Elements and Systems

04

Children interact with elements and systems in an intense manner, through playing, running, crawling, lying on the floor, and investigating their world. Therefore, these must be carefully considered as part of a Universally Designed Early Learning and Care setting.

Snapshots

A selection of images taken by the children from across the case study settings.

Elements and Systems: Overall Design Issues

The elements and systems of an Early Learning and Care (ELC) setting range from building materials and finishes, to natural and artificial light, heating and ventilation, down to fittings and technology. These elements and systems often provide the most hands-on aspect of the environment, inside and outside, and will directly influence a child's experience of a setting.

When designing the elements and systems in an ELC setting, consider the Key Design Issues as framed by the selected **Síolta Standards** (See **Introduction page 16**):

	Rights of the Child	Provide an inclusive, calm and gently stimulating environment that supports all children through building materials, fit-out elements or technology.
	Parents and Families	Fit-out, internal environment, and technology that create a welcoming and supportive setting for parents and families regardless of age, size, ability or disability.
	Interactions	Doors, windows, furniture and fittings that promote and support positive interactions between children, families and ELC practitioners.
	Play	When thinking about elements and systems consider how all the detailed aspects of a building can come together to create an exciting, stimulating and playful setting for all children.
	Professional Practice	A calm, accessible internal environment along with carefully selected assistive technology will support Professional Practice.
	Community Involvement	Windows, doors, exterior finishes, and signage to make the setting visible and integrated in the community. Unobtrusive security measures to strike a balance between a safe setting and a welcoming and friendly one.

4.1 Building Construction, Materials and Finishes

↘ 01 Naíonra Choill Mhic Thomasín, Waterford.

Design features

- The 'Crannóg' (circular children's room with a low ceiling) with soft cushions providing relaxing space.
- Low level circular windows providing view to outside at a child's level.

Design considerations and awareness

A key concern for UD is that buildings are flexible and adaptable to meet user needs over time. Examples of this include the provision of a 'soft spot' where a section of a wall or floor is framed or structurally supported so it can be removed to create a new opening without affecting the overall structure. Or the provision of load bearing structures in strategic locations to allow future fixing of handrails, grab-rails, or hoists if they are required.

For an ELC setting it is important that the site layout and building position can facilitate growth and extension, while flexible internal layouts allow evolution over time. Everyday flexibility is also required to create spaces for different age-groups, and to create varying atmospheres. Large open spaces with moveable elements such as double doors or sliding partitions can be useful. Partitions should extend to the ceiling so that when they are closed they form a good acoustic barrier between adjacent spaces.

↘ 02 **Tigers Childcare, Blanchardstown, Dublin.**

Design features

- Large double doors between rooms providing the flexibility to combine spaces for certain activities and enable children of mixed ages to play together.

Design tip

- Minimise change in floor colour or colour contrast to avoid causing confusing or disorientation for people with cognitive and visual difficulties who may interpret the colour change as a step (see arrow).
- Furniture can be arranged to ensure that when the connecting doors are open there is no obstruction (see arrow).

Technical sketch 1: Indicative floor plan showing expansion, adaptability and flexibility features.
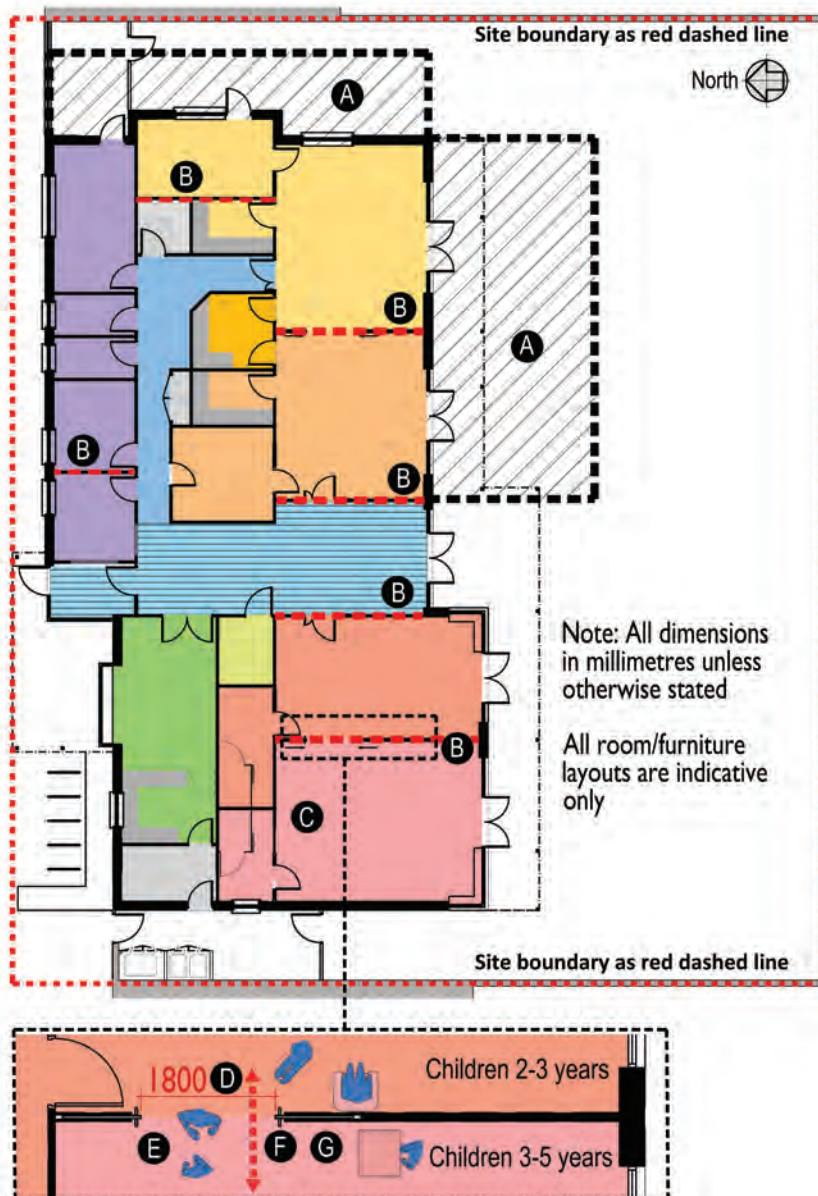
A   Space on site to expand if required.

B   Non-load bearing internal walls that can be removed to combine spaces or that can be replaced with moveable partitions.

C   Large sliding doors providing the option to open up or close off rooms as required.

D   Large 1800mm opening between rooms.

E   Sliding doors that can be opened or closed as needed.

F   Doors stops keeps handles a minimum of 50mm from the edge of the door opening.

G   Sliding doors that slide into a cavity will not compromise the wall space either side and will allow shelving, seating or other objects to be placed directly against the wall.

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Universal Design Guidance

- Where possible provide expansion space onsite to allow building footprint to extend when required.

- Provide load bearing structures such as steel beams or concrete columns that create wide span ceilings or floors without the need for supports such as columns or internal walls. This will allow flexible internal layouts or moveable partitions as required.

- Any partitions used to create separate spaces should extend to the ceiling so that when they are closed they form a good acoustic barrier between the adjacent spaces.

- Provide load bearing wall structures such as concrete blockwork or doubled studwork in strategic locations to allow retrofitting or handrails, grabrails, hoists, or other elements that require strengthening to take the weight of a child or adult.

Material and Finishes

Design considerations and awareness

Children explore and interpret their world in a multisensorial manner. Considering that the materials and finishes used in any space greatly influence our sensory experience, it is critical that the materials and finishes in an ELC setting are carefully chosen in terms of light, reflection, colour, acoustic properties, microclimatic conditions, and tactile effects.

↘ 03 Asilo Nido La Chiocciola, San Miniato, Italy.

Design features

- **Natural materials and subtle use of colour creates a calm environment.**

Balancing visual stimulation

The materials and finishes in a setting influence the visual environment for all users and in turn impact sensory stimulation, attention and distraction. This is particularly important for young children who naturally experience high levels of distraction and those who are acutely sensitive to their environment.

While many ELC settings are quite colourful and visually busy, a different approach is promoted by approaches such as the **Montessori, Reggio Emilia** and **San Miniato**. A more controlled and carefully curated visual environment is a key part of these philosophies. This is supported by research findings showing that multiple displays and materials can distract children, while a visually calmer environment may better support learning. An appropriate level of stimulation is recommended, this avoids the excessive use of bright colours and visual complexity that may overstimulate children.

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The appropriate level of stimulation is an important factor when designing for environments supportive of children with autism. The widely held consensus is that a calm, uncluttered and carefully structured environment will provide the sensory-attuned setting a child with autism requires. At the same time, it is important to avoid under stimulation, which research shows can be as negative as overstimulation.

To achieve a balanced approach to visual stimulation, careful attention should be paid to the selection of colours, bright or complex finishes and display materials. This applies to furniture, toys, and indoor and outdoor play equipment. It can be argued that this balanced approach to sensory stimulation reinforces the commonalities rather than the differences between the needs of various children.
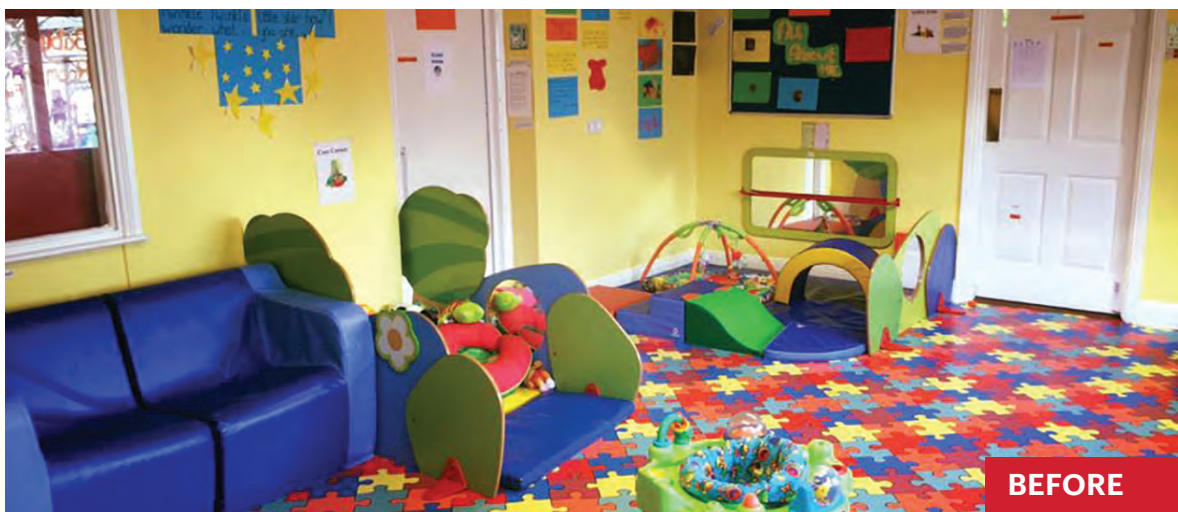
BEFORE

AFTER

↘ 04 High Care Childcare, Ballincollig, County Cork.

Design features

• In the before photo there is excessive use of primary colours and distracting patterns. In the after photo, the colours are neutral, patterns are removed, and the atmosphere is calmer and less over-stimulating.

Surface reflectance and patterns

Surface reflectance and the use of patterns or surface designs, both interior and exterior, can have a negative impact on many people. Excessive light reflection due to sunlight or artificial light can be problematic for people who are hyper-sensitive to light. Strong floor patterns or floor finishes with complex designs can also cause distraction, over-stimulation, and spatial confusion for many people.

↘ 05 Fuji Montessori Kindergarten, Tokyo, Japan.

Design features

- The ground surface of the roof terrace is finished with natural timber decking that is non-slip, non-glare and non-reflective. This helps to create a calm and visually uncluttered environment.
- The guard rails consist of vertical bars that allow children a good view from the roof deck while not being climbable.

Design tip

- Decking can be become quite slippery when wet and over time and requires regular maintenance to ensure its safety.

Colour

The impact and perception of colour depends on culture, context, gender and various other factors. For people generally, personal colour preference and preferred levels of illuminance have also been found to influence user perceptions of colour. Research regarding the impact of colour on children with autism, for example, varies greatly and has been shown to depend on the child's preferences. Similarly conditions such as **Attention Deficit Hyperactivity Disorder (ADHD)** can result in difficulties with visual functions such as depth perception, peripheral vision, and visual processing speed. People with ADHD may also experience colour perception difficulties with blue and yellow colours.

While the exact reason for this is still unclear, deficiencies in the central nervous system associated with ADHD are a possible cause.

⬅ For information about autism and ADHD see **www.hse.ie/eng/health/az/**

Colour is a very complex issue but there are some broad recommendations that should be considered as part of UD approach and these are outlined below in the following sections.

A subtle and calm approach to colour: Colour should be used carefully to create a harmonious environment, while stronger accent colours can be used to define certain areas or provide visual cues and identify landmarks. Striking the balance between understimulation and overstimulation is a challenge, but this balance is critical to a supportive environment for children.

↘ 06 Mallow Community Childcare, County Cork.

Design features

- Neutral background colours used on the walls and floor create a calm environment that is punctuated by a limited number of bright colours.
- Windows are fitted with safety restrictors that limit the opening of the window section to 100mm.

⬊ 07 High Care Childcare, Ballincollig, County Cork.

Design features

- Combination of neutral background colours and selected bright colours create a balanced and calm visual environment.

Design tip

- Ensure fabric used in this way is fire repellent.
- Bare concrete walls visible from children's rooms can be brightened up by painting them, adding planting, or using them as areas that children can draw on with chalk when they are outside.

Colour for wayfinding and orientation: Colour can play an important role in wayfinding and orientation for young children in the ELC environment. The use of distinct colours to create visual landmarks has been shown to help children understand where they are and to find their way around.

The use of colour to create landmarks and visual orientation nodes is also effective for children with autism where hypersensitivity or an inability to understand typical wayfinding symbols may cause disorientation or anxiety. This is particularly relevant in larger settings or settings where children have the freedom to move about independently.

Colour and emotional or physiological impact: There is a lack of consensus regarding the emotional or physiological impact of colour, some experts cautiously suggest the following colour implications for people of all ages.

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Red is a warm colour, believed to be stimulating. It increases perceived room temperatures and decreases the perceived size of a room (the opposite to blue). The use of red is also linked with higher blood pressure and an increased sense of smell.

Orange is a warm colour, strongly associated with nature and earthiness. It is also associated with cheerfulness and the sun.

Pink has been shown in certain cases to decrease aggression and overall is perceived as a relaxing and calming colour.

Yellow is a highly visible colour with strong communication qualities. It is believed to be a restful colour that increases perceived room size. It is typically associated with clarity, optimism and the sun.

Blue is a cool colour believed to be restful and calming which decreases perceived room temperatures and increases the perceived size of a room. In some cultures, it represents tranquility, wisdom, an awakening or transition to another world or state of mind.

Green is a cool colour believed to be very restful and increases the perceived size of a room. It is also strongly associated with nature, and represents freshness, growth, harmony and balance.

Colour is very subjective, and will be perceived differently depending on age, gender, culture, and contextual influences such as location, lighting conditions, time of day, season, or indeed fashion.

↘ 08 Asilo Nido La Chiocciola, San Miniato, Italy.
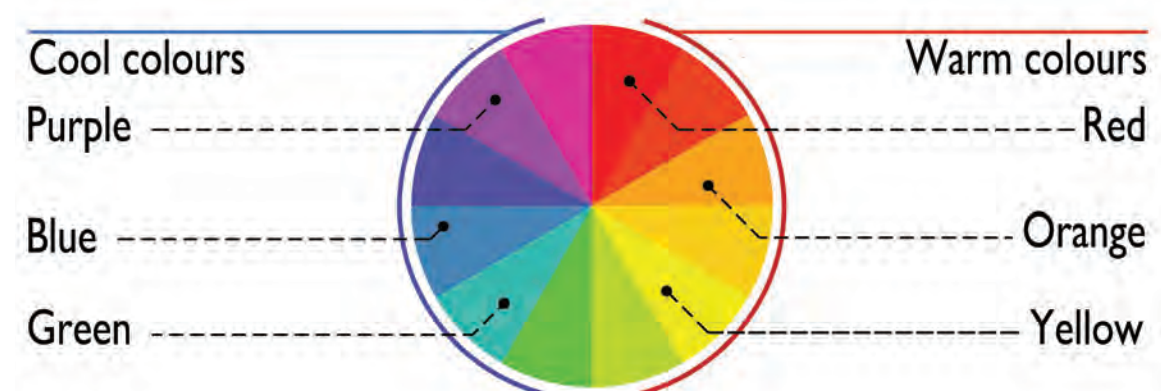
Design features

- A calm palette of colours using natural timber, white paint, and a panel of yellow in the background.

↘ 09 Beginnings Creche, Mahon, Cork.

Design features

- Neutral background colours combined with a small number of colourful items such as the cushions and rug create a calm but interesting space.

Design tip

- Ensure rugs are secured so they do not present a trip hazard.

Internal surfaces

Floors: Small children spend most of their time on the floor and therefore a suitable floor finish is crucial. Certain areas will require waterproof and anti-slip (at least R10 slip resistance) finishes such as linoleum or vinyl floor covering, while rest areas will require softer, more comforting materials such as soft mats or carpets. Balancing interesting and natural floor finishes with safety, maintenance and cleanability is a challenge and must be carefully considered to ensure materials provide the multisensory qualities critical to the ELC setting. Floor colours and patterns can affect how a person perceives a space. The use of sharp colour or tonal contrast in flooring can be perceived as a step or a hole by people with visual or perceptual difficulties. Blocks of contrasting colour or tone, or the use of strong floor patterns can be misinterpreted as objects on the floor, this can cause a person to step over them or side step, and may result in a fall.

Surface reflectance and patterns have already been discussed on **page 226** as a potential source or disorientation and spatial confusion, or distraction and over-stimulation, so these issues must be carefully considered in relation to floor finishes.

↘ 10 Ballindereen Community Childcare and Education Centre, Ballinderreen, County Galway.

Design features

• Hard wearing, non-slip, and non-glare vinyl floor that avoids patterns.

↘ 11 Ballindereen Community Childcare and Education Centre, Ballinderreen, County Galway.

Design features

- Soft carpet used to create a cosy seating corner for reading or relaxing.
- This space is at a mezzanine level, so gives children a different view to the outside space.

Internal walls: In a similar way to floors, the lower sections of walls are an important part of a child's environment and must strike a balance between sensory stimulation, safety and maintenance. Walls provide the main display area in the ELC setting and should be constructed and finished with robust materials to handle a high level of wear and tear. While display boards will provide dedicated areas for mounting various artwork and photographs all walls should take art creations of some sort. Walls should be painted in a wipe-clean finish. Use contrasting colours on walls, skirting boards and architrave to make the difference between doors, walls and floors visible. Blackboard paint can be used in some areas, so children can draw on this surface.

↘ 12 Naíonra Choill Mhic Thomasín, County Waterford.

Design features

- Walls used to pin up various artwork and photographs of the children.
- Sofa, bookshelf, and carpet used to create a cosy corner.

↘ 13 Northside Family Resource Centre, Ballynanty, Limerick City.

Design features

- A mix of materials used on internal walls including timber cladding (left) and brick (right) provide variety and visual interest within the setting.
- Distinct internal finishes can be used to create a sense of place and distinguish one room or space from another. This can help to orientate people within the setting and aid wayfinding.

↘ 14 Cheeky Cherubs, Ballincollig, County Cork.

Design features

- A tree branch hanging from the ceiling. This demonstrates the various elements that may get suspended from ceilings within a typical setting.

Design tip

- For features like this which may be a fire hazard, treat with fire retardant, clear intumescent paint or similar.

Ceilings: The ceiling within the early years setting should be of a colour that creates a sense of space, is easily maintained, and constructed using materials that will support hanging mobiles and other objects. It is important not to suspend too many materials from the ceiling, to avoid over-stimulation. Materials suspended from the ceiling must be fire retardant.

Universal Design Guidance

- Floor surfaces should reflect the activity in that area (waterproof for messy work or art areas, calm or cosy finishes using carpet or similar soft material for quiet area).
- Floor finishes should be non-slip (at least R10 slip resistance), non-glare materials that avoid strong patterns and sharp tonal or colour contrast.
- All walls should be constructed and finished with robust materials to handle a high level of wear and tear. Provide load bearing wall structures: such as blockwork or double stud partitions in strategic locations to allow fixing of handrails, shelves or other elements if required.
- Use ceiling materials that will support hanging mobiles and other objects. Where suspended ceilings are used the metal frame can help in this regard. In other situations, consider load bearing ceiling structures in strategic locations to allow fixing of hoists, hanging toys or mobiles, or other elements if required.
- Materials suspended from the ceiling must be fire retardant.

4.2 **Fit-Out Elements**

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Overall design considerations and awareness

The fit-out elements of an ELC setting are an important aspect of a child's multi-sensory environment and should be carefully considered as part of their sensory development and education. Windows and doors emit light, provide views and access to the outside world, while children interact with various fittings such as taps, or cupboard handles with great intensity.

These fit-out elements are an important part of how the child explores the environment and they play an important role in children's development through building competencies and acquiring everyday skills. While safety is obviously a major concern, the environment should not be sanitised to such an extent that children are disengaged or overprotected.

↘ 15 Le Chéile Family Resource Centre, Mallow, County Cork.

Design features

- Neutral colour, non-slip and non-glare flooring avoids distracting patterns.
- Good colour contrast between tables and floor help with visibility.
- The floor finish allows for easy use of mobility aids.

↘ 16 Benbulben Creche, Sligo Town, County Sligo.

Design features

- Double doors leading from the lobby into the building providing easy access for wide buggies or the movement of furniture or large objects.
- Glazed doors providing good visibility and supervision.

Design tip

- Stainless steel door handles may be uncomfortable to use for some users.
- Avoid over-using doors and windows for displays as the benefit of the glass panels can be lost.
- Doors picked out in contrasting colour from surrounding frame would make them easier to see and use (see arrows).

Doors

Design considerations and awareness

All users in the ELC setting will interact with doors and door handles everyday. From using the main entrance door, to entering a children's room or a toilet, the accessibility, ease of understanding and usability of these elements is critical.

Wide door openings, or double doors at the entrance and key circulation areas will facilitate buggies and wheelchairs and will help parents and guardians who are arriving or departing with more than one child, or when carrying child-related equipment. This will particularly help at peak times. Security is an important consideration for entrance doors and the design of these doors should balance accessibility with controlled entry and exit for authorised persons.

⟶ See **Section 4.4** for Safety and Security Systems.

In some internal locations the installation of 'Cat-and-Kitten' type doors (door-and-a-half) or double doors will help with movement inside the setting.

04

↘ 17 Cat-and-Kitten door, Le Cheile Family Resource Centre, Mallow, County Cork.

Design features

- Cat-and-Kitten doors providing wider access routes if required.
- The glazed panel allows a person to see if there is a child behind the door and allows the child a view out to the corridor beyond.

Door handles: Lever handles should be used rather than round or oval door knobs as many children and adults find these hard to use. Certain door handles, and controls must be out of reach for small children, therefore, the location and operation of these must be carefully considered in terms of UD.
For instance, **Technical Guidance Document M 2010 of the Building Regulations (Part M)** recommends that door handles should be located between 800mm and 1200mm above floor level, however, many ELC settings will locate handles above this height for safety reasons. While being cognisant of security, certain doors such as toilets should be operable by children. Consideration should be given to the fact that successfully opening and closing doors is an important part of any child's development.

Doors that use colour or tonal contrast to stand out from the background will provide good visual contrast and make these doors more visible and easier to identify.

↘ 18 Lever arm door handles and pull handles.

Design features

- Left image: Lever arm door handle with the ends turned. This prevents clothes getting snagged and reduces the risk of a child banging their head.
- Right image: Large format vertical pull handle that is easy to grasp and contrasts visually with the background.

Design tip

- Stainless steel door handles may be uncomfortable to use for some users.

↘ 19 WC door handles and locks.

Design features

- Left image: Large format thumb turn lock on a WC cubicle door that is easy to see and use. Door knob (to the right of lock) is for pushing/pulling the door only and does not require turning.
- Right image: Lever arm WC lock (below main handle) that is easy to understand as it operates in the same way as the main door handle. The lever arm lock is also easy to turn.

Design tip

- Plastic-coated door handles/locks are more comfortable to touch compared to steel.

↘ **20** Tigers Childcare, Blanchardstown, Dublin.

Design features

- Low level glazing in doors enabling children to both see and be seen through the panels.
- Good colour contrast between the door frame/architrave and the door and wall makes the door more visible.
- Lever arm handles that are easy to use. The ends of these are also turned in to prevent clothing getting snagged.

Design tip

- Better colour contrast between the doors and the floor would improve visibility.

Glazing panels: The use of glazed doors, or vision panels within doors that extend down to approximately 300mm from the floor, or separate/additional low-level vision panels will allow an approaching person to see if a child is behind the door.

It also gives small children a view out of the space to areas of interest or activity beyond. Where extensive areas of glazing are provided the glass should be marked with a permanent manifestation that contrasts visually with the background. **All glass should be safety rated and fire resistant.**

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↘ 21 Northside Family Resource Centre, Ballynanty, Limerick City.

Design features

- **Low level glazing panel allowing a person to see if there is a child behind the door but also allowing the child a view out through the door.**

Finger protection: Finger protection door guards should be considered for parts of the setting where children spend a lot of time. These are fitted on the hinge side of the door to prevent children getting their fingers and hands caught in this part of the door. These guards can be fitted to front and back of the door (i.e. the door jamb side and the hinge side) to make sure the door is safe on both sides.

Low level gates: In certain locations within a setting, for instance in open plan areas for infants or young toddlers, low-level gates are often used to keep children safely within these areas. The locking mechanisms on these gates should be easy to locate and use for appropriate staff. Given the height of these gates they may not always be clearly visible. Colour or tonal contrast can be used to make these gates more visible and avoid creating a potential trip hazard.

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↘ 22 Tigers Childcare, Blanchardstown, Dublin.

Design features

- Low level gate to prevent children from leaving the area.
- The glazed panel allows a person to see if there is a child behind the gate but also allows the child a view out to the space beyond.

Design tip

- Colour or tonal contrast can be used on low-level gates to make sure they are clearly visible and do not present a trip hazard.
- Ensure any gap under doors such as this are too small to allow a child roll under the door.
- Ensure safety glass is used for all low-level glazing.

Safety barriers and stair gates: Where safety barriers enclose a space or are used at the top or bottom of stairs the following should be considered:

- Safety barriers are typically suitable for children up to 24 months. All openings or spaces in the gate should be less that 65mm, including the space between the bottom of the gate and the floor.
- There should be no structure or part of the gate that gives a child a foothold for climbing.
- There should be no holes or openings that could trap or hurt the fingers of a child.
- There should be no sharp edges or protrusions which could catch on clothing or hurt a child.
- To open the gate two consecutive actions or two separate but simultaneous actions should be required to prevent a child opening the gate.
- Avoid gates with a bottom threshold as this will be a trip hazard.

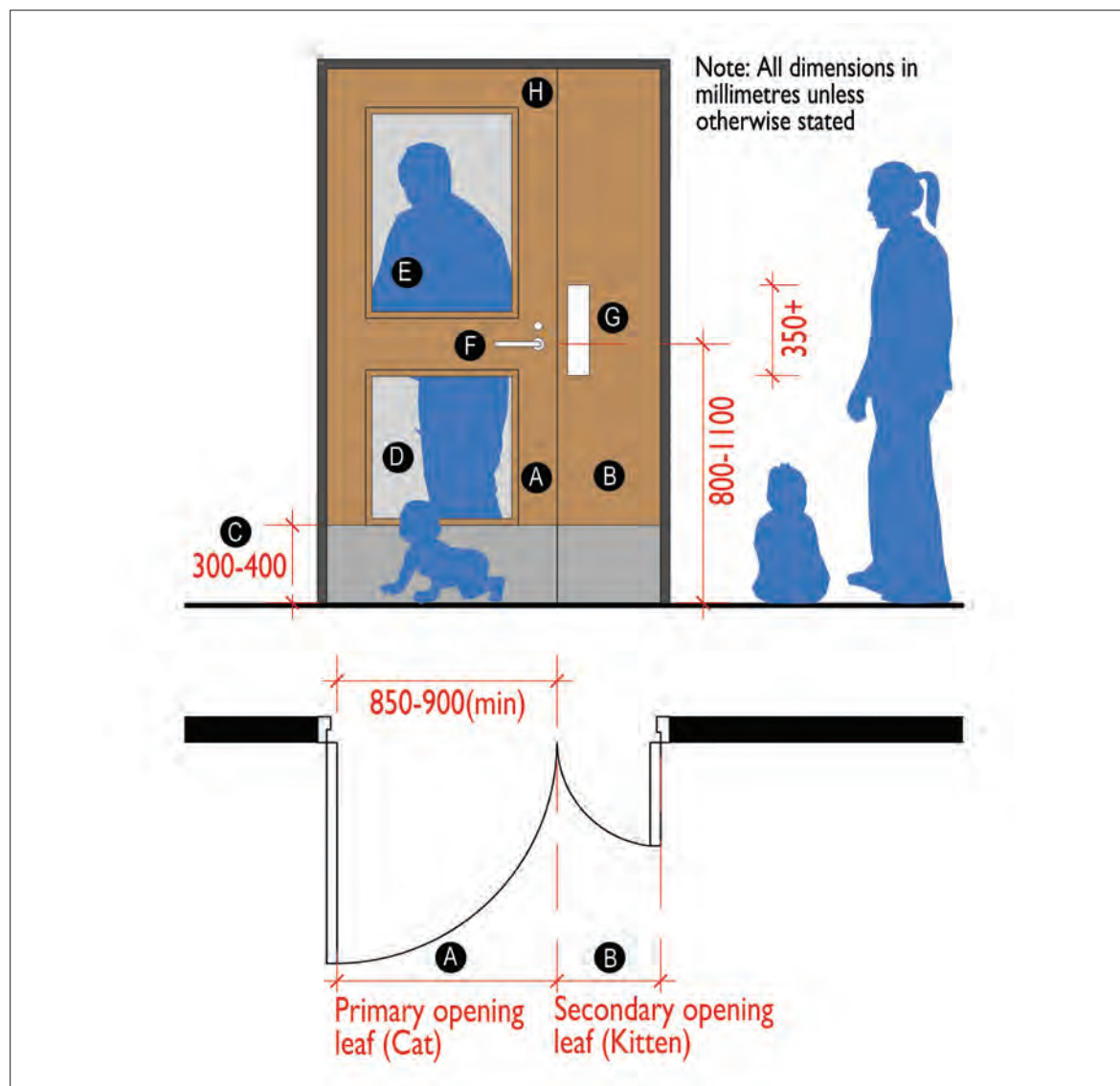↘ 23 Carraig Briste, Enniscorthy, County Wexford.
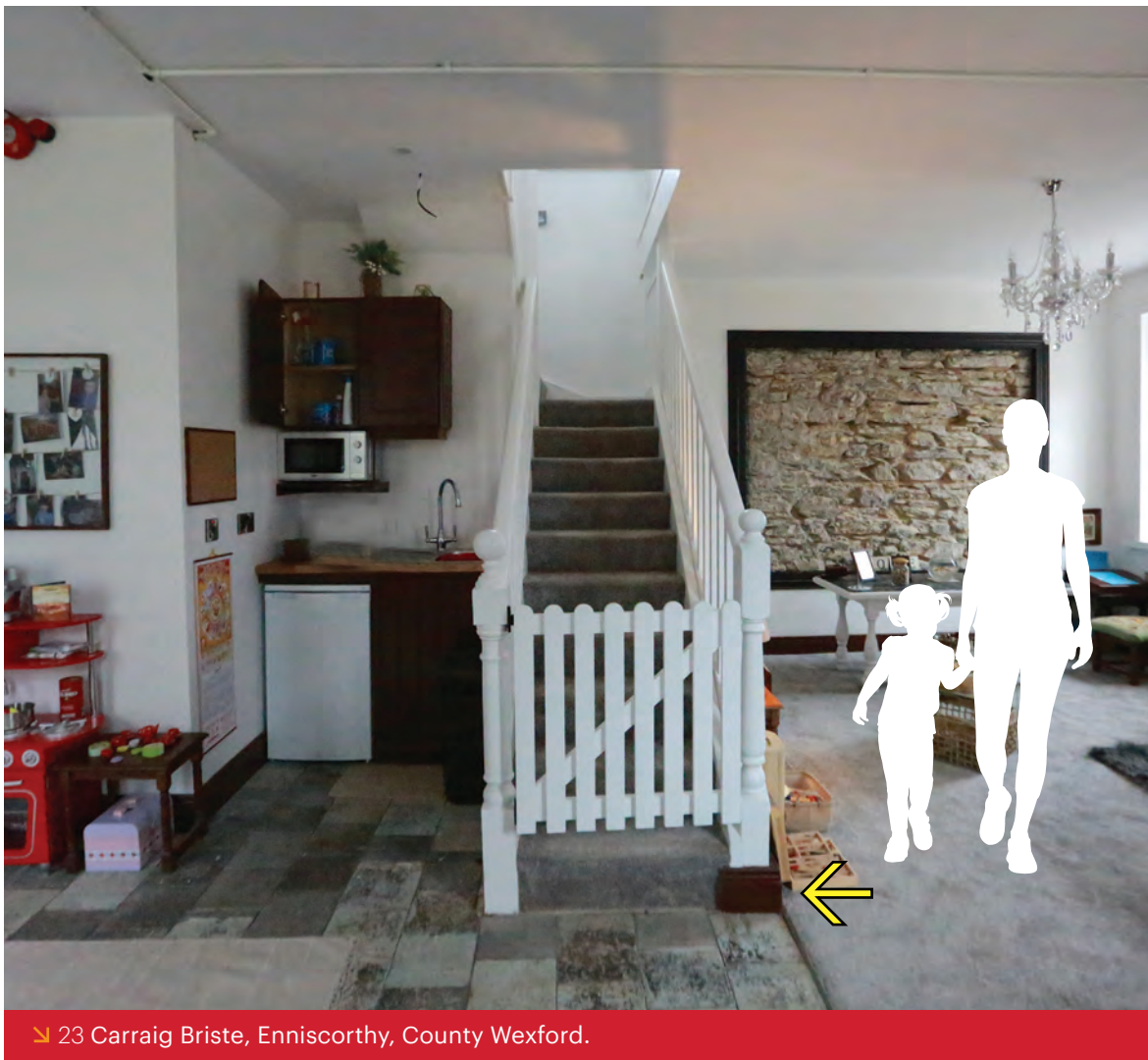
Design features

- The stair gate is made to measure to ensure a good fit with the stairs.
- The colour of the stair gate contrasts with the carpet.

Design tip

- A lower handrail set between 600-750mm would benefit children and people of smaller stature.
- The handrail should extend 300mm past the last step. In this scenario a newel post or similar upright would have to be installed at the end of the handrail to ensure that people do not collide with the extended handrail.
- Ensure junction between different floor materials such as timber floor and carpets do not pose a trip hazard (see arrow).

Technical sketch 2: Indicative design of internal doors.

Note: All dimensions in millimetres unless otherwise stated

350+

800-1100

850-900(min)

300-400

Primary opening leaf (Cat)

Secondary opening leaf (Kitten)

A A cat-and-kitten door (door and a half) with primary opening leaf with a minimum clear width of 850mm but preferably 900mm.

B Secondary opening leaf to provide a wider opening as required.

C 300-400mm kickplate. Height of kickplate may be determined by the age group within the room and the maximum height required to ensure small children can see out and be seen.

D Lower level glazed panel to allow small children see out and be seen as a person opens the door.

E Upper level glazed panel to allow views and admit light.

F Lever arm handle at between 800-1100mm.

G Push plate to secondary door leaf to be at least 350mm long.

H Good colour contrast between door, frame, and wall to make door more visible.

Universal Design Guidance

- Entrance doors to the building should balance safety and security with accessibility to ensure doors are easily operated by authorised persons **(See Section 4.4 for Safety and Security Systems).**

- Provide easily opened internal doors with accessible and usable handles. While safety requirements for children accessing certain areas must be considered, consideration should also be given to doors to appropriate areas that can be used independently by children.

- Doors should have lever handles that can be opened easily with one hand rather than round or oval door knobs as these can be difficult to use.

- Door handles should be provided in accordance with the building regulations and located between 800mm and 1200mm above floor level. Where handles are located higher than this for child safety reasons, careful consideration should be given to the accessibility and usability of these doors for a person using a wheelchair or someone of small stature.

- Use winged or lever thumb-bolts for toilets.

- Use low friction hinges to make doors easier to open and close.

- Provide glazing panels or vision panels within doors that extend down to approximately 300mm from the floor, or separate/additional low-level vision panels placed on the lower part of the door.

- Finger protection door guards should be considered for parts of the setting where children spend a lot of time.

Windows

Design considerations and awareness

The windows of an ELC setting control much of the interaction between inside and outside, not only in terms of views and daylight, but also in terms of sound and thermal insulation. Windows should provide maximum views to the outside, allowing children and adults to experience positive stimuli such as bird song, external activities, or the changing weather.

Window sills and transoms: Windows support the relationship with external spaces. Window sills and transoms should not obscure the view to outside. Remember the eye line of crawling babies or toddlers is much lower to the ground, so consider how windows enable them to see outside.

↘ 24 Carraig Briste, Enniscorthy, County Wexford.

Design features

• Window providing a view to outside and a place to put plants or objects of interest to attract the attention of children.

Design features

- High levels of glazing providing light and views to outside.
- Glazed door used to fit play rail that provides a multisensory experience for children while also attracting them to the outside.

Design tip

- Ensure items attached to a bar such as this do not pose a trip hazard when using the door or block the door in the event of evacuation.
- Fully glazed doors should have marking/manifestations between 850mm and 1000mm and 1400mm and 1600mm above floor level. This will make the glass visible from a range of eye levels and prevent people walking into the door.

Window operation: Windows should also be easily operated by staff, and while appropriate restrictors will be necessary in certain locations, consideration should be given to windows that can be safely used by children as part of their interaction and engagement with the setting.

Opening Sections: Windows should be designed so that if the opening section projects into the room that it does not present a collision hazard or takes up too much space within the room. Outward opening sections should not present a collision hazard, especially if it is at child height, for people using the space outside. This is particularly important where windows open onto play areas.

↘ 26 Tigers Childcare, Blanchardstown, Dublin.

Design features

- Windows extend all the way to the floor to provide extensive views to the outside for children sitting in seats or sitting/lying on the floor.
- Windows are fitted with safety restrictors that limit the opening of the window section to 100mm.
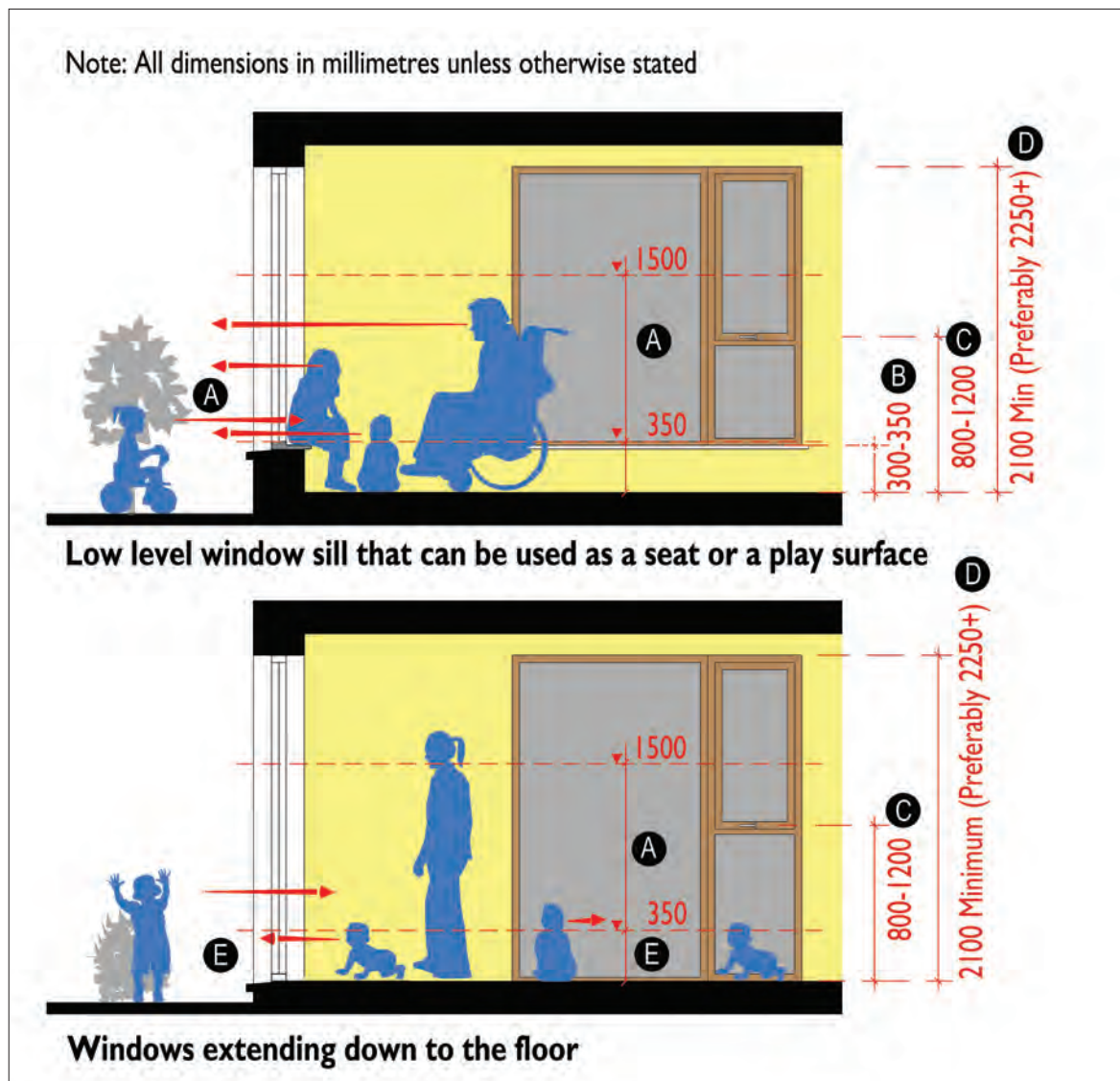
Design features

- If the colour of the handle contrasted with the colour of the window frame it would make this handle more visible.

Acoustic and thermal performance: Windows protect building occupants from disruptive external noise, solar glare or excessive solar heat gains, or conversely, heat loss. Therefore, the performance of the window in terms of U-Values, (how well insulated it is) acoustic insulation and solar transmittance (the amount of light permitted through the glazing) should be carefully considered.

Window dressing: Where curtains or blinds are used these must be carefully designed and installed so the pull cords or chains do not present a strangulation risk to children. For existing blinds with cords or chains replace these with solid wands or ensure all cords are beyond the reach of children. Only blinds that do not involve a cord or chain device are suitable in an ELC setting.

New blinds are manufactured so they do not contain cords or chains. These include motorised blinds, blinds operated by a gearbox and crank handle, or hand operated blinds that do not involve a cord but use side tracks or a spring-loaded mechanism or similar.

Note: For more information about blinds and associated safety issues see **Tusla (2018) Quality and Regulatory Framework: Full Day Care Service and Part-Time Day Care Service.**

Universal Design Guidelines for Early Learning and Care Settings

Technical sketch 3: Indicative design of windows doors.

Note: All dimensions in millimetres unless otherwise stated

Low level window sill that can be used as a seat or a play surface

Windows extending down to the floor

A Avoid window transoms between 350-1500mm for unobstructed views for at least one section of the window. This will provide unobstructed views to the outside for a range of people at different eye levels.

B Window sill at 300-350mm off the ground will provide a place to sit or a surface to play on for small children. This also provides good views from the inside out, and from the outside, in terms of interaction and supervision.

C Window that is easily opened with one hand with a lever handle between 800 and 1200mm from floor level. This handle should have a colour contrast to the window frame behind so it is easy to see.

D The height of the window should be maximised to admit as much natural light as possible and also increase the view.

E In some locations, such as spaces for babies or young toddlers, consider windows that extend all the way to the floor to provide views out for young children who are crawling or sitting.

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Universal Design Guidance

- Consider the location and size of windows to admit high levels of natural light.

- Provide low-level sills or floor-length windows to maximise views to the outside and support visual development.

- Provide a combination of full-length windows and low-level sills of 300mm that afford a place for a small child to sit.

- Use high performance windows to achieve low U-Values, high levels of acoustic insulation and to control solar transmittance.

- Avoid window designs that place a transom between approximately 500 and 1500mm (or depending on the age group to be served) above floor level to provide unobstructed views to the outside.

- Ensure all existing blinds and curtains do not contain cords or chains that present a strangulation risk to children.

- Replace cords with solid curtain or blind wands.

- Select blinds that do not use cords or chains. Options include motorised blinds, blinds operated by a gearbox and crank handle, or hand operated blinds that do not involve a cord.
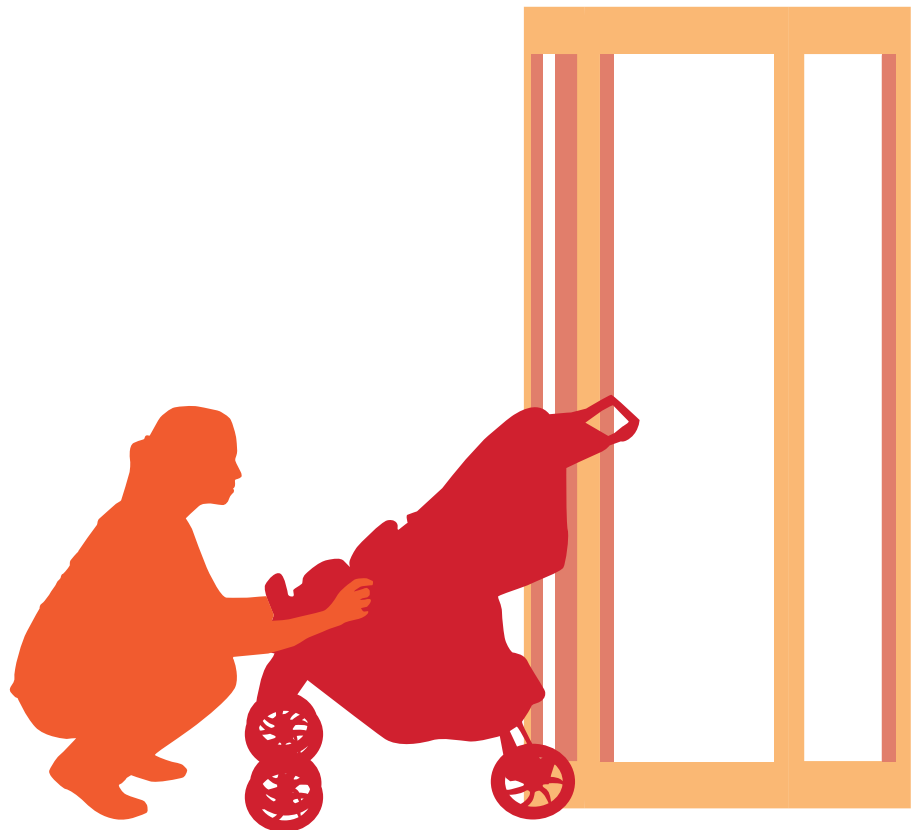
Electrical fittings and controls

Design considerations and awareness

While electrical fittings and controls will typically be placed out of reach of small children, they must still comply with **technical guidance document M of the Building Regulations 2010**. These stipulate that socket outlets and switches for lighting and permanently wired appliances should be placed between 400mm and 1200mm above the floor. New electrical sockets will be fused and therefore child safety covers will be sufficient in terms of safety. However, the location of other fittings such as heating controls should be considered, so they comply with building regulations, and are in a location removed from children for safety reasons.

↘ 27 Heating, lighting and window blind controls.

Design features

- Good colour contrast to make fittings more visible.
- Large rocker-style light switches are easier to use as they require less finger strength.

Design tip

- Ensure text on light/control switches is accessible and large enough to read and does not fade easily from use (see arrows).
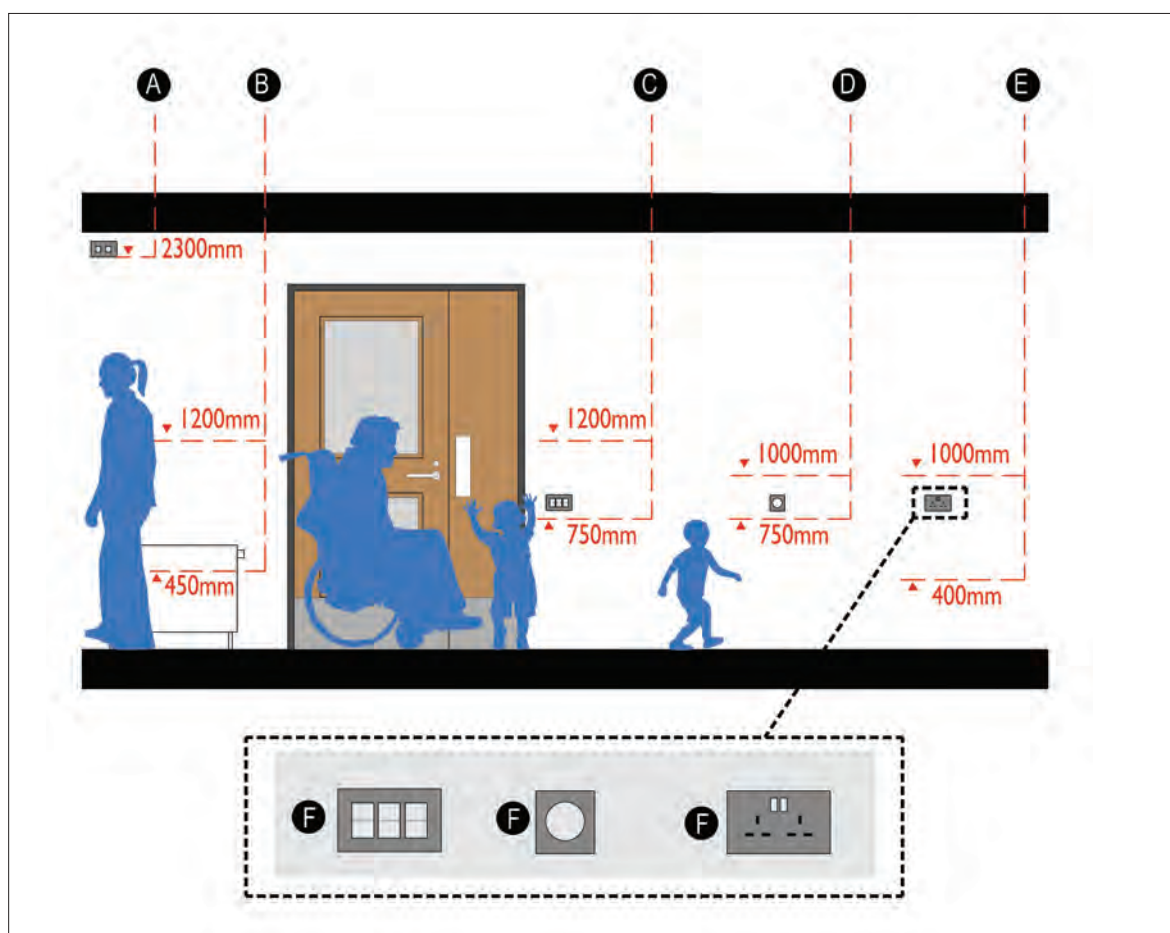
A high number of power points or socket outlets should be provided throughout the building to provide options for plugging in lights, equipment or assistive technology. This is important not only in areas used by children or by staff, but also in circulation spaces. Consider how settings can be future proofed by providing blanked off power and data connections in key locations to provide for the retrofitting of features such as power operated doors, windows, electrical hoists and stair lifts. These blanked off connections should be provided both at

low level and a higher level (i.e. 2300mm or more above floor level) to provide options for floor level or ceiling level technologies such as blind and curtain openers, and ceiling mounted hoists.

Switches and sockets should visually contrast with the background using colour or tonal differences to ensure they are visible and easily identified by people with sensory, physical or cognitive difficulties.

Technical sketch 4: Recommended heights of electrical fittings and controls.

A   High level data outlet and power points.

B   Thermostatic radiator valves between 450-1200mm above floor level.

C   Light switches and permanently wired switches between 750-1200mm above floor level.

D   Switches and controls for intercom, heating, and ventilation between 750-1200mm above floor level.

E   Electrical sockets, telephone and data outlets between 750-1200mm above floor level.

F   Colour contrast between fittings and background to make the fittings more visible.

Universal Design Guidance

- Install a high number of power points or socket outlets throughout the building to provide options for plugging in lights, equipment or assistive technology.

- Socket outlets and switches for lighting and permanently wired appliances should be placed between 400mm and 1200mm above the floor.

- Carefully consider the location of certain fittings and controls so they are in a location removed from children for safety reasons.

- Provide good colour contrast between switches and background to improve visibility.

- Future proof spaces by providing blanked off power and data connections in key locations to provide for the retrofitting of power operated doors, windows, electrical hoists and stair lifts if required in the future.

Parent Lux Children's Club:

"My daughter has Asperger's syndrome, and has never been affected by noise or light issues at Lux."

Signage

Design considerations and awareness

Wayfinding is a collective term that describes the features in a building or environment that help with orientation and navigation. Signage plays a big part in helping a person to find their way to the setting, locate the entrance, and then navigate around inside the building.

Due to the small size of many ELC settings and the level of familiarity that many users will have with the environment, wayfinding will not always be a concern. However, there are users who might visit infrequently such as prospective families, new staff and delivery drivers or those with sensory, physical or cognitive difficulties that will benefit from well placed, legible and easily understood wayfinding signage.

↘ 28 Tigers Childcare, Blanchardstown, Dublin.

Design features

- Good wayfinding signage at the site entrance informs a person about the location of parking and the main entrance to the building.
- Signage over the main entrance door continues the wayfinding and guides a person into the setting.

Design tip

- Increasing the size of the arrows will make the sign more useful for people.
- Adding a light above the sign would increase visibility in low light conditions.

04

Types of signage: Four types of signage are typically required in buildings including: Information signs; directional signs; identification signs; mandatory signs. It is helpful to take a consistent approach across these categories so that each type of sign has the same appearance. This will help a person identify signs and understand that one sign tells you that you have arrived at your destination (i.e. identification signs).

Signage colour: Consistent visuals for each and all categories of signage will help ELC users identify the kind of signage they are looking at. For signage legibility the contrast between the signboard and the colour of the text is important. Contrast is determined by the Light Reflectance Value (LRV) of each colour, and is measured between 0 and 100, where a high LRV results in a bright colour, while a low LRV results in a darker colour. For good colour contrast there must be an LRV contrast of at least 70% between the text and the background colour.

Surface Finish: The surface finish of the signage should be non-glossy or non-reflective so as not to cause difficulties for those with sensory, physical or cognitive challenges. For signage, font and size, Sans serif display typefaces such as Arial or Futura are considered highly legible, while letter size on signage is determined by the appropriate viewing distance. In terms of letters and spelling, legibility will be improved by capitalising the first letter of names and locations while using lower-case for all other letters.

Language and terminology: The use of simple, easily understood language and terminology will help with wayfinding and this will be reinforced by clearly associated symbols or icons.

↘ 29 Beginnings Creche, Mahon, Cork.

Design features

- Post mounted signage providing direction to key parts of the setting.
- Good colour contrast between the lettering and the sign board make the signage clearly visible.

Design tip

- Signage legibility is helped by use of upper and lower case letttering.

Technical sketch 5: Four types of typical signage.

Note: All dimensions in millimetres unless otherwise stated
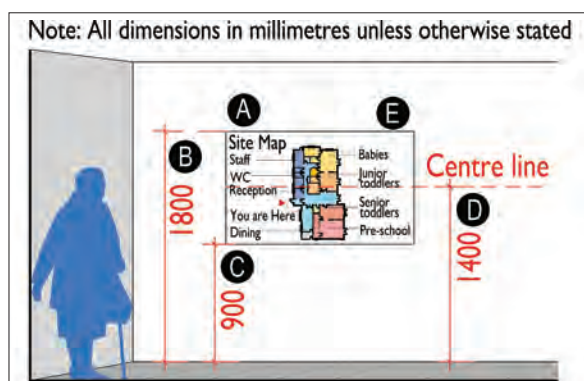
01 - Information signs

A The example shown here is a floor plan map.

B Top of map is 1800mm above floor level.

C Bottom of map is 900mm above floor level.

D Map is centred at 1400mm above floor level.

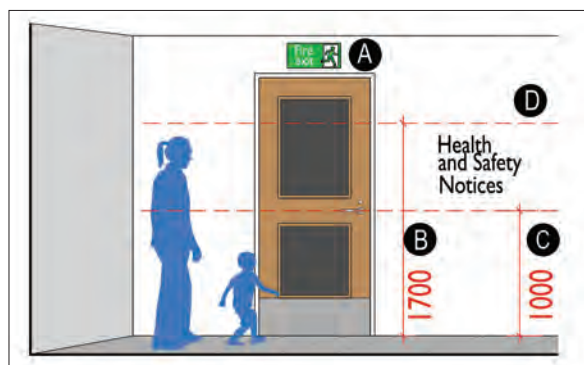**E** Large format text with good colour contrast to the background.
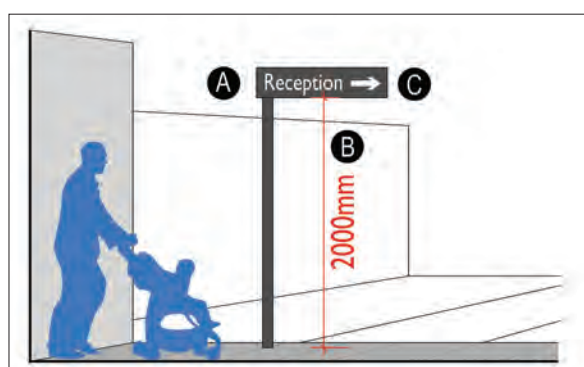
02 - Directional signs

A The example shown here is a directional signpost.

B Bottom of sign is 2000mm above floor level.

C Large format text and arrow with good colour contrast to the background.
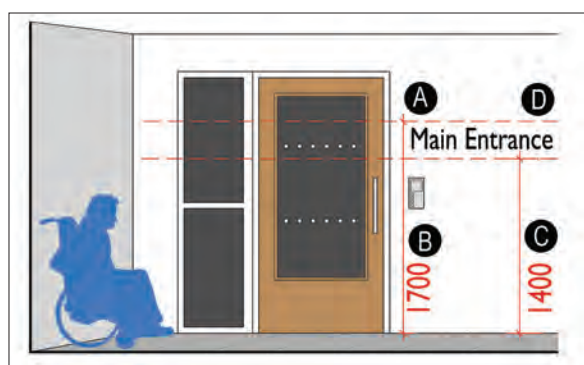
03 - Identification signs

A The example shown here is a building entrance identification sign.

B Top of sign is 1700mm above floor level.

C Bottom of sign is 1400mm above floor level.

D Large format text with good colour contrast to the background.

04 - Mandatory signs

A This example shows an Emergency exit sign and location of possible health and safety notices.

B Top of health and safety notices 1700mm above floor level.

C Bottom of health and safety notices 1400mm above floor level.

D Large format text with good colour contrast to the background.

All signage

Careful use of signage will avoid visual clutter and confusion. Signage should use simple language and simpler and recognisable symbols to provide clear wayfinding for all users in the setting.

Universal Design Guidance

- Directional signs and room identification signs for close range viewing should be 1400-1700mm above floor level. Embossed signs to be positioned where a person can approach and touch the sign without being obstructed or causing an obstruction to other people.

- Wall-mounted signs should not project more than 100mm from the wall surface. These signs should be mounted on the wall adjacent to the leading edge of the room door rather than on the door face so that they are always visible and to ensure that the door is not opened while someone is reading the signage.

- Detailed maps, diagrams, and timetables should be centred at 1400mm above floor level, with the lower edge no lower than 900mm and the upper edge no higher than 1800mm above floor level.

- Directional or identification signage requiring medium-range viewing should be based on the following:
  - Suspended signs: 2300mm clear headroom to the underside of the sign.
  - Post-mounted signs: Located at least 2000mm above floor level.

- Directional or identification signage for large spaces that require long-range viewing and that may be obscured by people, should be placed at least 2300mm above floor level.

- Consider Sans serif display typefaces such as Arial or Futura or similar typefaces that are highly legible.

- Ensure good colour contrast between signage text and the sign board or background surface. This should have an LRV contrast of at least 70%. For more information on visual contrast and LRV see section Visual Contrast in Building for Everyone - Booklet 4 – Internal environment and services.

- Signage font height is determined by the distance at which the signage will typically be viewed:

Viewing distance	Font height
6000mm	200mm
4600mm	150mm
2500mm	100mm
1500mm	50mm

4.3 **Internal Environment**

Overall Design considerations and awareness

In terms of the indoor environment, there are at least four key factors that affect how people perceive their environment, and in turn how this environment impacts on their health and well-being. These include:

- Visual or lighting quality (view, illuminance, reflection);
- Thermal comfort or indoor climate (temperature, moisture, air velocity);
- Indoor air quality (odour, fresh air, air pollution);
- Acoustical quality (indoor and outdoor noise, vibrations).

↘ 30 Ballindereen Community Childcare and Education Centre, Ballinderreen, County Galway.

Design features

- **Different window positions and configurations allow a variety of light into the room and views out of the room.**

Design tip

- **Reducing visual distraction would make the room a calmer space.**
- **Ceiling hung fabric must be fire retardent.**

These environmental factors greatly influence how a person perceives and engages with their environment. Pedagogical approaches and best practice design advocate a multisensory engagement with the world through the natural environment, light, colour, temperature variation, tactile materials, smells, sound and more.

Natural and Artificial Light

Design considerations and awareness

Creating 'lightscapes' is an important part of the Italian Reggio Emilia approach. Both natural and artificial light are used to emphasise or play with space, texture, colour, shadow, and light modelling to create a multisensory environment for children. The use of blinds, curtains and dimmer switches enhances this.

Natural and artificial light is also vital for 'placemaking' where light can be used to create a sense of place, make a space more recognisable, and reinforce the sense of identity attached to a particular place. These are important issues in ELC settings.

Lighting plays an important role in the creation of ambiance and atmosphere, where bright light is used for activity and stimulation, while softer light helps with rest and relaxation. Sleeping areas should have the facility to dim lights or block out daylight using black-out blinds or curtains.

↘ 31 Naíonra Choill Mhic Thomasín, County Waterford.

Design features

- The use of glass blocks, circular and rectangular windows in the space for children maximises the natural light, while avoiding glare.

Lighting is important for sensory experience, placemaking, and ambience. There are some UD issues to be considered in terms of lighting, including the provision of higher levels of evenly distributed illuminance, or the reduction of glare.

↘ 32 Tigers Childcare, Blanchardstown, Dublin.

Design features

- Two very different kinds of lighting within two different spaces in the same setting. The top image shows a well-lit children's space with plenty of natural and artificial light. The bottom image shows how artificial light can create an ambience using dimmable ceiling hung lights and fish tank lighting within a darker central or social space.

Design tip

- Higher levels of lighting should be achievable within the social space through dimmable lights that can be turned up or through additional lighting that can be turned on as required.
- Artificial lighting should be carefully designed to avoid glare.

← Note: For more information about lighting see Tusla (2018) **Quality and Regulatory Framework: Full Day Care Service and Part-Time Day Care Service.**

Universal Design Guidance

- Good levels of natural light throughout the building reduces the need for artificial lighting and benefit people who may be sensitive to some forms of artificial light.

- Good levels of natural light benefit many people with sensory, physical or cognitive difficulties by providing higher levels of illumination.

- Glare from direct or indirect sunlight should be controlled as this can cause visual discomfort or difficulties for some users and result in excessive heat build up within the room unless the glass is solar reflective.

- Provide evenly distributed illumination to avoid harsh contrasts or excessive shadows which can cause visual difficulties for some users.

- Recommended levels of illumination for the internal environment:

Location	Level of illumination (lux)
Entrances	150
Corridors, passageways and walkways	150
Steps ramps and landings	200
Lift landings and lift cars	200
Lift control panels	100
Toilets, shower rooms and bathrooms	200 to 300
Reception desks	250
Directional signs, maps and information displays	200
Play room	300
Handicraft room	300

- Provide task lighting to enhance task visibility or to provide higher levels of illumination to specific areas such as steps or ramps.

- Careful colour rendering and tonal contrast to ensure spaces and objects are visible for occupants with sensory, physical or cognitive challenges or who are colour blind.

- Ensure good levels of natural and artificial light for people who need to lip read.

- It is important to avoid glare, flicker and unwanted noise from light fittings.

Thermal Comfort and Indoor Air Quality

Design considerations and awareness

Thermal variations such as warm, cool or cold spaces, air movement and other environmental conditions are an important part of how a person interacts with and understands their environment. For children, these environmental stimuli are central to development and enrich the multisensory experience of an ELC setting.

There are certain thermal environment issues that need to be carefully considered in the context of ELC. For instance, excessive heat or cold can be a distraction and cause difficulties for some children. In this regard, temperatures between 18 to 22°C are recommended for mainstream conditions while in sleep areas the recommended room temperature is 16 to 20° C. However, for settings catering to children with additional needs an upper limit of 23°C may be required. For some children with severe physical challenges incontinence may be an issue. These children may need to be changed more often and therefore may require higher room temperatures of between 25-30°C to ensure they do not become cold during any prolonged period of undress.

↘ 33 Northside Family Resource Centre, Ballynanty, Limerick City.

Design features

• **Opening windows and doors to provide ventilation.**

Where radiators are used, care should be taken through the use of thermostats and/or radiator covers, to eliminate any risk of burn injuries though contact with radiator surfaces, particularly for younger children, children with sensory, physical or cognitive difficulties or people with reduced sensation.

Effective ventilation is important, and a lack of fresh air can impact on concentration and cause drowsiness. Effective ventilation removes lingering odours, which is especially important in sanitary areas and openable windows provide a convenient and healthy form of ventilation. Where mechanical ventilation systems are used, it is important that their operation is silent as background noise can negatively affect the acoustic conditions in a playroom. Ensure windows on upper floors are fitted with safety restrictors that limit the opening of the window section to 100mm.

For certain areas within the setting mechanical ventilation may be required to achieve the air changes necessary to maintain healthy indoor air quality: and remove odours. The Health Services Executive recommend the following as set out in the table below:

Air changes per hour	Area
10-15 air changes per hour	Laundry areas
3 air changes per hour	Toilet compartments and sluice rooms
2 air changes per hour	Lobbies, stairwells and other access areas
3 air changes per hour	Play and rest areas

* All sanitary accommodation and nappy changing areas must be ventilated directly to the external air.

Note: For more information about heating and ventilation see Tusla (2018) **Quality and Regulatory Framework: Full Day Care Service and Part-Time Day Care Service.
Management of Infectious Diseases in Childcare Facilities and Other Childcare Settings.**

Universal Design Guidance

- **Provide easily opening windows and doors for ventilation.**
- **Provide quiet running mechanical ventilation where required.**
- **Provide 3 air changes per hour in nappy changing rooms (with external ventilation).**
- **Provide 10-15 ACH for laundries.**

Sound

Design considerations and awareness

Multisensory experiences include the idea of 'soundscapes' or a variety and diversity of sounds within a setting. Sound helps to define and characterise spaces and help to create a sense of place.

While the positive multisensory nature of sound must be remembered, it is important to note how sound might affect certain occupants, particularly infants or children with physical, sensory or cognitive challenges. For example, it is recognised that children on the autistic spectrum can experience hyper sensitivity to sound and find certain noises, such as unexpected loud sounds or repetitive low pitch sounds distressing. Children with communication, learning, behavioural, and interaction difficulties, and other challenges, rely on good room acoustics and sound insulation to support their comfort, learning, and social interaction.

↘ 34 High Care Childcare, Ballincollig, Cork, and Lotamore Preschool, Mayfield, Cork.

Design features

- **A variety soft furniture, furnishings and textiles providing sound absorption.**

Good acoustics are a key element when designing for children and adults with sensory, physical or cognitive difficulties. The basic principle for creating good acoustic environments is to increase sound – to help a person with a hearing impairment to hear important things; and at the same time reduce noise. It is not only about blocking noise out, it is also about ensuring that a person can hear pleasant and stimulating sounds.

A suitable acoustic environment is important; rooms with hard materials such as exposed steel especially in exposed roof structures, brick and block walls, tiled floors and extensive glazing, that reflect a lot of sound will be unsuitable for many children, including those wearing hearing aids (i.e. where the hearing aid amplifies noise). Low frequency noise (often caused by fans or pumps) is a major issue as it can interfere with speech recognition by masking important speech sounds.

Careful consideration must be given to the location of key spaces to provide a calm environment and restful spaces. Through careful planning and design, noise generating activities can be located so they do not cause disturbance.

The silent running of equipment and appliances is important. Acoustic separation and insulation can be used to dampen noise and protect the acoustic environment of the ELC setting.

Universal Design Guidance

- **Locate quiet rooms such as sleep rooms or other relaxing areas away from high activity or noisy spaces such as outdoor play areas.**

- **Provide high levels of acoustic insulation in wall and floors to isolate noise generating activities or equipment. This can be achieved with the use of dense masonry walls that are plastered on both sides; through fitting two or more layers of gypsum board to stud walls or ceilings; or the installation of sound absorbent material such as mineral wool batts/quilt within wall or floor cavities.**

- **Avoid rooms with hard materials such as brick and block walls, tiled floors and extensive glazing, that reflect excessive amounts of sound.**

- **Use soft furniture, furnishing, textiles and planting to absorb sound.**

- **Locate equipment that generates low frequency noise, such as pumps or fans away from spaces occupied by children and staff.**

4.4 **Technology**

Overall design considerations and awareness

Technology in the early learning and care setting may be used for safety and security, communication, or for multisensory stimulation or educational purposes.


↘ 35 Cheeky Cherubs, City Hall, Cork.

Design features

- Light table used to create relaxing multisensory space.

- A light table is a piece of equipment where there is a light source located under a translucent table top, enabling children to explore light, colour and natural materials in a multi-sensorial way.

Technology plays an important role within a Universally Designed ELC setting in terms of making the environment safe, accessible, understandable and easy to use for all children, staff, parents, and visitors. Bearing in mind the diversity of ELC users that occupy a setting, careful consideration should be given to the use of technology for all users regardless of age, size or disability.

An integrated approach to technology is important in all parts of the setting; from approaching, entering and circulating within the setting, down to the internal environment and fit-out elements. Technology is at the core of Assistive Technology for users with specific physical, sensory or cognitive needs, but it is also important for all ELC users in terms of safety and security, and for multisensory stimulation.

These aspects of technology within an ELC setting are illustrated in the Indicative Building Section below and they are briefly discussed in the subsections that follow.
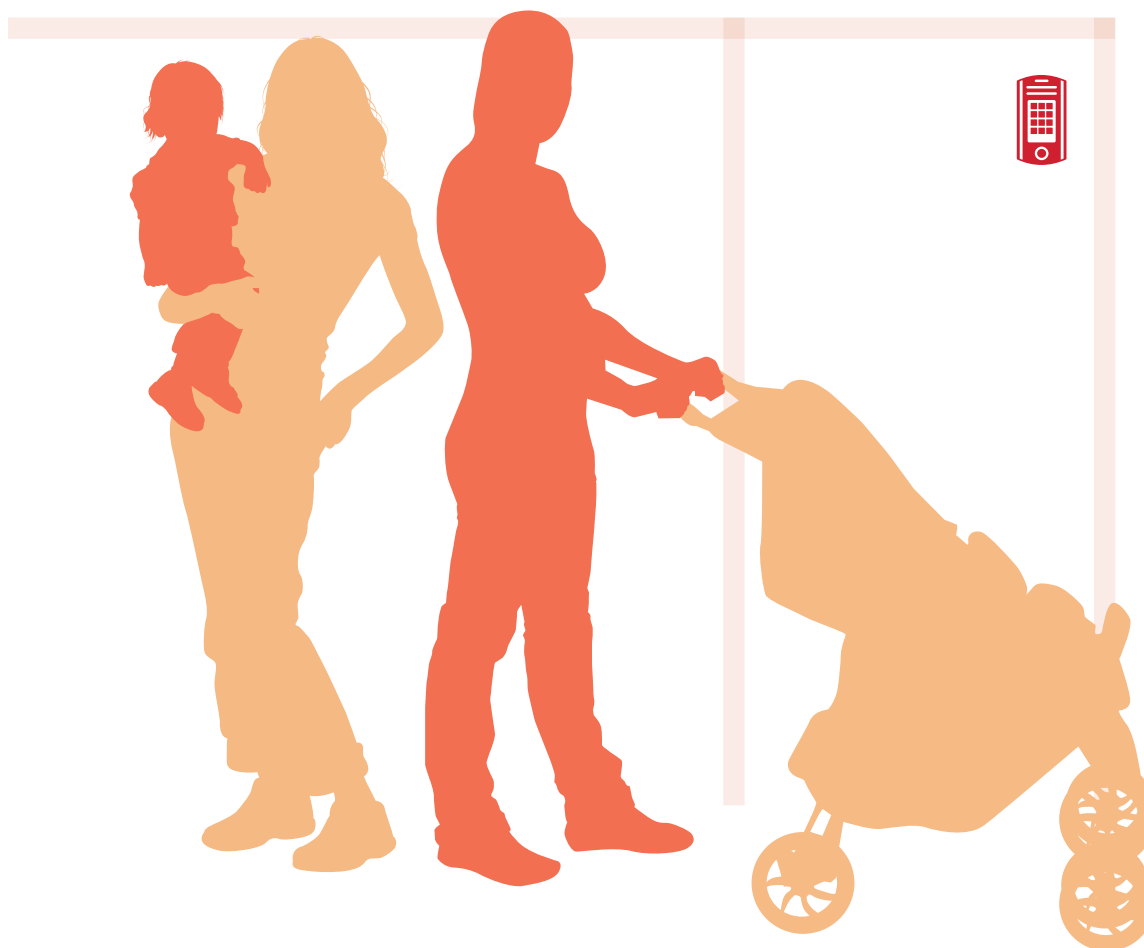
Technical sketch 6: Indicative Building Section - Examples of Various technologies that can be used within a ELC setting.
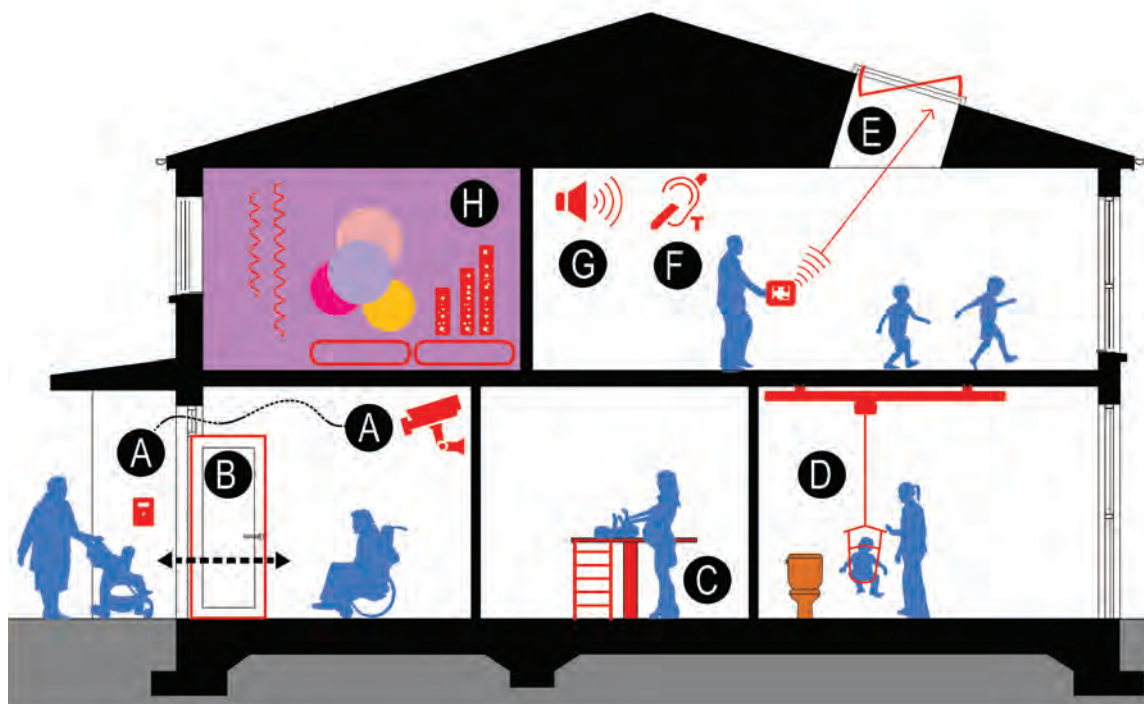
Examples of technology to support safety and security

A   Integrated access control, Intercom system and CCTV.

Examples of technology to support users with physical challenges

B   Power operated entrance door.

C   Power operated adjustable changing bench.

D   Ceiling or wall mounted hoist.

E   Power operated windows.

Examples of technology to support users with sensory challenges

F   Hearing enhancement system such as a Hearing Loop.

G   Audible information.

Examples of technology to support users with cognitive challenges

H   Sensory room that uses technology such as lighting or sound for multisensory stimulation. Further information on sensory rooms can be found on **page 280**.

Safety, Security and Communication

Design considerations and awareness

Providing a safe and secure building is a critical concern of an ELC setting and the use of intercoms, coded keypad entry, or Closed-Circuit Television (CCTV) are commonly used in this context.

Intercom systems: Intercom systems allow staff carefully manage access into the setting. Systems that use both voice and video enhance security while at the same time allow a person with hearing or speech challenges to be seen by staff and given access. Some settings are using face recognition systems to control access, and this may also be beneficial for people with speech or language difficulties. Many intercom systems can be linked to smart phones through an app and this allows management and staff to monitor and control access from any location. Intercom systems can also be designed so that staff can activate an electrically powered door, this could benefit many setting users including those pushing a buggy or using a wheelchair.

↘ 36 Lux Childcare, Moate, County Westmeath.

Design features

- Intercom system at external gate that provides audio and visual monitoring and access control.

- This system is also connected to the owner's smart phone and this enables remote surveillance and access control.

04

A fob or swipe card entry may be beneficial for staff as this can be easier to use than keys or entering a code.

All intercom or keypad panels should be placed on the handle side of the door and clearly visible on approach, accessible and easy to use. If a face recognition system is being used consideration will have be given to the location and height of the camera or panel to ensure it is usable by people of various heights or those using a wheelchair.
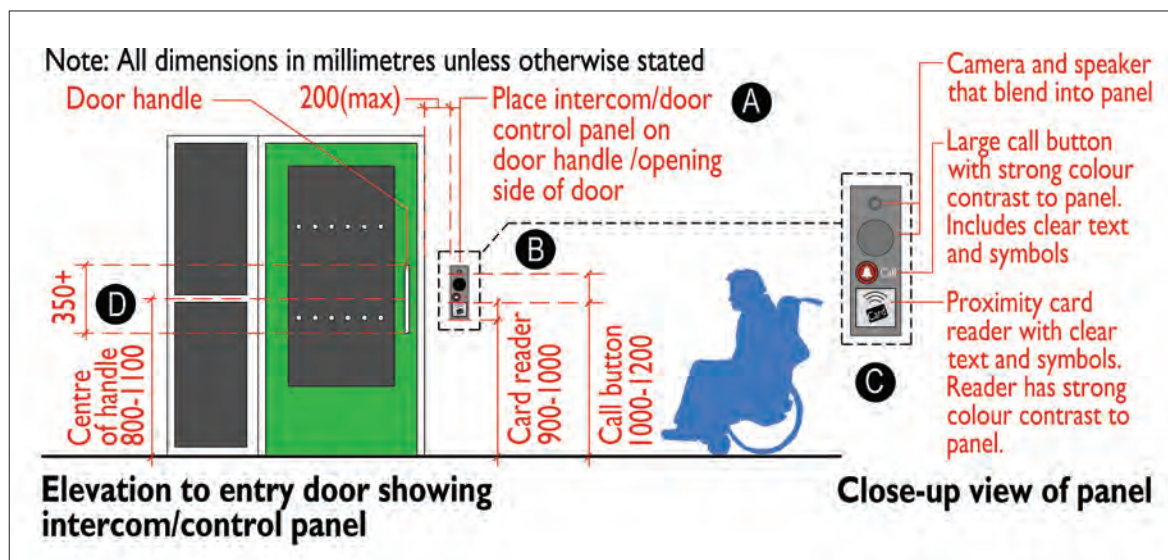

↘ 37 Varied forms of access control in ELC settings.

Design features

- The image to the right shows a facial recognition system, while the image to the left shows a fingerprint recognition system.

Design tip

- A panel that is less reflective and with larger buttons and text would improve its accessibility for all users.

Technical sketch 7: Indicative intercom and door control panel.

Note: All dimensions in millimetres unless otherwise stated

Elevation to entry door showing intercom/control panel

Close-up view of panel

A Intercom/door control panel located on the door handle /opening side of the door within 200mm of the door frame.

B Ensure card readers are located 900-1000mm above ground level while call buttons are located 1000-1200mm above ground level.

C Provide a large call button with strong colour contrast to panel. Provide clear and legible text and symbols so the button is easy to see and use. Ensure panel features that a person does not have to directly use, such as cameras or speakers, blend into the panel so they do not distract from key features such as call buttons.

D Proximity card reader with clear text and symbols. Reader has strong colour contrast to panel so that it is easy to see and use.

ELC practitioner, Naíonra Choill Mhic Thomasín:

"The crannóg is specifically a quiet area and seomra spraoi for physical play yet with the use of the tent from the AIM box children can have a smaller group in the tent in the seomra spraoi."

04

Close Circuit Television (CCTV): Where appropriate, CCTV provides additional security by providing both live surveillance, video recording and storage. However, CCTV cameras should be very subtle, so they do not detract from a welcoming or friendly environment.

Fire detection and alarms systems: A qualified built environment professional with fire safety expertise should be engaged in the early stages of the design or retrofit of an ELC setting to ensure the facility complies with all fire safety requirements. This will include Means of Escape in Case of Fire (Including Fire Detection and Alarm Systems), Internal Fire Spread, External Fire Spread, Access and Facilities for the Fire Service.

> For all safety requirements see Technical Guidance Document (TGD) B – Fire Safety: see **https://www.housing.gov.ie/housing/building-standards/tgd-part-b-fire-safety/technical-guidance-document-b-fire-safety**

Careful consideration will need to be given to safe evacuation for all children and adults using a setting. Bear in mind children not yet walking and children with additional challenges that will make independent evacuation more difficult.

Fire detection and alarms systems:

- Every ELC setting must have a fire alarm system installed to give early warning of an outbreak of fire.

- Provide self-contained alarm units that are mains powered with the smoke detectors and alarm sounder housed in one unit.

  Note: A battery powered smoke detector (not wired) is not a self-contained unit and is inadequate for any category for ELC service.

- A fire alarm system based on self-contained units will be sufficient for a single-storey premises where less than 20 children are accommodated.

- Services must have a fire alarm system that incorporates manual call points for raising the alarm, alarm sounders, automatic detection of smoke or heat by suitably located detectors, control and indicating equipment and cabling. These are required for both a single-storey building and multi-storey premises.

The fire alarm system and the means for escape must meet certain requirements depending on the size and complexity of the building. See the requirements in Technical Guidance Document B – Fire Safety: see **https://www.housing.gov.ie/housing/building-standards/tgd-part-b-fire-safety/technical-guidance-document-b-fire-safety**

Means of Escape

Escape routes may be by way of a door leading directly to a place of safety outside the premises, or may be by way of a hallway, a corridor, or a stairway in the case of an upper storey. All escape routes must lead to a place of safety in the open air at ground floor level. If a fire occurs on the premises, the escape routes should not be threatened at the early stages, while the evacuation is taking place. An exit door leading directly to the outside provides the most effective and safest means of escape. Where a direct exit is not possible, an escape route which will not be rendered unusable in the early stages of a fire will also be satisfactory. If there is only one escape route from a room or area this should not be through another room, because a fire in the outer room would make this single escape route unusable.

To enable evacuation of the premises to be completed before the escape routes are endangered by fire and smoke, the distance to be travelled on an escape route before reaching a place of safety should be limited.

Maximum Travel Distance (metres)

Available Escape Routes	Active Children	Sleeping Children, Infants
Single Escape Route	18m	10m
Alternative Escape Route	45m	20m

For further information on the particular fire safety requirements in ELC setting see: **https://www.earlychildhoodireland.ie/wp-content/uploads/2015/08/Fire-Safety-In-Preschools.pdf**

A Note on Fire Alarms Sounders: As part of the fire alarm system, an audible alarm is required to warn occupants about the detection of a fire, however many alarms are designed with very loud sounders that produce a sound more than 100 decibels (dB). This is known to disorientate many people and make communication difficult, and can have a negative impact on small children and people who are hypersensitive to noise.

Note: For more information about fire safety see Tusla (2018) **Quality and Regulatory Framework: Full Day Care Service and Part-Time Day Care Service. See Building Regulations 2006, Technical Guidance Document B, Fire Safety for details regarding the design of fire safety systems.**

↘ 38 Excessive alarm sounds can cause disorientation and extreme anxiety.

Universal Design Guidance

- Provide accessible, understandable and easily used intercom systems that allow staff to safely control access to the setting.

- Consider voice and video intercom systems for enhanced security. The video function will support people with hearing or speech difficulties. For video intercoms ensure the panel is located so people of various heights or those using a wheelchair can use it.

- Where face recognition systems are to be used locate the camera or panel to ensure it is usable by people of various heights or those using a wheelchair.

- Provide CAT 6 data cables in all key locations for non-wireless technology.

- Consider how intercom systems can be connected to power operated doors for enhanced accessibility.

- Locate all intercom or keypad panels on the handle side of the door and ensure they are clearly visible on approach, accessible and easy to use.

- Where CCTV systems are installed ensure the cameras are subtle, so they do not detract from a welcoming or friendly environment.

- Fire alarm sounders should be carefully selected to ensure they are not excessively loud. Consider sounders that emit a sound level of 65 dB, or 5 dB above any other noise likely to persist within the space for a period longer than 30 seconds. Use a larger number of quieter sounders as opposed to a small number of very loud sounders. This will depend on the size and layout of the setting but may include sounders in all key rooms and in circulation areas.

Assistive Technology

Design considerations and awareness

The field of Assistive Technology (AT) concerns the practical tools that can support functional needs of children who experience difficulties linked to disability. It encompasses a broad spectrum of low tech and high tech technologies, for example, walking frames, wheelchairs, hearing aids, vision aids and computer-based communication aids. These technologies play a crucial role in enabling independence and access to play and education.

↘ 39 Graiguecullen Parish Childcare Centre, County Carlow.

Design features

*   **Children of various abilities within an ELC setting, illustrating the need to carefully consider assistive technology.**

In terms of ELC, a wide range of assistive technology, including magnifiers, screen reading technology, and portable writing and communication devices may be used within the setting. While these forms of assistive technology are outside the scope of these guidelines, the building should be fitted with a generous number of electrical outlets to power and charge these devices. Centrally floor-mounted sockets will serve devices being used in the middle of the room and avoid the hazard of cables trailing across the floor. A sufficient number of data cable outlets will allow the connection of non-wireless devices or Information Communications Technology as required.

Design features

- Power operated door allows a staff member to activate the door through the intercom system.
- The door opening automatically allows easy access for a person entering with a buggy or wheelchair.

Assistive products for mobility and physical impairments: A power operated door will make entering a setting easier for many users, not only for a person in a wheelchair or someone using a mobility aid, but also for anyone entering the setting with a buggy. In the ELC context, the door will typically be activated by a staff member. The safety issues associated with a power operated door will need to be carefully considered. Among others, these include a safe door opening speed (this will depend on the size of the door and the context and can be set as part of the operation mechanism), the need for an audible warning system, presence and motion detection to prevent collisions, and signage to alert people about the operation and door swing direction.

Within the setting, high level windows or skylights may need to be power operated. Ceiling mounted hoists and adjustable changing tables may be required for children with limited mobility.

04

⬊ 41 Power operated height adjustable changing table.

Design features

• **Electrically operated changing table allows a user to easily adjust the height without having to lift the table or operate a lever.**

Design tip

• **Ensure children are not left unattended so they do not roll off the open side.**

Electrically powered height adjustable changing tables will allow the height of the table to be set according to the needs of the staff member using it. This will allow rapid and easy adjustment at the press of a button. This has advantages over manually adjusted tables as these may not be usable by people with certain mobility, dexterity or strength difficulties.

The installation of a ceiling or wall mounted hoist system may be appropriate in some settings where children have more profound physical difficulties or where staff require assistance when lifting or transferring children, for instance, from a wheelchair to a changing table or toilet. Where a hoist is not installed, future-proofing can be achieved if the ceiling and wall construction can take loads associated with the hoist. Blanked off power and data connections at 2300mm above floor level will allow the connection of a hoist motor at a future date.

Technology for visual challenges: In terms of ELC, for most visual challenges, support consists of ICT equipment, large format books, braille, and other small-scale items. The main considerations for building design revolve around sufficient storage space, adequate power supply and the availability of data cables/sockets within rooms. The provision of audible information for children, staff, and family members with visual challenges should be considered. For larger settings this may include audible wayfinding directions received through a headset or their smartphone. This relies on various forms of technology including Global Positioning Systems (GPS) or Radio Frequency Identification (RFID) technology that imbeds information in the built environment and allows users to navigate or detect obstacles as they travel along a route.

Audible warnings may also be beneficial as part of power operated doors to warn users, particularly those with visual difficulties that a door is opening towards them and that they should stay back to avoid being struck by the door.

Technology for hearing challenges: There are a few whole room technology solutions that can be used to enhance hearing in an ELC setting. For instance, whole room soundfield system helps distribute sound around the room through a microphone and amplifier. This is also known as sound reinforcement and will not be suitable for profound hearing loss. Alternatively, an induction loop system can be installed to transmit sound directly to a person's hearing aid. This system consists of a microphone or pick- up device, an amplifier, and an insulated wire that forms a loop around the space and acts as an aerial that transmits to a hearing aid that is on the correct setting.

Technical sketch 8: Diagram of Induction Loop in an ELC setting.
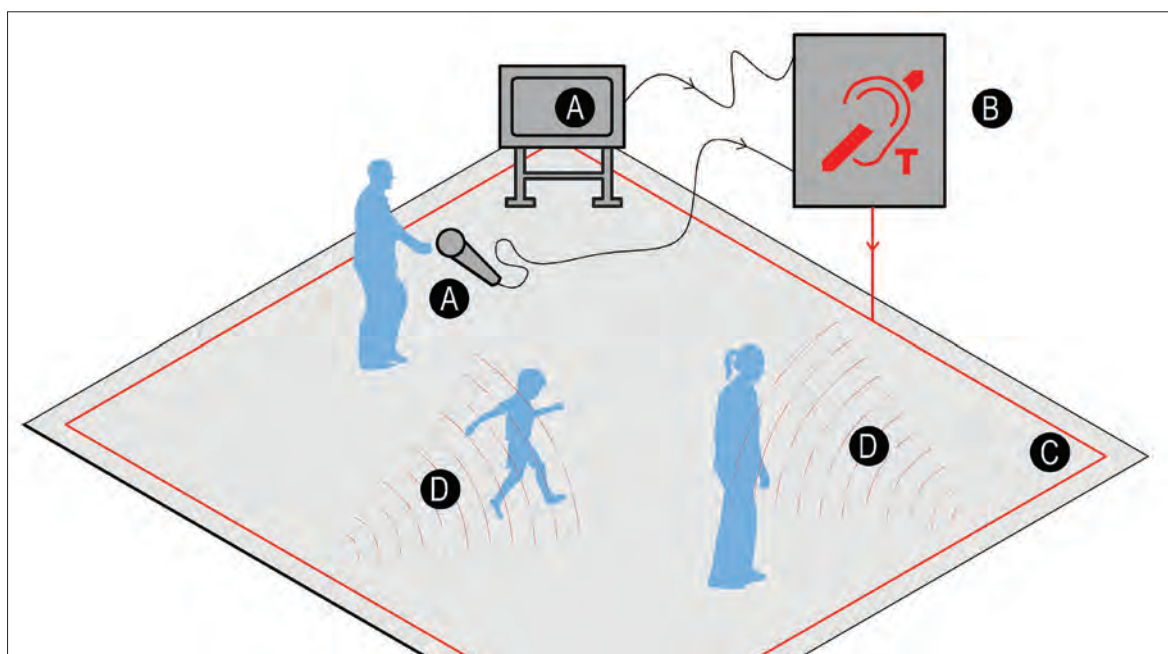
A Audio sources.
B Induction loop amplifier.
C Induction loop.
E Loop broadcasting to occupants wearing hearing aids.

Technology for Physiotherapy, Occupational Therapy, and Speech and Language Therapy: While these services will not be usually provided in a typical ELC setting, some key requirements are worth considering. For these services the main building considerations involve storage space, adequate power supply and data cables/sockets. A physiotherapy space for equipment used by physiotherapist, speech and language therapists and occupational therapists, may require a hoist or height adjustable couch. An occupational therapy space will require adequate storage for rehabilitation equipment, while a speech and language therapist may require an induction loop or hearing aid facilities.

Universal Design Guidance

- Consider power operated doors at the main front entrance taking into account the following:

  - An audible warning system to alert a user that the door is opening may be necessary depending on the requirements of the setting.

  - The door opening speed is determined by the door leaf width and the operating speed can be set to suit the context.

  - The activation device installed as part of the power operated door should be set to detect traffic at a suitable distance to ensure that the door opens early enough and stays open long enough to maintain safe entry and exit.

  - Preventing collisions with the door will be helped by detection by presence and motion sensing devices that should be part of all power operated door installations.

  - Additional activation controls at a lower height that can be operated by the foot rest of a wheelchair can be useful for people with limited upper body strength.

  - Doors that open towards people entering the building should include clear text indicating their automatic operation and direction of swing.

  - The door should also be capable of manual operation in the event of power failure.

- Provide electrically powered adjustable changing tables to accommodate the needs of staff of various heights or who may need to be seated while using the table.

- Consider a ceiling or wall mounted hoist for the lifting or movement or children with additional needs. Where this is not to be installed as part of the current project, provide blanked off power and data connections at ceiling level to allow future retrofitting.

- Consider the installation of hearing enhancement technology such an induction loop or soundfield system.

- Consider what audible technology may be beneficial. This can range from audible wayfinding technology, a public announcement system, or simply an audible alarm warning associated with a power operated door.

- Provide ample sockets in all key spaces to allow flexibility for the use of technology.

- Provide CAT 6 data cables in all key locations for non-wireless technology.

- Provide exterior plugs and exterior data cables for installation of external technology.

04

Technology for Multisensory Stimulation

Design considerations and awareness

Technology can be used within the ELC setting to enhance the multi-sensory and interactive learning environment for all children. More specifically though, it can be used as multisensory therapy for children with sensory processing difficulties or children with developmental conditions such as ADHD.

↘ 42 Tigers Childcare, Blanchardstown, Dublin.

Design features

- **Fish tank and lights creating a calm and multisensory experience for children who can watch the fish and lights, hear the bubbling water and touch the glass.**

Some settings employ a sensory room fitted with technology to stimulate the senses through light, touch, or sound. These technologies include bubble tubes, fibre optic sprays, sound therapy, and gentle vibrations for tactile stimulation.

Technologies used in the external environment include coloured lighting with changing patterns or moods, lighting or digital projections, proximity, or accelerometer sensors which trigger an object to react to a child's behaviour, or acoustic devices which emanate sounds if they are touched.

↘ 43 Cheeky Cherubs, Ballincollig, County Cork.

Design features

- A light table provides sensory learning opportunities for children. They can explore the colours, shapes and textures of varied materials. The soft light can be soothing for children.

↘ 44 Kidz @ Play School, Maynooth, County Kildare.

Design features

- A sensory room can provide a calming space for children. A space like this can provide a range of experiences to help children develop and engage their senses. These can include lights, colours, sounds, sensory soft play objects and aromas.

Universal Design Guidance

- Provide ample sockets in all key spaces to allow the flexibility for the use of therapeutic technology throughout the setting.

- Provide CAT 6 data cables in all key locations for non-wireless technology.

- Provide exterior sockets and exterior data cables for installation of external therapeutic technology.