the technologies that may satisfy these needs.

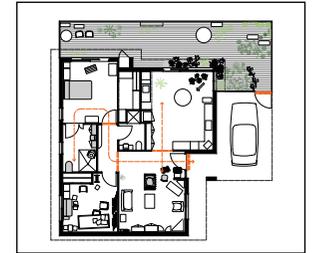
### LIMITATION

There were no observed limitations for this participant's use of the home at this stage, however the participant is at potential risk of falls and could also suffer overuse injury in dominant / functional limb. Either of these outcomes would change the participant's level of function and resulting requirements of the home.

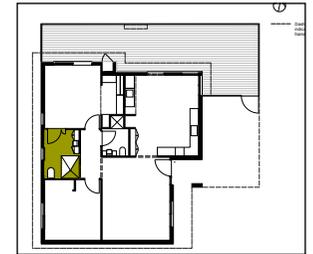
The location of the plumbing points in a variety of locations in the plan places some limitations on changes to the spatial arrangement in the future. This would be similar to unit designs in comparable suburban locations.



MODIFICATIONS PLAN



FURNISHED PLANS



BASE BUILDING PLANS



PAGE

D

**Anticipate a Range of Needs**

**Development of a supported environment that anticipates a range of future needs.**

*...We're aiming to comply with platinum level of liveable housing design guidelines ... We're also finding we've had to do some very minor home mods to accommodate individual needs as well...*

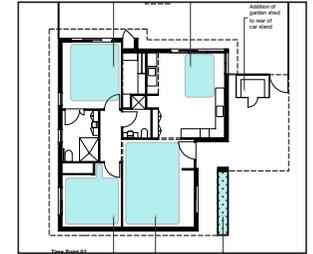
*...We got to the point of agreeing that we put all the backbone cabling into the structure, and anything else would have to be added on...*

*...You can bend over backwards as much as you want to do everything as per the code, (but) it all depends on the person that's going into the unit. Because they have special needs, special requirements, where you have to take these codes a little bit further, and say to yourself, "All right, seventy percent of the people require this, sixty percent require another thing, thirty percent require another thing." I believe if you're doing a purposely built unit for this type of independent living, you have to take off all those other additional points, which aren't in the codes. Then that means, hey, hold on when this person vacates, we can put anybody in there. You don't have to keep modifying...*

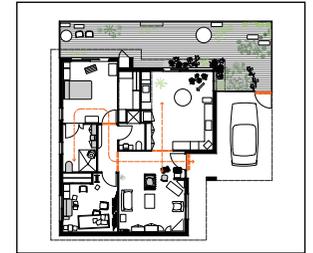
**ENABLER**

While the observation of different residents was not possible within this project, the projective diagrams offer evidence for discussion of this subcriteria. Projective diagrams of residents with higher physical support needs (eg using a motorised wheelchair) indicates that this unit design performs well, however some limitations are noted as below for a range of users. Please refer to that section for further detail. (Continued next page)

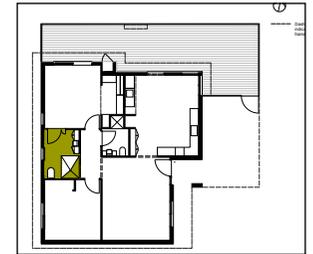
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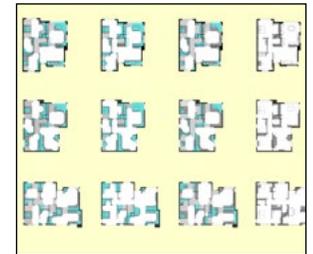
MODIFICATIONS PLAN



FURNISHED PLANS



BASE BUILDING PLANS



PROJECTIVE DIAGRAMS

D

**Anticipate a Range of Needs****Development of a supported environment that anticipates a range of future needs.****ENABLER (CONTINUED)**

The installation of ply lining to bathroom walls, and cabling and power supply for technology enablement (as set out elsewhere in this report) anticipates a range of resident needs, as well as changes to technologies that may satisfy those needs.

The provision of a second bedroom makes the unit suitable for occupation by people with a range of social / family networks. Provision of a second bathroom, which has a reasonable sized foot print and direct path of travel to the toilet, opens up options for use of both bathrooms by the resident, visitors and potential future occupants of the second bedroom.

Location of the unit at the rear of the block may naturally build additional passive security that would appeal to people living on their own, and the design of the development around a shared driveway offers an additional layer of privacy in contrast to homes opening directly onto a public street.

The large open plan dining and kitchen area can be furnished to accommodate a range of uses (e.g. computer work and dining) and also to suit individuals or small groups, and larger groups (e.g. sitting at a large dining table). Wide openings between the more 'public' areas of the home, including kitchen / dining and living areas, as well as the hallway with bathroom, offers ease of travel between these for a wide range of users.

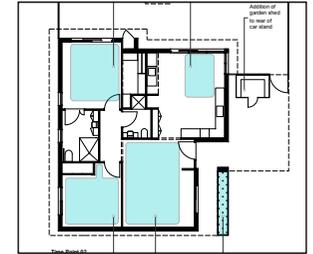
Provision of an accessible carport has the capacity to accommodate a wide range of car transfers needed by this resident group.

**LIMITATION**

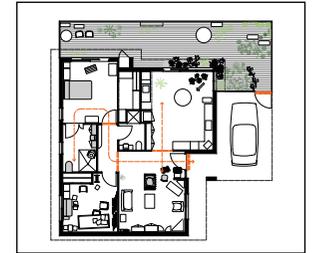
As noted above, the projective diagrams offer evidence for discussion of this subcriteria. Limitations for the projected users modelled are influenced by the location of joinery and furnishing. Please refer to that section for further detail.

Anecdotal reports provided by family members of other residents noted that a glazed shower screen to the shared bathroom rendered this space unusable by residents in wheelchairs, or needing support in the shower. This may also impact options for more than one resident with disability to occupy the home, without further modification.

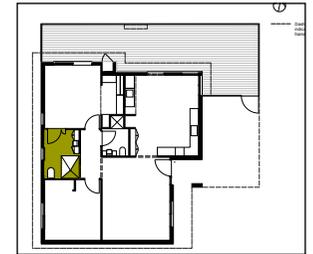
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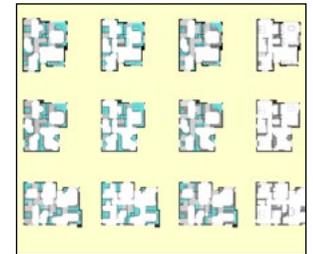
MODIFICATIONS PLAN



FURNISHED PLANS



BASE BUILDING PLANS



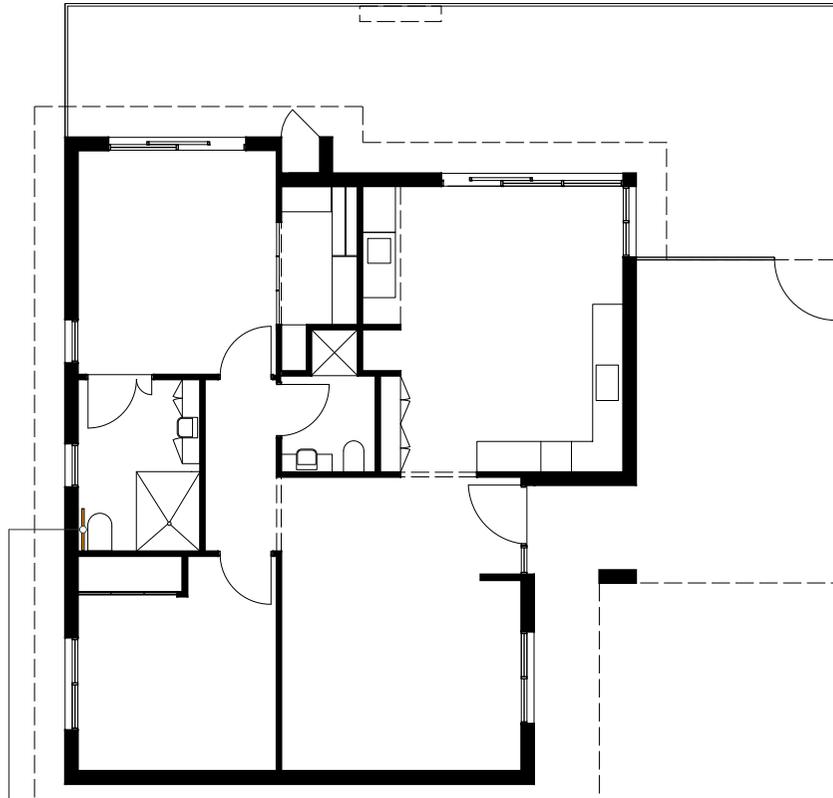
PROJECTIVE DIAGRAMS



0m 4m



Pre-Move  
Post -Move

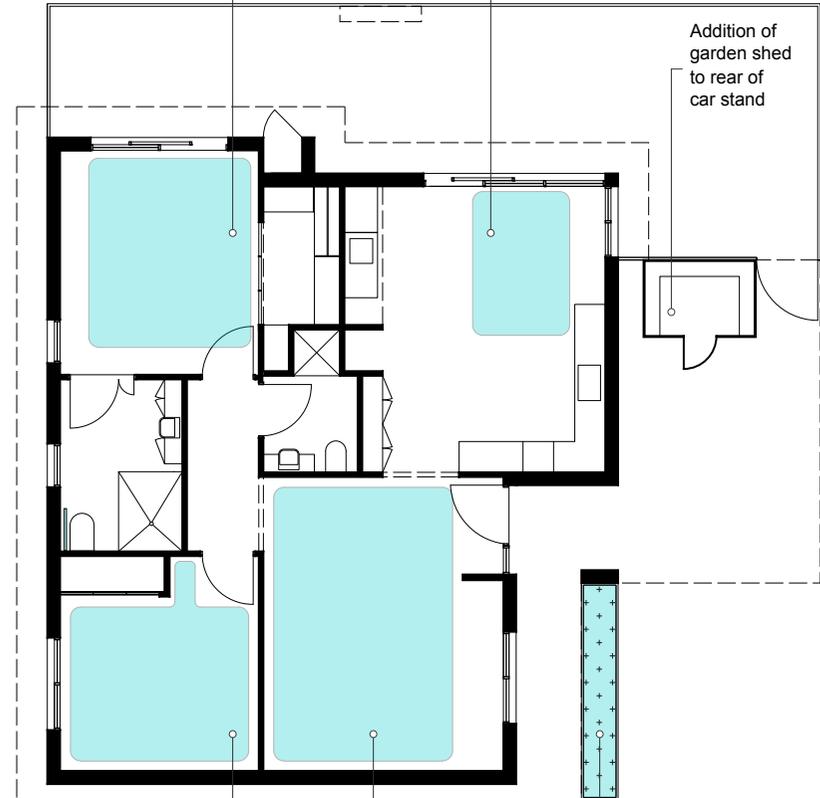


Time Point 01

Addition of grab rail to bathroom

Addition of carpeting to dining and bedroom 01

Addition of garden shed to rear of car stand

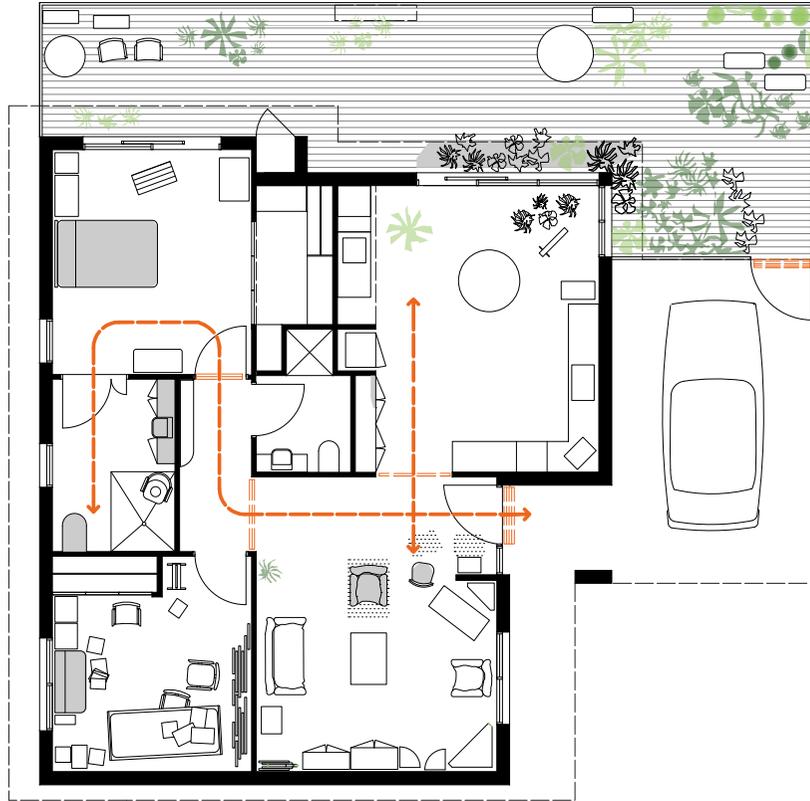


Time Point 02

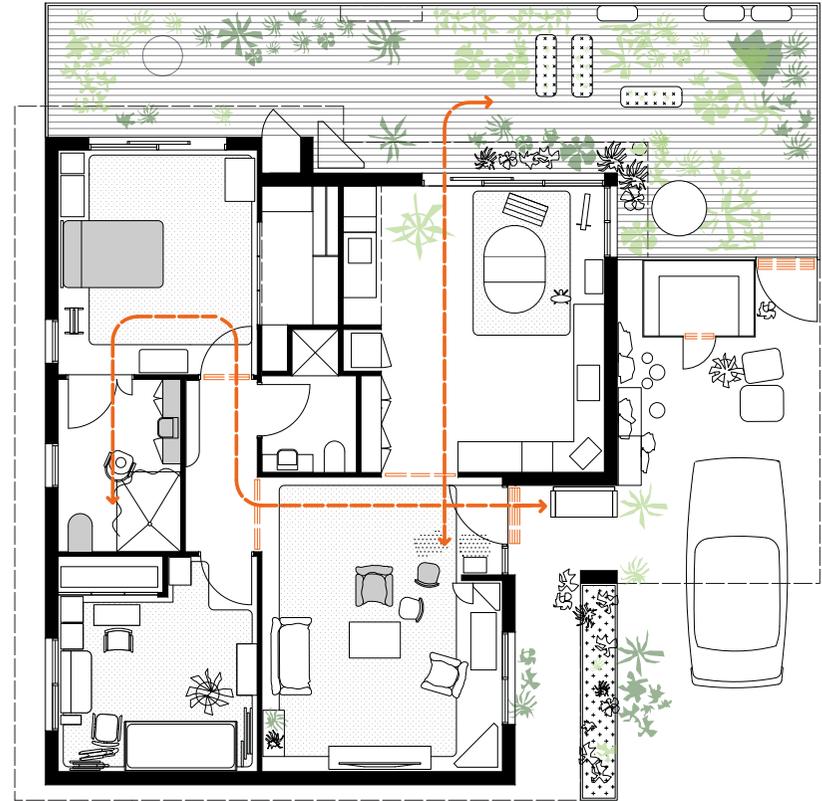
Addition of carpeting to lounge and bedroom 02

Construction of raised garden bed





Time Point 01



Time Point 02

0m 4m



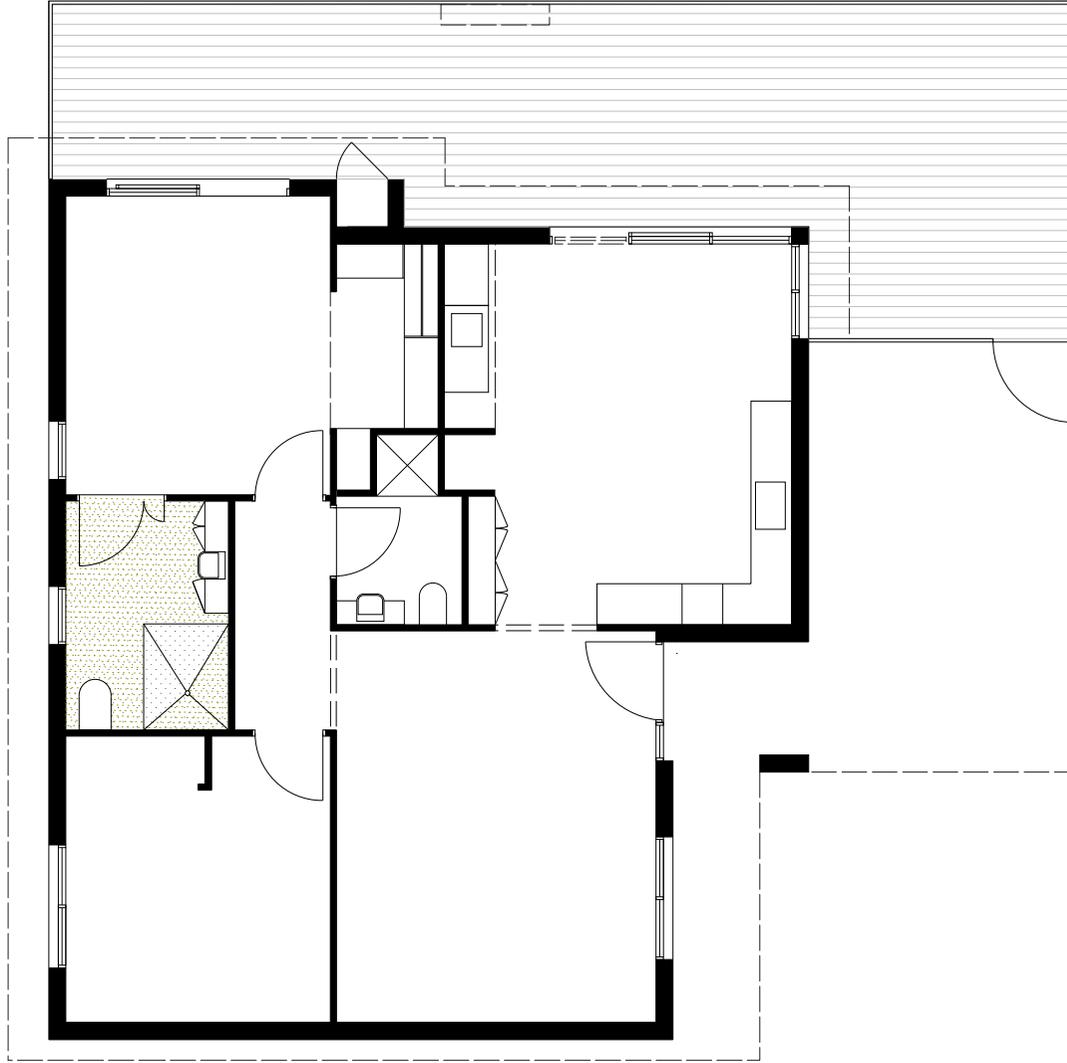
PUBLIC / PRIVATE THRESHOLDS

strong

very strong

main circulation route





0m 4m



--- Dashed line indicates roof/door frame above



	2	3	4	5
Not Satisfied At all	Not Very satisfied	More or less satisfied	Quite satisfied	Very Satisfied

## Participant 4 - iPad

ASSISTIVE DEVICE	
How satisfied are you with,	
1. The <b>dimensions</b> (size, height, length, width) of your assistive device? Comments: <i>iPad mini trialled but not as easy to use</i>	5
2. the <b>weight</b> of your assistive device?	5
3. the <b>ease in adjusting</b> (fixing, fastening) the parts of your assistive device?	4
4. how <b>safe and secure</b> your assistive device is? <i>Getting the iPad off the wall takes effort and risks dropping due to magnetic pull</i>	5
5. the <b>durability</b> (endurance, resistance to wear) of your assistive device? Comments: <i>No protective case currently</i>	5
6. how <b>easy</b> it is to use your assistive device? Comments:	5
7. how <b>comfortable</b> your assistive device is?	5
8. how <b>effective</b> your assistive device is (the degree to which your device meets your needs?)	5
SERVICES	
How satisfied are you with,	
9. the <b>service delivery</b> program (procedures, length of time) in which you obtained your assistive device? Comments:	4
10. the <b>repairs and servicing</b> (maintenance) provided for your assistive device?	2
11. the quality of the <b>professional services</b> (information, attention) you received for using your assistive device?	2
12. the <b>follow-up services</b> (continuing support services) received for your assistive device?	1

Three satisfaction items: Easy to use, service delivery & repairs/servicing

## RISK MANAGEMENT

Proactive systems and strategies that aim to provide reliable response, and flexible monitoring, to anticipate and manage unexpected events experienced and secondary health conditions following neurotrauma.

Proactive preparation

System selection

*...They have all got an intercom on the front as well, which also has a keypad. That also works for the main caregiver so they can have keyless entry especially in the case of an emergency if someone is inside and they've fallen over for whatever reason – they don't have to go find the keys. They can enter the code and access it straightaway...*

*...There's two backup systems as such. We've obviously got the pendants ... At the same time, it triggers a strobe and siren sort of alerts so there's actually a [external] visual indicator of a particular unit when they're in distress. That serves two purposes. It's a security system as well as a visual indicator for the callout system. Then it calls through network and will keep ringing the main caregiver's unit until someone answers...*

At data collection time point 1, the researchers observed the smart tablet controlled home automation and communication technology to be inoperable, reporting a fault. At both time point 1 and 2 of data collection, the participant and support staff reported fluctuating performance and reliability of the system. For these reasons, the researchers determined that it would not be possible to get reliable 'actual use' data – this limits understanding of the frequency and type of technology this participant is using.

*...When there's been a panic alarm, they will dial it. They will call the phone. An automatic voice prompt will come up saying which unit it is and what classification an emergency or just assistance needed. From that, the caregiver can hang the phone up. Then they can dial into their units. They've got an extension for every unit. It's one hundred, two hundred, one through two. That will automatically make the phone call throughout the whole unit and then they can talk to them from there...*

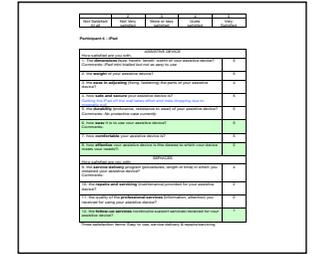
D

### Pro-active preparation

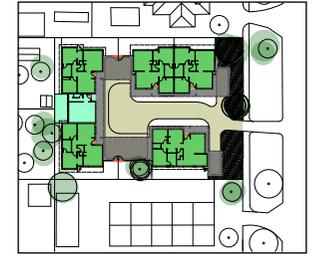
**Safe management of 'out of the ordinary' events through the selection and inclusion of relevant systems and procedures.**

*...Having a system that monitors or as such what's going on, they could have multiple tenants at a time. I suppose that's the whole idea. I think they're pendant buttons, if they're in one unit. Let's say unit one and there's an issue at unit six and it's urgent, we've set up a wireless mesh network so they can carry a device around with them. They've got mobile confirmations from anywhere in the premises. That's not like they have to be stuck back to the main tenancy and waiting for a call. That's right. The way the wireless system is set up they've got a mobile device. They can walk through the area. They can also bring up the different units on that device. They can open doors and everything like that in the emergency event. It gives them the flexibility for that as well...*

PAGE



QUEST



CONTROL ACCESS POINTS

D

**Pro-active preparation****ENABLER**

A number of additional features have been added to the technology procured for RIPL Project 2, when compared with Project 1. This includes three levels of alert from non-urgent through to urgent need for assistance, the addition of visual indicators of a call for assistance from a specific unit, mobile support staff alerts and multiple alternative systems for communication beyond smart tablet or phone-based systems. Reports by the participant and support staff suggest that these have proved important when the smart tablet technology has failed or been under repair.

It was reported to the research team that changes to the assistive technology, its backup and use, had been made following data collection time points.

**Safe management of 'out of the ordinary' events through the selection and inclusion of relevant systems and procedures.**

**LIMITATION**

The participant in this study and support staff interviewed indicated a low level of confidence in one of the key technology systems installed, the smart tablet/phone technology, due to a reported lack of reliability of this device and the application used on it in their experience.

Training on technology use was delivered by technicians who supplied the system, and may have benefited from input from a professional with understanding of the implications of brain injury and learning principles to apply with this population.

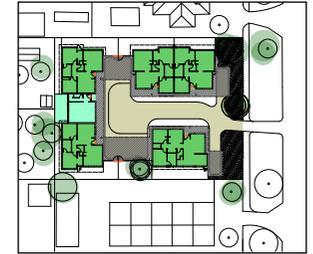
There will likely be a need for follow up training and review of how the system is being used by tenants, in order to ensure that the range of features offered are being used, as necessary and the system proves reliable across all access methods.



PAGE

Item	Location	Access Point	Control Point	Access Point	Control Point
Participant 1 (Other)					
Participant 2 (Other)					
Participant 3 (Other)					
Participant 4 (Other)					
Participant 5 (Other)					
Participant 6 (Other)					
Participant 7 (Other)					
Participant 8 (Other)					
Participant 9 (Other)					
Participant 10 (Other)					
Participant 11 (Other)					
Participant 12 (Other)					
Participant 13 (Other)					
Participant 14 (Other)					
Participant 15 (Other)					
Participant 16 (Other)					
Participant 17 (Other)					
Participant 18 (Other)					
Participant 19 (Other)					
Participant 20 (Other)					

QUEST



CONTROL ACCESS POINTS

At data collection time point 1, the researchers observed the smart tablet controlled home automation and communication technology to be inoperable, reporting a fault. At both time point 1 and 2 of data collection, the participant and support staff reported fluctuating performance and reliability of the system. For these reasons, the researchers determined that it would not be possible to get reliable 'actual use' data – this limits understanding of the frequency and type of technology this participant is using.

It was reported to the research team that changes to the assistive technology, its backup and use, had been made following data collection time points.

### ENABLER

The current home automation and communication technology system that was selected is not reliant on internet capability as this may drop out or be affected by natural disasters (potentially more common in this outer suburban area). There are multiple systems available for a tenant to use to activate a call for assistance. The user interface on the system selected for RIPL Project 2 is simplified when compared to Project 1. This has capacity to increase ease of use and new learning for both support staff and residents. The 'mesh' system put in place allows individual units to be separated out from the system, in case of onsale of a single unit.

PIADS data for this participant indicates that, when the technology is working, it is having a significant and positive psychosocial impact for the individual.

### LIMITATION

At data collection time points 1 and 2, both the participant and support staff interviewed advised that the smart tablet application system was unreliable, with frequent breakdown and need for technical support reported. Pendant ok. At time point 1, the researchers observed the smart tablet-controlled home automation and communication system to be inoperable and reporting a fault on-screen. Based on tenant and support staff reporting, these faults have significantly impacted the experience of use and satisfaction with professional and follow up services, including repairs and servicing. This was also evidenced by the QUEST data for this participant.

D

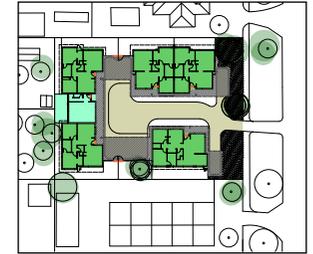
### System Selection

**Communication and emergency response systems that are reliable with backup protocols in place. The expected response time must be appropriate, and understood by both residents and support workers.**

*...Over a week, [the technology is not working] probably a quarter of the time. We have a special technician who comes out every single time...But nothing really gets done, it only gets reset and hopes that will help. Yeah and then it happens again a week later...*

Participant ID	Age	Gender	Occupation	Income	Education	Health	Living Situation	Technology Use	System Reliability	System Satisfaction	System Impact
P001	65	Female	Retired	Low	High School	Good	Single	Smart Tablet	Unreliable	Low	Negative
P002	55	Male	Employed	Medium	University	Good	Single	Smart Tablet	Reliable	High	Positive
P003	70	Female	Retired	Low	High School	Good	Single	Smart Tablet	Unreliable	Low	Negative
P004	60	Male	Employed	Medium	University	Good	Single	Smart Tablet	Reliable	High	Positive

QUEST



CONTROL ACCESS POINTS



CONTROL ACCESS POINTS

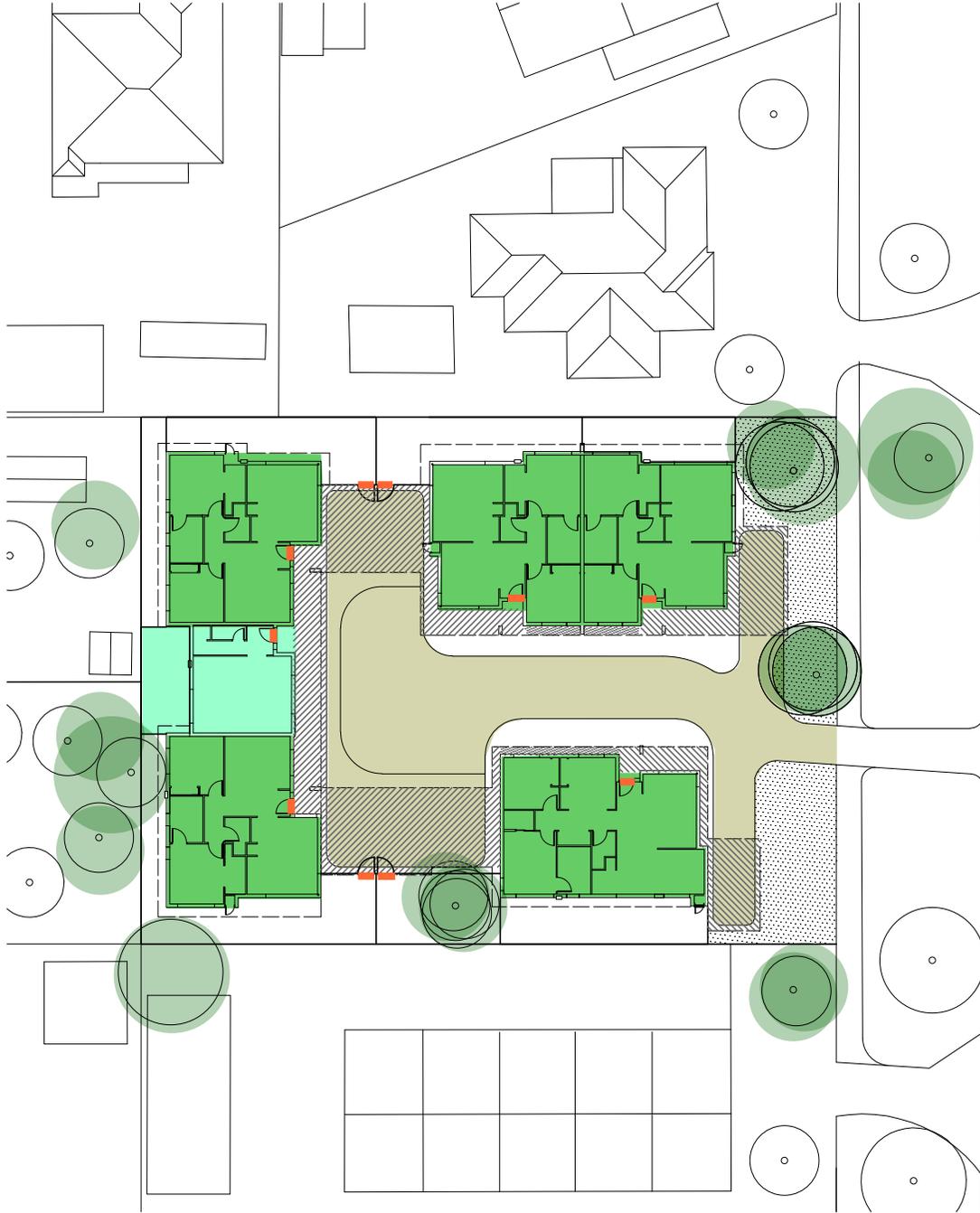
Question	Answer	Score	Comments
<b>Partnership 1 - Work</b>			
<b>Assessment evidence</b>			
1. The student has completed the assignment on time.	Yes	10	
2. The student has completed the assignment on time.	Yes	10	
3. The student has completed the assignment on time.	Yes	10	
4. The student has completed the assignment on time.	Yes	10	
5. The student has completed the assignment on time.	Yes	10	
6. The student has completed the assignment on time.	Yes	10	
7. The student has completed the assignment on time.	Yes	10	
8. The student has completed the assignment on time.	Yes	10	
9. The student has completed the assignment on time.	Yes	10	
10. The student has completed the assignment on time.	Yes	10	
11. The student has completed the assignment on time.	Yes	10	
12. The student has completed the assignment on time.	Yes	10	
13. The student has completed the assignment on time.	Yes	10	
14. The student has completed the assignment on time.	Yes	10	
15. The student has completed the assignment on time.	Yes	10	
16. The student has completed the assignment on time.	Yes	10	
17. The student has completed the assignment on time.	Yes	10	
18. The student has completed the assignment on time.	Yes	10	
19. The student has completed the assignment on time.	Yes	10	
20. The student has completed the assignment on time.	Yes	10	

QUEST

The Evidence section includes relevant information for this Criteria. Click on the links above to explore. The up / down keys on the keyboard will scroll through the pages included.

Use the navigation toolbar on the right of the screen to return to the criteria page ('C'). Links to Home, Criteria Overview ('O') and Panoramas ('P') are also provided.

On other pages in this criteria section, you can return to this Evidence ('E') page with the navigation toolbar on the right.



0m 10m



- Common Driveway
- Individual units within development
- Support Worker Unit
- Covered circulation zones
- Client and Support worker access point



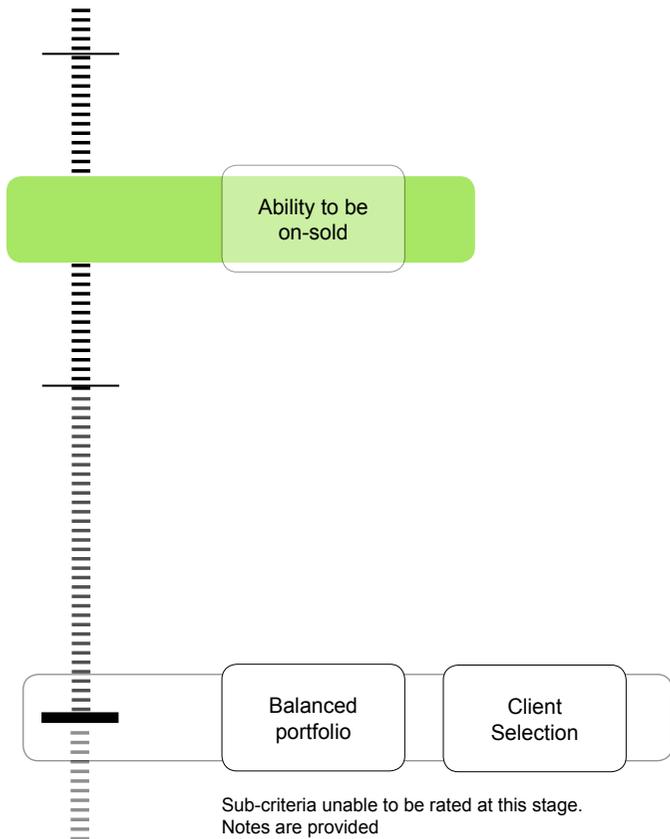
	2	3	4	5
Not Satisfied At all	Not Very satisfied	More or less satisfied	Quite satisfied	Very Satisfied

Participant 4 - iPad

ASSISTIVE DEVICE	
How satisfied are you with,	
1. The <b>dimensions</b> (size, height, length, width) of your assistive device? Comments: <i>iPad mini trialled but not as easy to use</i>	5
2. the <b>weight</b> of your assistive device?	5
3. the <b>ease in adjusting</b> (fixing, fastening) the parts of your assistive device?	4
4. how <b>safe and secure</b> your assistive device is? <i>Getting the iPad off the wall takes effort and risks dropping due to magnetic pull</i>	5
5. the <b>durability</b> (endurance, resistance to wear) of your assistive device? Comments: <i>No protective case currently</i>	5
6. how <b>easy</b> it is to use your assistive device? Comments:	5
7. how <b>comfortable</b> your assistive device is?	5
8. how <b>effective</b> your assistive device is (the degree to which your device meets your needs?)	5
SERVICES	
How satisfied are you with,	
9. the <b>service delivery</b> program (procedures, length of time) in which you obtained your assistive device? Comments:	4
10. the <b>repairs and servicing</b> (maintenance) provided for your assistive device?	2
11. the quality of the <b>professional services</b> (information, attention) you received for using your assistive device?	2
12. the <b>follow-up services</b> (continuing support services) received for your assistive device?	1

Three satisfaction items: Easy to use, service delivery & repairs/servicing





*...The interesting thing is as that identified area of need gets closer to the city, this model that we've developed for [location of RIPL Project Two] becomes less available because of site yield and cost to develop that site. It just doesn't become economical unless you do a higher density or partnership type approach ...*

*...I think also tying it to probably our two main outcomes or the success criteria being client outcomes and the financial viability. There's a lot of discussion happening around the business around those two and where the balance lies in those...*

**SCHEME VIABILITY**

The management of claim liability through operational cost savings in order to deliver a viable and sustainable insurance scheme (TAC, 2011).



D

## Ability to be on-sold

On-selling of apartments on the open market as individual dwellings or as a parcel.

...Two or three bedrooms assists with resale; one-bedroom units may not be as easy to move on the open market. It's a very conservative approach. It's like if the RIPL model doesn't work we can sell these on the open market or we can rent these on the open market...

...I think it's blending well. I even had an agent ring me up, he wanted to sell them for me. I said, "It's not even mine." So they must have liked them...

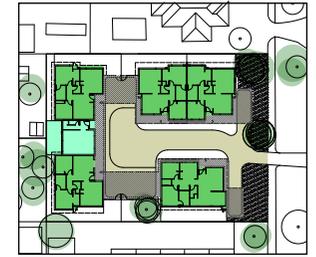
**NOTE:** The rating for this sub-criteria is the overall rating for resale of the group. Notes regards the sale of individual apartments are included below. A detailed analysis of issues affecting the real estate market is beyond the scope of this study or research team expertise, however comments and ratings are offered on the basis of general observations.

## ENABLER

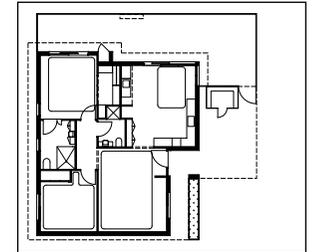
Material selections, fittings and fixtures for the units consisted of good quality finishes in neutral tones. This would offer some benefits in terms of broadening market appeal to a range of prospective buyers, as well as for prospective tenants. The development of two and three bedroom units was informed by advice regarding potential to sell the units should the need arise. The development as a whole is in keeping with the neighbourhood, in terms of scale, massing and orientation to the street, as well as material selection and spatial arrangement on the site.

The spaces are relatively large and the ceilings are high. The construction type is typical for the area, and easy to maintain and to fix traces of wear and tear where necessary. No evidence of wear and tear was found in the participant's unit at either time point, further benefiting potential for resale of this particular unit. Modifications are relatively minor, and removal of grab rails, for example in the bathroom, could likely be achieved with minimal and easily rectified damage to wall linings. (refer Modifications Plan; Traces of Wear and Tear Plan)  
(Continued next page)

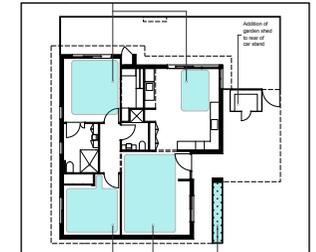
PAGE



DEVELOPMENT PLAN



TRACES, WEAR &amp; TEAR PLAN



MODIFICATIONS PLAN

D

**Ability to be on-sold****ENABLER (CONTINUED)**

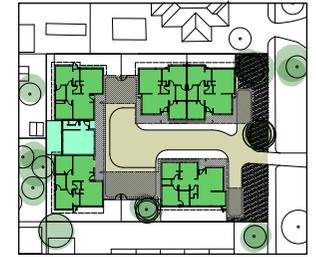
The installation of technology, while supporting assistive technology needs for the resident group, make use of a system used in standard residential settings. The installation may have appeal across a broad market. The installation is incorporated as a 'mesh' across a number of units, allowing support workers to remain in contact with all residents. The ability to disconnect the 'mesh' will allow each of the units to retain and continue to use the assistive technology installations independently, even if one or more of the units is sold on the open market or for another purpose.

**LIMITATION**

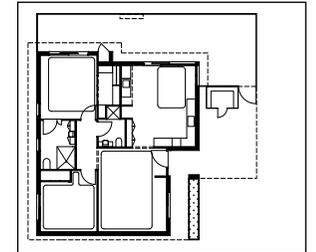
Removing installed grab rails or ceiling hoists (where fitted) may be necessary, however repairs are likely to be relatively easy to undertake, as noted elsewhere. Typical door types for a European laundry would include bifold or sliding doors to the area. The removal of the roller door to the laundry area may be a more costly exercise, if it was expected to positively impact buyer appeal, however should be achievable. Simple additional or replacement fittings in the bathrooms, such as glazed shower screens, may improve broad appeal.

In terms of on-selling of particular units, those at the edges of the development appear to have more appeal than a unit located 'within' the group. Those units located close to the support workers' unit may have a problem of 'overlooking' or a perceived lack of privacy for visitors, however it should be noted the participant unit observed is very private, with limited overlooking from other surrounding properties.

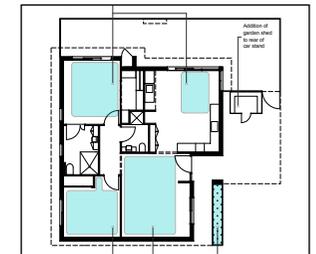
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DEVELOPMENT PLAN



TRACES, WEAR &amp; TEAR PLAN



MODIFICATIONS PLAN

**ENABLER**

The mix of accommodation offered at RIPL Project Two includes both two and three bedroom units. This is in contrast to the one bedroom units provided at RIPL Project One. Over the two sites there is now a developing mix of housing types, and potential resident groupings that can be accommodated through this mix.

It is of note that only single occupants have participated in the study to date. The opportunity to observe other users, including families, of these spaces would further inform the study and its findings.

*...We were adamant that one of the units had to be a 'family unit' with a minimum of three bedrooms. We made a choice at the end to leave out one of the walls in the third bedroom to give that unit greater circulation space and ease of use for a wheelchair tenant. If that unit was going to be used for a family to live there we can put that wall back in very quickly and easily...*

**D****Balanced Portfolio**

**RIPL investment to support a range and mix of client needs, and that will minimise redundancy of spaces delivered.**

Sub-criteria unable to be rated at this stage.  
Notes are provided

**LIMITATION**

The cost of providing support worker accommodation in the current support staff hub may be reviewed. Interview data suggested that the inclusion of a second level was driven by the requirements imposed for Local Planning approvals, in combination with the number of units required for a suitable yield on the site. The design of the unit may offer value if it was to be on-sold, but may not suit the current requirement for support workers' purposes as effectively as a smaller office with sleeping space and bathroom. (refer Development Plan)

The location of the development was found to be highly influential on the experience of residents in the RIPL Project One study, with reference to the location of their previous homes and social support networks. The distribution of housing types across a number of distant sites may therefore be less of a factor in the success of a balanced portfolio, when considered in combination with resident experience. A suitable mix of housing types on each site, allowing TAC clients to live with other residents (eg family) in a variety of arrangements may be more effective. Tailoring such a balance to the mix of household types within the client group, and the location of social support networks or residential history, may therefore impact the success of investment in design and development within the portfolio.

**ENABLER**

The design of the units would appear to offer suitable accommodation to a range of potential residents. As noted elsewhere, the inclusion of two and three bedroom units may allow for wider options to accommodate different resident family arrangements.

The Projected Use Diagrams indicate the availability of various areas of the home in terms of access and reach. The shading indicates Degrees of Access as described elsewhere, and draws on resident data from RIPL Project One to make projections. It can be seen that for each unit type at RIPL Project Two, client selection has a significant impact on home use and availability. While these are necessarily diagrammatic, and represent only reach and access, and not experience, it is clear that the spatial arrangement, assumed and eventual furniture location, and location and width of openings are particularly relevant. As an example, the removal of a wall to the third bedroom in unit type 3 (the lower row of the matrix) provides more access to the room itself, and of the corridor as well for all projected users. In most instances, there is good access to most areas of the homes.

D

**Client Selection**

Sub-criteria unable to be rated at this stage.  
Notes are provided

*...The interesting thing with this project was it was the TAC's very first identified area of need. We had a cohort of clients in the local area which we found surprising at the time, but there was quite a large cohort so it was a very obvious area of need...*

*...It was our first project that was identified under a complete ownership model where we would procure the land ourselves within that identified area, procured the architect, the builder and oversee the project just for our own purposes. There was no partnership approach whatsoever...*

PAGE



**LIMITATION**

The development includes both two and three bedroom units. During the timepoints visited on the site, all of the units had single residents. As in previous subcriteria, the research team questioned the lack of one-bedroom options on the site, in terms of fit with the client population.

The Projected Use Diagrams highlight the impact of furniture and spatial arrangements on access and reach for different residents. The spatial arrangement has an impact on the availability of the space and its use for all projected users. The location of furniture in these diagrams is according to architect's drawings, and has a clear impact on the ability of 'projected' residents to access particular areas of the home. Central location of furnishings, including beds and tables, would appear to present an obstacle for three of the four projected users. While residents would clearly be able to rearrange or select furniture according to their preference and need, the construction of these environments will clearly respond to some assumptions as a result of the location of GPOs, data or aerial connections, light fixtures etc.

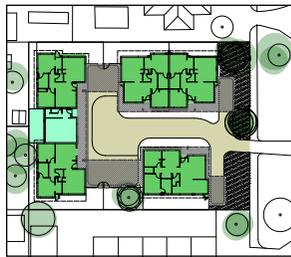
**D****Client Selection**

Sub-criteria unable to be rated at this stage.  
Notes are provided

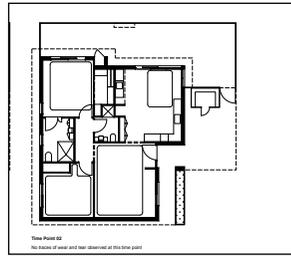


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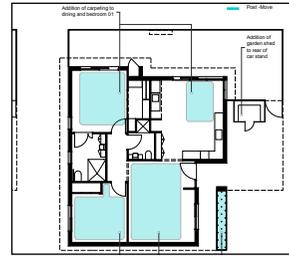




DEVELOPMENT PLAN



TRACES, WEAR &amp; TEAR PLAN



MODIFICATIONS PLAN

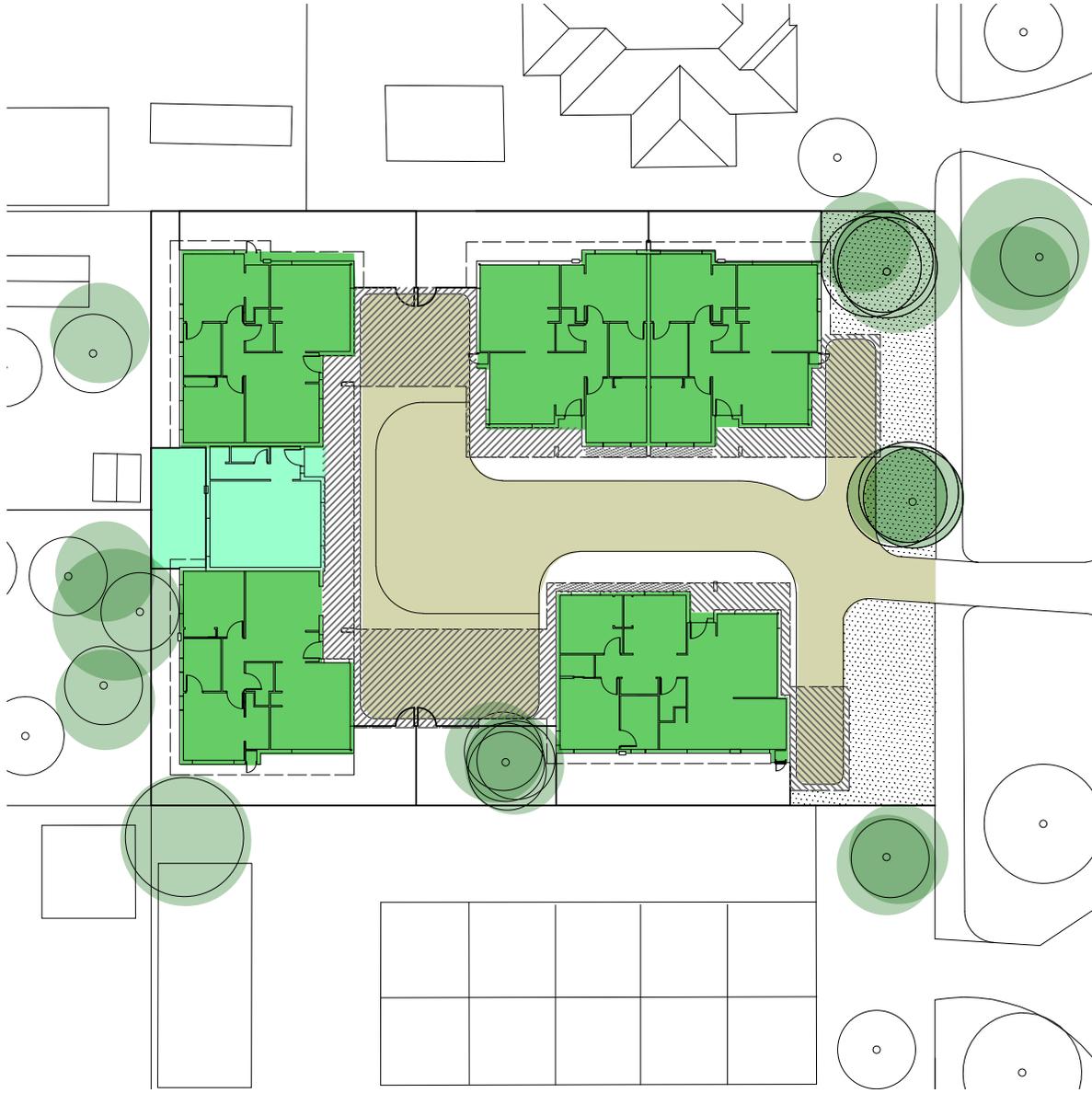
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On other pages in this criteria section, you can return to this Evidence ('E') page with the navigation toolbar on the right.

# GROUND FLOOR DEVELOPMENT PLAN

# EVIDENCE

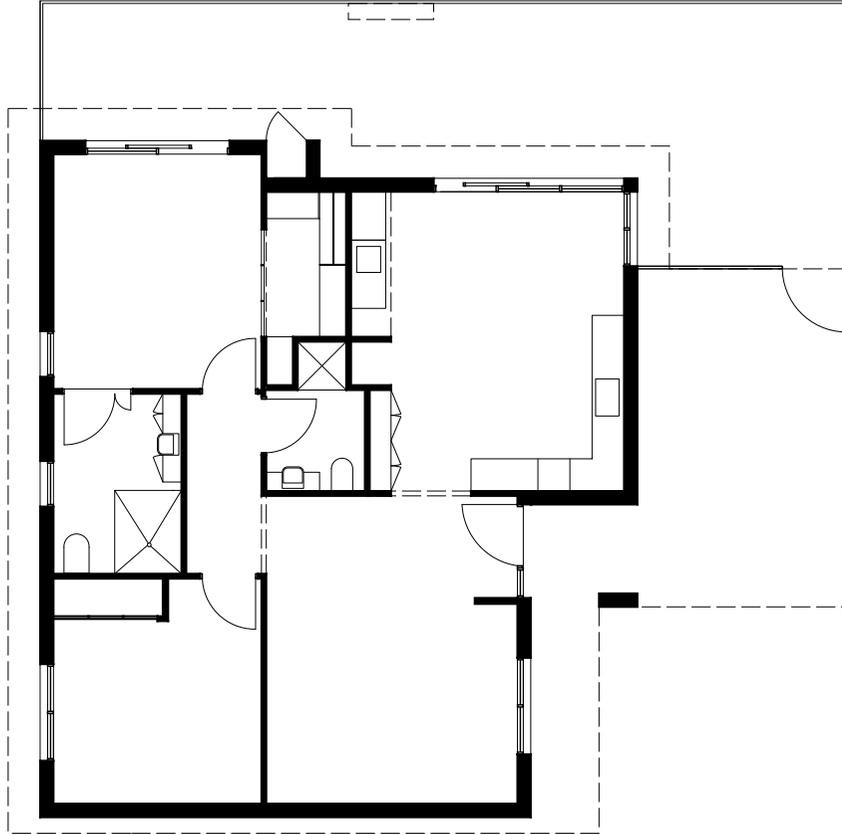
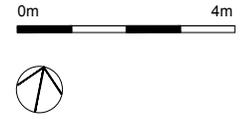


0m 10m



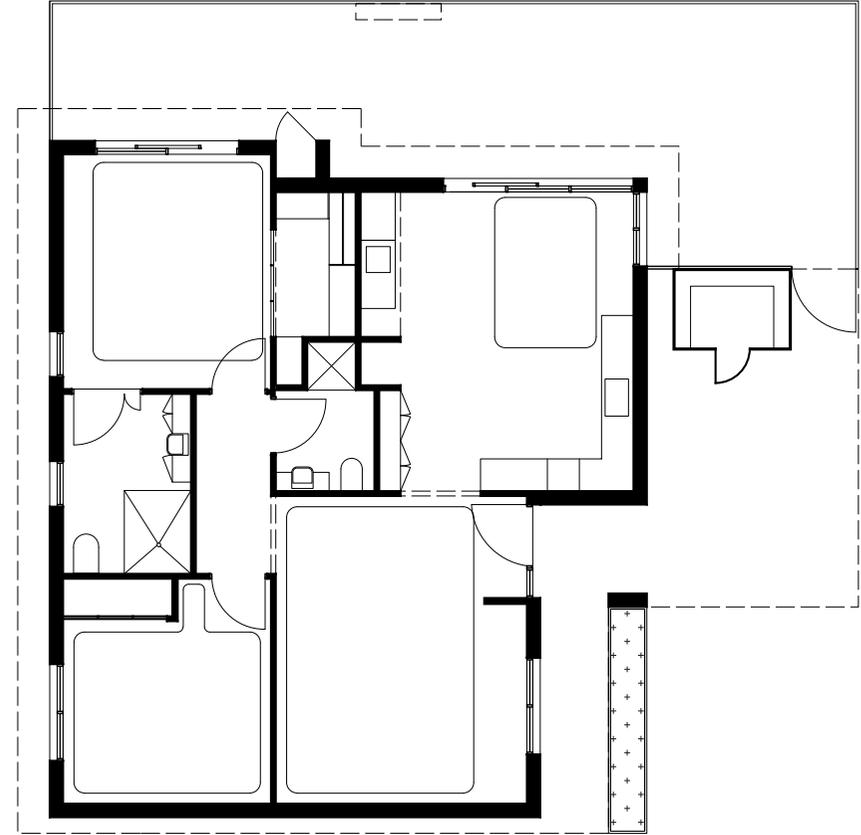
- Common Driveway
- Individual units within development
- Support Worker Unit
- Covered circulation zones





**Time Point 01**

No traces of wear and tear observed at this time point



**Time Point 02**

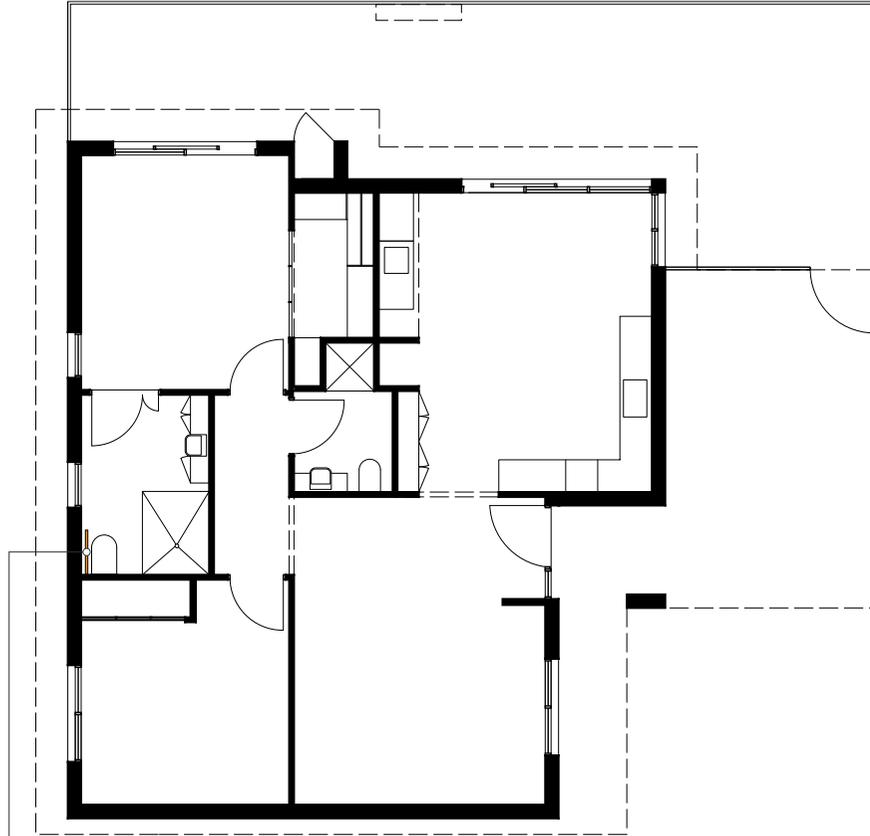
No traces of wear and tear observed at this time point



0m 4m

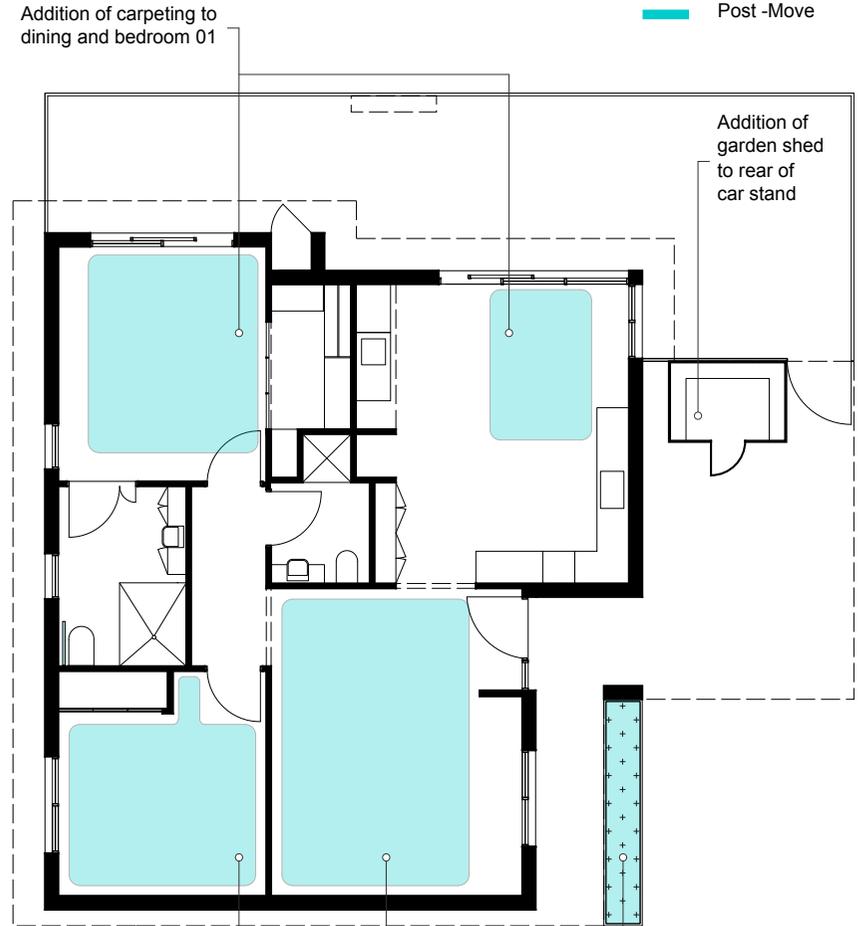


Pre-Move  
Post-Move



Time Point 01

Addition of grab rail to bathroom



Time Point 02

Addition of carpeting to lounge and bedroom 02

Construction of raised garden bed



This is the second RIPL project reviewed by the research team, and recommendations are informed by the further iteration of the Environment-Experience Evaluation Framework (E-EEF) initially developed in the RIPL Project One Post Occupancy Evaluation (POE). The recommendations below draw on this work, however it should be noted that the evidence base informing some of these aspects has been somewhat limited by low participant numbers in POE of RIPL Project Two. The resident who participated in this study of RIPL Project Two is ambulant, further limiting findings on key areas of the use and experience of this development. The addition of anecdotal reports by some family members of non-participants has been very helpful, and researchers have also developed new methodologies drawing on previous research findings in RIPL Project One to extend the use of data available for reporting. Challenges of participant recruitment have been highlighted in communications with the reference group, and the extension of ethics approvals to allow for recruitment via additional means has been approved, and will be applied in the next POE sites if necessary.

### **RIPL Design Brief**

One of the primary tasks of the research team in undertaking POE of RIPL projects is to inform future developments for RIPL, other areas of the TAC, and, by extension, other providers of housing and support for people with disability into the future. For this reason, we have reviewed RIPL Project Two against the current version of the RIPL design brief (v5.0). The current version of the brief was produced in September and October 2015, after delivery of RIPL Project Two, and now consists of two documents, Design Background (Transport Accident Commission, 2015a) (indicated as 'DB' below) and Design Specifications (Transport Accident Commission, 2015b) (indicated as 'DS' below). The research team is aware that there is a potential argument for RIPL Project Two to be reviewed against the previous version of the brief that informed its design and delivery. However, the researchers considered there would be more valuable learning gained for RIPL and the TAC if Project Two was reviewed against the current version, to further inform this developing brief.

### **Site Planning and Context**

RIPL Project Two is the first cluster model delivered by the property trust. Located on an outer suburban street, the six units are comparative in appearance and site layout to other residential unit developments, providing consistency with the local suburban streetscape. Procurement of a site of a suitable scale for the anticipated site yield required some trade-offs in terms of some RIPL Design Brief criteria. The requirement for ease of access from RIPL housing to transport and services proved challenging from this site.

The local environment is hilly in nature and the site address is on an incline, approximately 700m metres from shops and services. It may be argued that this is inconsistent with the implications of the current brief requirement for a level site with accessible paths of travel to local facilities and amenities (DS, Site Selection, s2.1), particularly for people using a manual wheelchair. The RIPL team worked with local council to progress provision of footpaths which have contributed to making the site more accessible by motorised wheelchair or when walking.

A key opportunity for developing neighbour relationships is by regular presence in the local streets and community. This is also noted in the current version of the Design Background (DB, Part 4 – Site Selection). Reports from the study participant, and anecdotally from family members, state that the location of RIPL Project Two has meant that tenants were more likely to use a vehicle for local travel. This may reduce opportunity for the building of natural relationships through incidental contact with neighbours (e.g. when walking a pet; when travelling by foot or wheelchair to a local café or shops).

Site selection may also increase the likelihood of a tenant requiring support from another person to travel out for particular purposes (e.g. grocery shopping), with implications for cost of support and frequency of travel into the local community. In RIPL Project One it was observed that the need for support was reduced by very close proximity of the housing to an accessible café and shopping centre. This allowed tenants to travel out of their home most days to visit a café or make small and easily transported grocery purchases, rather than rely on attendant care or family support for transport (e.g. to complete a large weekly grocery shop). In addition it is noted that accessible transport options are not as readily available at RIPL Project Two as they were at RIPL Project One, should residents wish to travel beyond the immediate suburban location. The train station is 1.4km travel distance from RIPL Project Two.

These findings reinforce the value of the terms now included in the current RIPL Design Background and Specifications with regard to Site Selection.

### Layout and Planning

The site layout of RIPL Project Two responds well to the requirements for orientation and access to private open space that are set out in the Design Specifications (DS, s2.1; s2.2). All units appear to have good solar access to living spaces. A section highlighting design for or consideration of energy efficiency is now included in the Design Specifications (DS, s9.9). The participant's unit was able to make excellent use of private open space as additional 'living' space that allowed pursuit of a valued hobby, gardening, with good sun access and protection from wind. It is notable that the current RIPL Design Specifications set out requirements for the provision of gardens with raised garden beds etc (DS, s3.3), which may be of value for some residents. In RIPL Project Two, the participant has demonstrated great skill and expressed pride in the achievement of building a garden in this new independent home. There are relatively direct paths of travel from car spaces to the front doors of units, although these are not always linear as set out in the current version of the Design Specifications (DS, s2.1).

Planning of units is strongly influenced by decisions regarding the number of bedrooms per unit, and – by implication – the number of bathrooms and the scale of other spaces. At RIPL Project Two, four of the units have two bedrooms and two full bathrooms, and the fifth unit has capacity for three bedrooms and two full bathrooms. This is consistent with the current Design Specifications (DS, s5.4). At present, one wall separating a bedroom and hallway has been removed in the three-bedroom unit, to improve access for a tenant using a large wheelchair. The sixth unit is a two bedroom, two storey unit, currently used as the separate support staff space, consistent with Design Specifications re Site Selection (DS, s2.1).

The aim of this approach was to allow capacity to offer individual housing and support to each tenant, but to allow for tenants to choose to live with family now or in the future, including a partner and/or children or friends (DB, Part 5). This decision was also made with a view to potential resale value as reported to the research team within interviews, and noted under the criteria Scheme Viability in the Project Report. To date, single occupants have tenanted all units, consistent with the intentions of the Design Guidelines (DG, Part 5). Of note, smart appliances harnessed by the participant in this study, including an internet-enabled large screen television used in the lounge, have negated the need to use a computer which had been set up in the second bedroom as an office, leaving that space largely unused, aside from storage.

There are clear implications of the decision to develop two and three bedroom units in this type of housing model, in terms of the cost of construction, as well as running costs and maintenance. There are potential opportunity costs where development of single bedroom units on the same site may offer a greater yield. If this approach is to be pursued, trade-offs should be considered in terms of delaying tenant allocation for larger units to identify a TAC client who may wish to live with family or friends, versus accepting the additional costs implied by single occupancy.

The ensuite and second full bathroom provided in each of the units in RIPL Project Two (as per DS s5.2) offers some flexibility for both toilet and bathing access for visitors or guests, and for some RIPL tenants (with lower physical access needs) may provide a suitable second toilet option. The research team was unable to investigate the inclusion of overnight visitors in all units, due to the low number of study participants. Given single occupants have tenanted all units to date, the trade-offs noted above regarding the cost of provision of a second full bathroom versus actual use may be further considered. Findings from RIPL Project One included a reconsideration of the privacy of spaces in the home, and implications for layout and circulation pathways, when bathroom use is regularly accompanied by support workers. This may suggest other design solutions such as locating bathroom access closer to main circulation routes rather than as ensuites within more private sleeping areas.

The implications of spatial layout for circulation patterns and privacy that were noted in RIPL Project One were not as apparent in Project Two. This outcome may be influenced by differing needs of the individual ambulant participant, and the locations within which this person needed support in the unit. The adjustment of furnishings between time points one and two provides some evidence, alongside interview data, of preferences for spatial connections and the locations of activity for the resident. Design decisions around the relationship of corridors and rooms, as well as the locations of power points and expectations for their use have the potential to limit, as well as offer, flexibility. The Projective Diagrams offer some evidence in this regard, and suggest that the arrangement of sections of the RIPL Design Specification, and the table of requirements for electrical power outlets (DS, s9.2) by room type may be further considered.

The design of RIPL Project Two includes a clear focus on access from each unit to private and public outdoor spaces and each unit has undercover carport access (as per current DS, s3.1). For the participant in this study, gardening is a valued hobby, as noted above. The carport has offered covered space for the installation and use of a small shed and shelving for storage and gardening activities during inclement weather. This was of great benefit to the participant, and further increased the spaces available to the person in their home. The current RIPL Design Specifications now set out a requirement for lockable storage within car parking areas, where space permits (DS, s3.1), and this would appear suitable for this participant to support gardening activities, and also a recumbent bicycle and other equipment currently housed in the participant's car, as noted in the evidence pages of this report.

#### **Fitting the Fit Out**

A number of criteria identified through the development of the E-EEF are relevant to the 'fit' between residents and elements of their environment. For the participant in this study, the provision of accessible fittings and fixtures, with incorporation of some adaptability (e.g. height adjustment to some shelving; ability to retrofit grab rails) was particularly useful to allow for access to many areas of the home. Nevertheless, given the height of this person, even with this capacity for adjustment, some shelving remained inaccessible for the tenant. Anecdotal reports from other families further indicate a necessary approach to fitting the fit out for other tenants at RIPL Project Two.



Carpeting hard wood spaces to build a sense of homeliness, positioning lounge furnishings around a centralised audio-visual system and television chair, and provision of customised storage to allow for pursuit of personal hobbies were seen as significant contributions to the participant's sense of 'home'. Choice of adjustable furniture, such as an extension dining table that can be set at its smallest size when the person is home alone, or at a longer length when dining with visitors, has allowed further flexibility. This example is also relevant to the other sections of these recommendations, Fitting the Fitout, and Customisation and Flexibility. The adjustment and relocation of the table in the dining area, as demonstrated in the furnishing plans between data collection time points one and two, also highlights the improvement in circulation routes between the interior of the home and the garden, which is accessed daily for food supply (growing vegetables) as well as recreation and home-making. The opportunity, and individual's ability to develop spatial links to particularly valued spaces in the home, is considered here a good example of 'home-like'.

It is notable that the participant in the study did not have need for a mobility device or other large assistive technology aids to daily living, although provision of the storage and charging of these was provided via power points, and spatial accommodation in walk-in robe and other areas of the home. This has meant that the appearance of the home may be considered more 'home-like' without compromise of this particular resident's functional needs. However, further discussion of this distinction may assist a more nuanced approach to the challenge of housing design for this resident group.

#### **Customisation and Flexibility**

For the participant in this study, ply lining of bathroom walls behind plasterboard and tiling has allowed for flexible retrofit of necessary grab rails in the bathroom. This retrofit of customised grab rails is consistent with the timing of installation as set out in the current RIPL Design Specifications (DS, s5.2), and LHDG 7 (Platinum) requirement set out in the same section. This is also consistent with the Element 7 of the Liveable Design Guidelines, as set out in RIPL Design Background (DB, Part 8). At RIPL Project Two, installation has been customised to the participant's needs and provides further endorsement for the application of this strategy.

The installation of a recessed track for a ceiling hoist is noted in the participant's bedroom at RIPL Project Two, anticipating a range of future needs in the dwelling and allowing use of this for transfers by future tenants if necessary. This is consistent with the current RIPL Design Specifications (DS, s5.4).

Height adjustable shelves have been set low for the participant where possible, to allow independent access. The research team considered the current requirements for adjustable shelving, albeit distributed throughout the Design Specifications document, calls for a greater proportion of adjustable shelving than was provided at RIPL Project Two. As noted above, the provision of a large undercover carport space has enabled installation of a shed and freestanding shelving undercover, whilst still ensuring a vehicle can be parked with undercover / wet weather access. The vehicle is used for secure storage of large recreational items, including a recumbent bicycle. The current Design Specifications sets out a requirement for lockable storage within car parking (DS s3.1) and also more generally notes TAC client needs for the storage of large equipment (DS s5.6). As noted, the participant in this study is ambulant, and therefore has lesser requirements for equipment storage than might be anticipated in other RIPL sites or for other residents.

### Client Selection

Findings from POE with the participant in this study, coupled with anecdotal reporting from other families and key stakeholders, highlight questions regarding the cost-benefit of tenanting two or three-bedroom units with single occupants. As noted above, there may be a delay in the identification of a tenant via the TAC client base who may wish to return to - or continue - living with family, but with more flexible support. The research team noted that there are trade-offs in both approaches. Provision of a two-bedroom dwelling to a single occupant more flexibly accommodates overnight guests or the development of future partner live-in relationships or child-bearing; however, RIPL Project One demonstrated visitors' accommodation in a one-bedroom unit, prompting further consideration of this point.

Clearly there are some finer issues that might influence decision making for development of a particular site, including the identification of a suitable mix of unit sizes with reference to the TAC client cohort and local planning requirements, bearing in mind stated ambitions of RIPL stakeholders for clients to remain close to locations with which they are familiar, and where social and/or family supports are already in place.

The findings in this project also point to the potential Scheme cost gains that may be harnessed by further considering alternatives to RIPL housing for some individuals, or possible extension to more independent community living. RIPL Project Two lends itself well to the development of a 'neighbourhood network' or 'keyring' support model (Poll, 2007), where a unit could be purchased within a mainstream unit development in close proximity to RIPL Project Two, with staffing support from Project Two outreaching to this additional dwelling.

### Transition Planning

For the participant in this study, transition was reportedly well-planned and seamless and included visits to the new home prior to the tenant's final move. Transition planning has included the opportunity for the participant to review and experience greater choice regarding the type, amount and timing of both disability support and main meals. The participant has had significant input regarding choice and recruitment of disability support staff, particularly those providing targeted one-to-one supports each week. The participant has decided to recruit support staff with skills that will support particular and valued role participation, including gardening. The person's ability to drive their own vehicle has allowed good access in the local and broader community. Transitioning from living with others to living alone has been seen as particularly positive in terms of building privacy and autonomy.

Feedback from key RIPL staff is that for RIPL projects three and four, as part of transition planning, RIPL has moved away from training tenants on assistive technology use prior to the move-in date. Rather, training is now provided to support staff prior to the move, with the support provider then required to undertake initial training with the tenants. Once the residents have transitioned into the new housing, follow up training with tenants delivered by the assistive technology provider, is then offered in the weeks post move. For the participant in this study, new learning appears to be a strength, and the person displayed good ability to independently operate home automation and communication technology. The research group will further examine this new approach to technology training in post occupancy evaluation of RIPL Projects Three and Four.

### **Building Skills and Independence**

Participant findings, coupled with anecdotal reports from other families, has indicated that the accessible design and flexible support accessed via smart home communication systems has decreased reliance on line-of-sight paid supports. Following a transition from shared living with other people with disability to living in one's own home has allowed significant positive changes in relation to privacy, choice (e.g. regarding meal types and timing) and autonomy for the participant in this study. In contrast to participants in RIPL Project One, this tenant has not reported issues with loneliness when living alone. Examining the first year of occupancy with this tenant through POE highlights the significant gains in independence the person has made with adjustment from a block funded, 24-hour shared support model to a more flexible model of support, and staff identified changes in support needs experienced for this tenant, and how they related to an accessible home and community environment and flexible on-call supports.

### **Assistive Technology Design**

The 'mesh' assistive technology system delivered across the units, which allows disconnection of single units in the case of resale, is a positive design step that builds further flexibility in RIPL projects in the view of the research team. However, feedback from the participant and support staff in this study, as well as anecdotal feedback from other families, points to issues with system malfunctions and failures as well as maintenance and response times experienced in the first year of project delivery. Necessary back-up systems have been provided and were reported to offer an alternative, basic system for contacting support staff, and it is reported that maintenance calls for the assistive technology installation have reduced over time. The inclusion of a section within the current RIPL Design Specifications to focus on Assistive Technology in particular, is a very positive addition (DS, s9.7).

Inclusion of building and system maintenance and response time parameters into contractual agreements, and review of reliable data to investigate frequency of such failures by RIPL, may be useful to ensure evidence-based decisions are made regarding system performance. With tenant consent, the back-end server of the home automation and communication technology implemented may provide a rich source of data on actual use (both frequency and type of technology being used in each dwelling) that was sought for this study, but unable to be accessed as a result of system failures. Data collection will rely on an extended study period, and a level of reliability in the home automation and communication system and server data collection processes. This usage data would further inform RIPL and other TAC developments that include home automation, and should be harnessed to further inform this evidence base.

### **Support Model**

The shared support at RIPL Project Two, offered through a flexible on-call model, has been particularly beneficial in building independence and reducing incidental and unnecessary line-of-sight support for this particular participant. As the person has developed routines for community living, support needs have further reduced. This evaluation has highlighted that, for some TAC clients who move to RIPL settings, there is a potential to begin to focus on future transition planning for the next step of community living beyond RIPL. The recent approval by the RIPL board to invest in 'hub and spoke' or 'outreach' models is a useful next step in a 'continuum of accommodation versus a continuum of support' recommended in previous reports to the TAC (O'Brien et al, 2010, p.34).

Specific to RIPL Project Two, there appears some potential to tenant the staff support unit and thus increase the tenancy rates and cost-benefit of RIPL Project Two. Such a proposal would require close consideration in relation to both the physical support needs of a potential new tenant in this two storey unit, and any additional costs of refit. The privacy of information regarding other tenants held in the staff support space would also need to be considered. Ensuring that this information is stored and discussed in a secure and private manner would be a key consideration.



Australian Rehabilitation & Assistive Technology Association (2012). ARATA NDIS Policy Statement: Assistive Technology within the NDIS. Australia: Author.

Australian Institute of Health and Welfare (2007). Disability in Australia: Acquired brain injury. Canberra, ACT: Author.

Bordass, B. & Leaman, A. (2005). Phase 5: Occupancy - Post-occupancy evaluation. In W. Preiser & J. Vischer (Eds.), *Assessing Building Performance*. Burlington, MA: Elsevier Butterworth-Heinemann.

Callaway, L., Tregloan, K., Williams, G., & Clark, R. (2016). Evaluating access and mobility within a new model of supported housing for people with neurotrauma: A pilot study. *Brain Impairment*, 1-13.

Ching, F. (2007). *Architecture: Form, Space and Order* (3 ed.). Hoboken, NJ: John Wiley.

Cross, N. (2007). *Designerly Ways of Knowing* (1st ed.). Basel: Birkhauser Verlag AG.

Demers, L., Weiss-Lambro, R., & Ska, B. (2000). Quebec User Evaluation of Satisfaction with Assistive Technology (QUEST Version 2.0) – An Outcome Measure for Assistive Technology Devices. In I. f. M. P. Technology (Ed.): Webster.

Dorst, K., & Cross, N. (2001). Creativity in the design process: co-evolution of problem-solution. *Design Studies*, 22, 425-437.

Fisher, G., & Kayhan, E. (2012). Developing the Residential Environment Impact Survey Instruments Through Faculty–Practitioner Collaboration. *Occupational Therapy In Health Care*, 26(4), 224-239.

Friedmann, A., Zimring, C., & Zube, E. (1978). *Environmental Design Evaluation*. New York: Plenum Press.

Goldschmidt, G. (1991). The dialectics of sketching. *Creativity Research Journal*, 4(2), 123-143.

Hadjri, K. & Crozier, C. (2009). Post-occupancy evaluation: purpose, benefits and barriers. *Facilities*, 27(1/2), 21-33.

Jutai, J. & Day, H. (2002). Psychosocial Impact of Assistive Devices Scale (PIADS). *Technology and Disability*, 14(3), 107-111.

Koskinen, I., Zimmerman, J., Binder, T., Redstrom, J., & Wensveen, S. (2011). *Design Research Through Practice: From the lab, field and showroom*. Waltham, MA: Elsevier.

- Krefting, L. (1991). Rigor in Qualitative Research: The Assessment of Trustworthiness. *The American Journal of Occupational Therapy*, 45(3), 214 - 222.
- Lawson, B. (2004). Schemata, gambits and precedent: Some factors in design expertise. *Design Studies*, 25, 443-457.
- Lawson, B. (2006). *A model of design problems How Designers Think - the Design Process Demystified* (4 ed., pp. 83-111). Oxford: Elsevier.
- McMurtrie, R. J. (2012). Feeling space dynamically: variable interpersonal meanings in high-rise apartment complexes. *Visual Communication*, 11, 511-534. doi: 10.1177/1470357212454099
- Moraes Zarzar, K. (2008). The Use of Architectural Precedents in Creative Design. In K. Moraes Zarzar & A. Guney (Eds.), *Understanding Meaningful Environments : Architectural Precedents and the Question of Identity in Creative Design* (Vol. 4). Amsterdam: IOS Press BV.
- O'Brien, P., Pryor, J., Harman, A., Rivas, M., & Nicholl, B. (2010). Innovative models, housing design and home modification for people with acquired brain injury: A literature review and environmental scan. Sydney, Australia: University of Sydney, Centre for Disability Studies.
- Poll, C. (2007). Chapter 4 - Co-production in supported housing: keyring living support networks and neighbourhood networks. In S. Hunter & P. Ritchie (Eds.), *Co-production and personalisation in social care: changing relationships in the provision of social care* (pp. 49-66). London, UK: Jessica Kingsley Publishers.
- Poon, J. & Maher, M. L. (1997). Co-evolution and emergence in design. *Artificial Intelligence in Engineering*, 11, 319 - 327.
- Preiser, W. & Vischer, J. (2005). *Assessing Building Performance*. Burlington, MA: Elsevier Butterworth Heinemann.
- Rittel, H. & Webber, M. (1973). Dilemmas in a General Theory of Planning. *Policy Sciences*, 4, 155 - 169.
- McCuskey Shepley, M. (2011). Research Methods for Design Practitioners To Evaluate Facilities. *HERD*, 4(3), 7-13.
- Stenglin, M. (2009). Space Odyssey: towards a social semiotic model of three-dimensional space. *Visual Communication*, 8, 35-64.
- Transport Accident Commission (2011). *TAC 2015 Independence: Accommodation Strategy Project*. Victoria, Australia: Author.

- Transport Accident Commission (2015a). Residential Independence Pty Ltd: Design Background (version 5.1). Melbourne, Australia: Transport Accident Commission.
- Transport Accident Commission (2015b). Residential Independence Pty Ltd: Design Specifications (version 5.0). Melbourne, Australia: Transport Accident Commission.
- Transport Accident Commission (2016). Residential Independence project. Melbourne, Australia: Author. Accessed on 8 April 2016 via <http://www.tac.vic.gov.au/clients/home-and-family/about-the-ripl-project>
- Trelgoan, K., Callaway, L., Meyer, B., Wood, R., & Ianello, N. (2014a). RIPL Project One: Post-occupancy built and technology design evaluation. Melbourne, Australia: Institute for Safety, Compensation and Recovery Research.
- Tregloan, K., Callaway, L., Meyer, B., Wood, R., & Ianello, N. (2014b). Learning from hindsight: Experience-centred evaluation of a new supported accommodation environment. Situation Symposium & Exhibition. Retrieved from <http://idea-edu.com/symposiums/2014-situation/situation-online-publication/>
- University of Illinois Board of Trustees. (2014a). MOHO Web: REIS. Retrieved 4 January, 2014, from <http://www.cade.uic.edu/moho/productDetails.aspx?aid=36><http://www.cade.uic.edu/moho/productDetails.aspx?aid=36>
- University of Illinois Board of Trustees. (2014b). MOHO Web: REIS-SF Retrieved 4 January, 2014, from <http://www.cade.uic.edu/moho/productDetails.aspx?aid=45><http://www.cade.uic.edu/moho/productDetails.aspx?aid=45>
- van Leeuwen, C., Post, M., van Asbeck, F., Bongers-Janssen, M., van der Woude, L., de Groot, S. et al. (2012). Life satisfaction in people with spinal cord injury during the first five years after discharge from inpatient rehabilitation. *Disability & Rehabilitation*, 34, 76–83.
- Visser, W. (2010). Visser: Design as Construction of Representations. *Art + Design & Psychology*, 2, 29-43.
- White, C (1986). Post occupancy evaluation. *CEFP Journal*, 24(6), 19-22.
- World Health Organisation (1995). Standards for surveillance of neurotrauma. Accessed via: [https://www.who.int/hq/1996/WHO\\_EHA\\_SPI\\_96.1.pdf](https://www.who.int/hq/1996/WHO_EHA_SPI_96.1.pdf)
- Zimring, C. M., & Reizenstein, J. E. (1980). Post-Occupancy Evaluation: An Overview. *Environment and Behaviour*, 12(4), 429-450.

Interviews will be semi-structured in nature and will cover the following topic areas:

**Pre-Project preparation:**

- Project background + inception
- Procurement processes
  - o Involvement of architects / other consultants (incl tech)
- Design Objectives ... Criteria review

- o Initial involvement in and contributions;
- o Relevant experience of organisation / individuals;
- o Preparations undertaken.

**Production:**

- Translation
  - o Identified Criteria to Built Outcome;
  - o Identified Criteria to installed Assistive Technologies;
  - o Design Brief to Final Documentation (Compromise / Variation);

PAGE



## - Translation (continued)

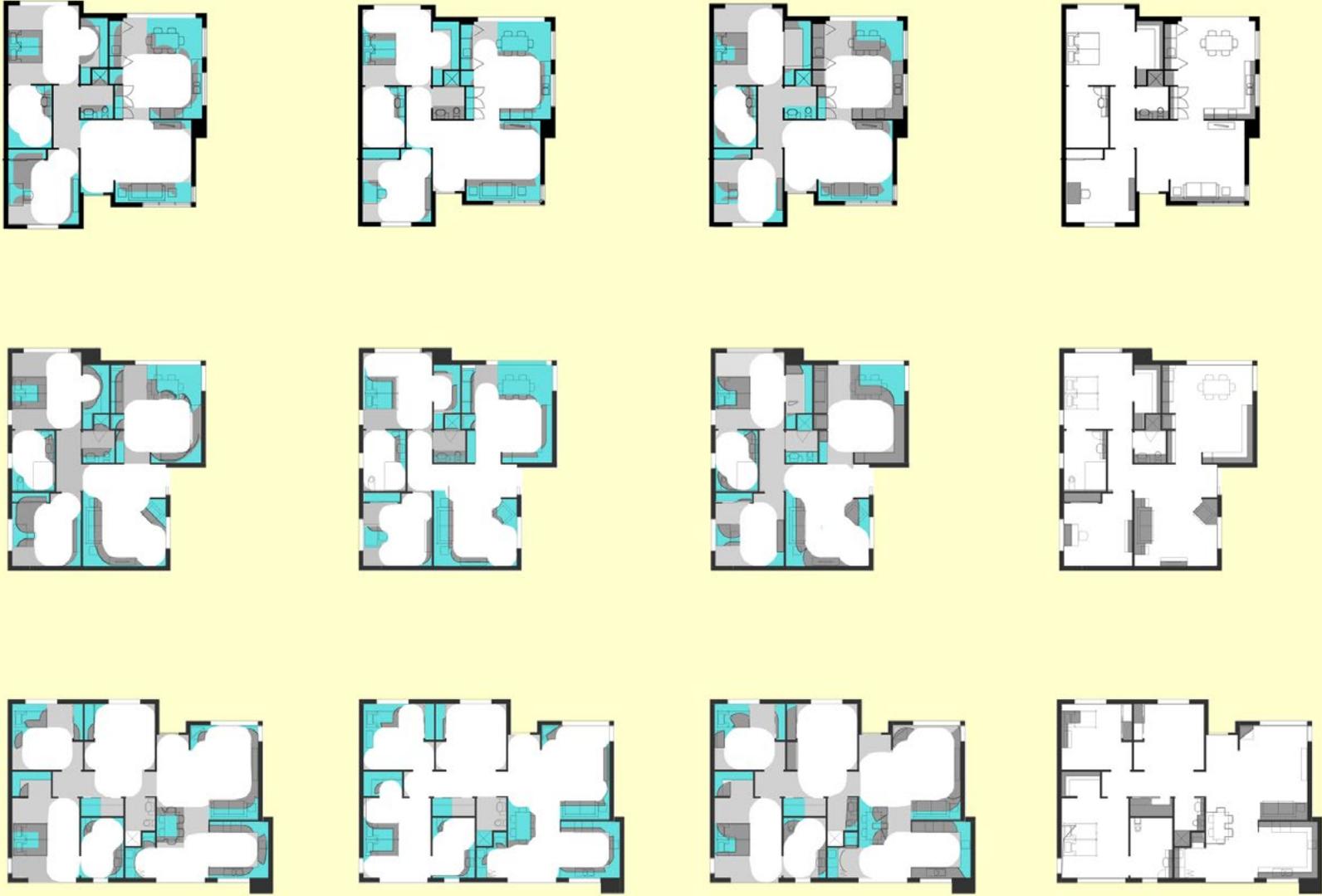
- o Identified deliverables and requirements;
- o Impact of legislation or other factors on the brief / task;
- o Organisation's expectations re clients, carers and support providers;
- o Further investigations, data collection;
- o Processes and development;
- o Changes to deliverables or expectations;

### **Project Outcome:**

- Early observations of occupation by clients
  - o Resulting alterations / amendments to the built space;
  - o Strengths and weaknesses from the participant's perspective;
  - o Timeline to completion.



# PROJECTIVE DIAGRAMS - PHYSICAL ACCESS



PAGE >

- White box: 360 Degree Movement Possible
- Grey box: Forwards and Backwards Movement Possible
- Dark grey box: Reach Only
- Teal box: No Access



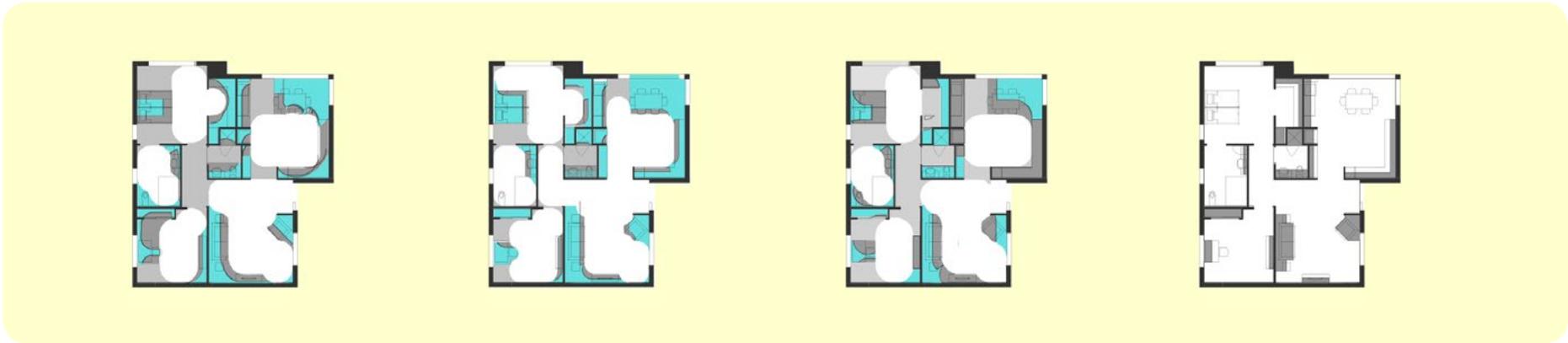
### Projective Diagrams - Degrees of Physical Access

The research team developed a new methodology at RIPL Project Two, developing projective diagrams of Degrees of Physical Access of a range of potential future tenants. This approach offered a means to review RIPL Project Two unit designs using research findings from the POE of RIPL Projects One and Two. As noted in the methodology section, the focus of the E-EEF is on the experience of residents evaluated against the criteria identified through Phase One of the RIPL Project One study, and refined in further studies. While the research team could not review residents' experiences and perspectives in spaces they did not inhabit, valuable findings are still available by considering implications of physical access for a range of example tenants. Measures of physical access were based on 'comfortable reach' findings from Projects One and Two. The development of Projective Diagrams - Degrees of Physical Access therefore drew on data collected from all study participants to date, in order to consider issues for residents with differing physical needs and abilities who may inhabit these designed environments.

Consistent with the Degrees of Physical Access in the homes actually occupied by residents, and noted there, the representations were produced on the basis of measurement of "comfortable reach on a forward path of travel". "Comfortable reach" was defined by the research group as the ability of a person to reach without strain or strenuous movement whilst seated on their main mobility device (i.e., preferred wheelchair) across several planes (up, down, left, right), or short-term standing where the person was able to do so (Trelgoan et al., 2014). In the production of these mappings, virtual blocks were created to represent relevant dimensions and radii of reach to inform the placement of fills and curves. These representations should be understood to demonstrate the minimum of 'usual' access.

These Projective Diagrams cannot anticipate the changes and priorities each resident may choose to make in another environment, including the subtle manipulations of assistive devices to reach or manoeuvre within the home environment, or customisations of environments and their furnishing to support individual inhabitation. The standard furnishing arrangements presented in design drawings were therefore used for this projection analysis, noting that these inform the location of many fittings and fixtures of the home as required by the current version of the RIPL brief. These include detail within the RIPL Design Specifications (s9.2-9.5) electrical power outlets and data and phone points, as well as lighting installations. The location of these fittings and fixtures, in turn, influence furnishing decisions by subsequent inhabitants. For these reasons, the Projective Diagrams are not presented as large scale plans, but rather as a matrix of diagrams that are most useful as comparisons rather than detailed descriptions.





- 360 Degree Movement Possible
- Forwards and Backwards Movement Possible
- Reach Only
- No Access

**HORIZONTAL ROWS – projected degrees of physical access for various individuals in the same unit types**

Projection diagrams in the horizontal rows demonstrate the differences in projected access based on comfortable reach of varied residents, in the same unit design. Example Tenant A's differing reach on each side is demonstrated, as is Example Tenant B's restricted extent of reach at benches and other obstacles. Example Tenant C's ability to access some items while standing and front facing, but differing reach by side when seated in a wheelchair, is shown, as is the challenge of reaching high levels for Example Tenant D.

As noted in the discussion below, the location of furnishings as well as the spatial layout of a unit has particular implications for different projections of access for each of the example tenants represented in these diagrams. It points to the significance of active preparation for the individual differences and challenges experienced by TAC clients in this group, but also the opportunities for decision making about furnishings and customisation to impact on resident independence.



**VERTICAL COLUMNS – degrees of physical access for an individual in different unit types**

Projection diagrams viewed by vertical column demonstrate the differences in projected access based on unit design for a single resident. These representations demonstrate the consistency with which a given furniture items presents a barrier or otherwise to a specific resident, but also the differences implied by unit design. The degrees of reach or access across the dining table, or across a bed, are consistent in each case as might be expected.

The location of the furnishings in each of the units has an impact on the proportion of unit area each resident is able to access. Placement of a dining table in the corner of units 1 and 2 significantly restricts access for most residents, while its placement along a wall in a space with significant surrounding room to manoeuvre allows access from three sides.

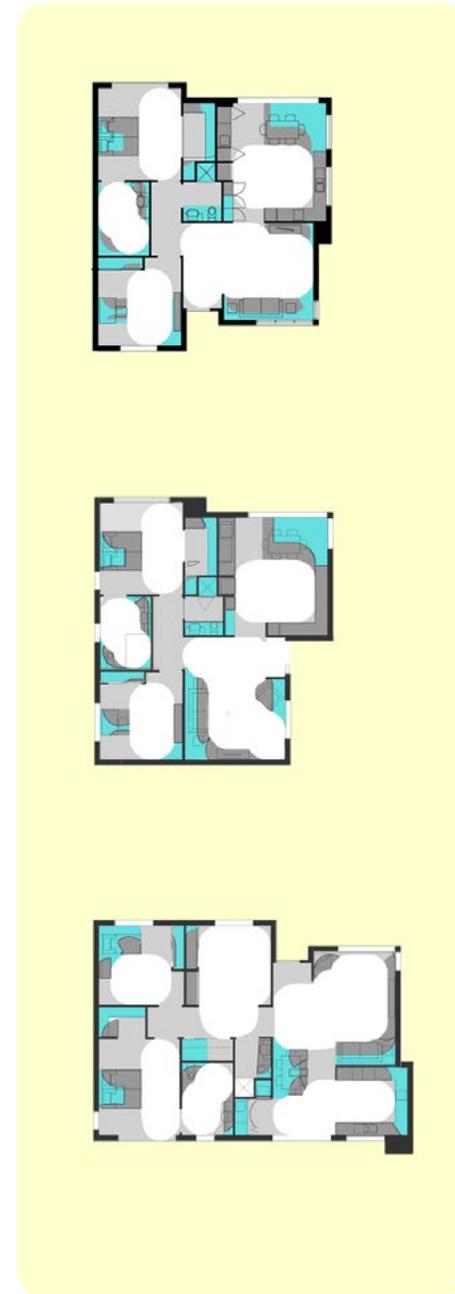
A similar issue is demonstrated through analysis of projecting fixed walls or wall returns into the spaces. This has implications for access into corners, and is particularly relevant where joinery or purpose built spaces such as laundries are located within a defined and contained zone. The same challenges can be observed at the internal corners of kitchen joinery installations.

At the other extreme, location of a large (e.g. double or queen) bed in the centre of a room means that most residents' access is limited over that area, and circulation around the bed limited to forward and back motion only within the boundaries of the walls. The smaller bed located in the corner of unit 3 allows more flexibility of movement, and 360 degree turning over much of that area, for most residents.

The combination of these issues can be observed at the removal of walls in the third and unfurnished bedroom of unit 3. This offers all projected inhabitants the most access to the space, as well as the hallway behind. The same limitations of access noted above can be observed within the storage space contained in that room, as mapped for each projected resident.

While the provision of large completely empty spaces clearly may not offer residents the utility they will need in a home, the study does raise a question as to whether larger open and flexible use spaces may offer more functional and accessible space than a series of defined use rooms with a connecting corridor. This is relevant to the discussion considering Home-like appearance vs Functional Effectiveness in the Recommendations.

-  360 Degree Movement Possible
-  Forwards and Backwards Movement Possible
-  Reach Only
-  No Access



This project is funded by the Transport Accident Commission, through the Institute for Safety, Compensation and Recovery Research.

April 2016

