City of Richmond

Child Care Design Guidelines

December 2019

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The City of Richmond would like to acknowledge the groups who contributed to the development of these child care design guidelines: The City of Richmond Child Care Development Advisory Committee, Developmental Disabilities Association, Richmond Centre for Disability, Richmond Society for Community Living, and the Society of Richmond Children's Centres.

1.0

Introduction

1.1 Mission Statement

The City of Richmond is committed to working with senior levels of government, the business community and the non-profit sector to develop child care spaces. Creating high quality, accessible child care facilities is a priority. The City wishes to promote the construction of new facilities that are designed to provide healthy, secure and inspiring environments for children while also addressing the needs of early educators, parents and caregivers.

1.2 About the Child Care Design Guidelines

The City of Richmond Child Care Design Guidelines were approved by City Council on September 14, 2015 as an administrative document to be updated from time to time.

The City of Richmond provides the following Child Care Design Guidelines (the "Guidelines") to assist City staff and the development community in the creation of child care space within Richmond for child care space in city-owned or city-leased premises. The Guidelines are provided to the public as a resource on an information only basis. While the content is thought to be accurate on the publication date shown, the Guidelines are provided on an "as is" basis and without warranty of any kind, either expressed or implied. The City of Richmond, its elected officials, officers, agents, employees and contractors will, in no event, be liable or be responsible for losses or damages of any kind arising out of the use of the Guidelines. Changes may be made to the Guidelines without prior notice.

The information contained in the Guidelines is subject always to the provisions of all governing legislation and bylaws including, without limitation, the BC Building Code, the Community Care and Assisted Living Act (BC), Child Care Licensing Regulation (BC), the City of Richmond Building Regulation Bylaw 7230, the City of Richmond Zoning Bylaw 8500, and the City of Richmond Subdivision and Development Bylaw 8751, all as they are amended or replaced with more current information.

1.3 Intent of the Child Care Design Guidelines and How They Are To Be Applied

The intent of the Child Care Design Guidelines is to provide clarity for developers, architects and child care operators regarding the City's expectations for the design and finish of child care facilities that will become municipal assets. While the document may be used as a resource by anyone considering building new child care facilities in Richmond, it will only apply to child care facilities built as City capital projects or developer-built community amenity contributions related to rezoning processes.

With these design guidelines, the City signals its intention to collaborate with the development industry to help deliver child care facilities that meet the needs of residents and employees who live or work in Richmond. The intent is not to provide minimum standards of design, but to establish guidelines that engage the creative talents of designers and developers to help deliver quality facilities.

1.4 City of Richmond's Commitment To Quality Child Care Facilities

The City of Richmond is committed to the delivery of accessible, affordable and quality child care facilities in the city, to promote the health and well-being of children and families, and to help foster overall economic stability and growth in Richmond.

The City has a strong history of facilitating the development of quality child care facilities and services, based on the following core planning principles:

- Meet the needs of the community, and provide child care options that Richmond families require to enhance socio-economic opportunities in the city;
- Provide quality spaces, indoors and outdoors;
- Provide for play-based learning;
- Provide for a welcoming transition between the family home and the child care place;
- Incorporate best practices in the development of child care facilities;
- Commitment to best practices for sustainable development;
- Commitment to principles of accessibility and universal design in the pedestrian environment;
- Development of resilient buildings for child care uses, that are durable and that minimize maintenance costs over the life of the facility;
- Commitment to sound management of public funds and working pro-actively with all stakeholders in the delivery of child care.

1.5 The Importance of Understanding How a Child Care Program Operates

Child care facilities are relatively complex building types with a specific set of building requirements. Central to the design of successful child care facilities is an understanding of the activities and routines that organize the daily life in the child care facility, and how these relate to specific age groups. To further this understanding, the following examples of daily routines in two age-specific child care groups are outlined.

The child care environment sets the stage for interactions and engagement with families; caregiving routines; play and learning. It is essential that consideration be given to the overall experience and feel of the space to create a welcoming and inclusive setting that promotes socialization, nurturing care and learning.

For additional information on the context of child care in British Columbia, please refer to the British Columbia Early Learning Framework available at https://www2.gov.bc.ca/gov/content/education-training/early-learning/teach/early-learning-framework.

Table 1: Examples of a Typical Day in a Full-day Child Care Program

Time	Group Care Under 36 Months	Group Care 30 Months to 5 Years
7:00 – 9:00am	• Centre opens. • Gradual arrival of children and families. • Free play; a variety of materials and spaces may be in use.	• Centre opens. • Gradual arrival of children and families. • Free play; a variety of materials and spaces may be in use.
9:00 – 10:00am	• Caregiving routines (diapering, morning naps, morning snack). • A range of small group activities (art, sensory, science, music etc.).	• Transitions to new activities. • Washroom routines, morning snack. • Small group meeting or activities (cooking, science, art, music). • Preparation for outdoors.
10:00 – 11:00am	• Dressing for outdoors, outdoor play or walks.	• Outdoor play.
11:00 – 11:30am	• Come inside, hand washing and preparation for lunch.	• Transition to indoors, hand washing, lunch, washroom routine.
11:30am – 12:30pm	• Lunch, diapering, preparation for nap.	• Lunch time.
12:00 – 3:00pm	• Nap or quiet activities for those who do not nap in the pm.	• Nap time for those who need it. • Quiet activities for those who do not nap.
2:00 – 4:00pm	• Wake up/free play/caregiving routines (diapering, afternoon snack).	• Wake up/free play or washroom routine.
4:00 – 4:30pm	• Small group activities (stories, songs, music, dancing), gradual departure of children begins.	• Snack available (may coincide with free play).
4:30 – 5:30pm	• Outdoor play.	• Outdoor and active play. • Gradual departure of children begins.
5:30 – 6:00pm	• Indoor free play / Centre closes.	• Indoor free play and activities / Centre closes.

Note: These are examples of daily routines. Times are typically flexible, allow for gradual transitions and may be adjusted to meet the needs of children.

2.0

Definitions Pertaining to Child Care

Child care operation and development has a regulatory language that is specific to the needs and requirements of child care facilities. It is important that the terms used in the regulation and development of child care facilities are well understood.

Definitions from Government of BC's "Child Care Licensing Regulations" or from Vancouver Coastal Health's "Design Resource for Child Care Facilities"—used by permission.

Children

- Infant: a child under the age of 18 months.
- Toddler: a child between 18 and 36 months.
- Preschooler: a child who is at least 30 months of age but has not yet entered Grade 1.
- School Age Child: a child who has entered school, typically between 5 and 12 years of age.
- Child requiring extra support: a child who for physical, intellectual, emotional, communicative or behavioural reasons, requires support and services that are additional to, or distinct from, those provided to other children.

Adults

- Parent: a parent of a child and includes, if applicable, the child's guardian, the person legally entitled to custody of the child, or the person who usually has the care and control of the child.
- Licensee: the person or organization who holds the license for the facility.
- Manager: the individual whom the licensee has authorized to manage the operation of the community care facility; person responsible to ensure that the program complies with all relevant legislation and regulations.
- Qualifications for Employees and Early Childhood Educators: the knowledge, skills, and abilities that early childhood educators must demonstrate to be certified in B.C. as set out in Provincial regulations and Child Care Sector Occupational Competencies.

Definitions Pertaining to Child Care Facilities

- Community Care and Assisted Living Act: the over-arching Act that encompasses the Child Care Licensing Regulation.
- Child Care Licensing Regulation: the regulation that describes requirements for establishing and operating child care facilities in British Columbia.
- Community Care Facilities Licensing (CCFL) Program: responsible for the licensing and monitoring of child and residential licensed facilities. In Richmond, the program is administered by Vancouver Coastal Health.
- Standards of Practice: the Director of Licensing may create additional Standards of Practice as permitted under the CCFALA and these are enforceable as regulations. At the date of printing of this document there are four standards of practice that apply to licensed child care facilities: Active Play, Family Child Care, Safe Play Space, and Water Safety.
- Environmental Health Inspections: Environmental Health Officers from Vancouver Coastal Health inspect and license commercial kitchens within a facility. They may also inspect child care facilities in cooperation with CCFL. While not involved in the design process of a child care facility, an Environmental Health Inspection may periodically occur at licensed child care facilities.
- Facility: a building or portion of a building in which licensed child care is provided, including the outdoor area dedicated to the program.

- Developmentally Appropriate: this term means that the space in the facility, and the interactions, activities, equipment and materials are appropriate for the age and expected range of skill levels of the children participating.
- Child Care Program: typically describes licensed child care which takes place outside an individual's home and may be provided for up to 13 hours per day. It includes:
    - Group Care (Under 36 Months): a program that provides care to children who are younger than 36 months old, commonly referred to as infants and toddlers;
    - Group Care (30 Months to School Age): care for children between 30 months and school age (typically 5 years old);
    - Preschool: care for children 30 Months to school age for no more than 4 hours per day;
    - Group Care (School Age): care for children who have entered Kindergarten and are up to 12 years of age, provided before or after school hours or on a day of school closure;
    - Multi-Aged Child Care: care for children of a variety of ages from infants to 12 year olds (8 is the maximum group size);
    - Family Child Care and In-Home Multi-Age Care: care provided by a licensee in their own home (7 or 8 is the maximum group size depending on the qualifications of the caregiver);
    - Occasional Child Care: care provided on an occasional or short-term basis;
    - Child Minding: care provided by a licensee while parents are attending on-site activities or programs and immediately accessible—not the focus of these Guidelines.

Other

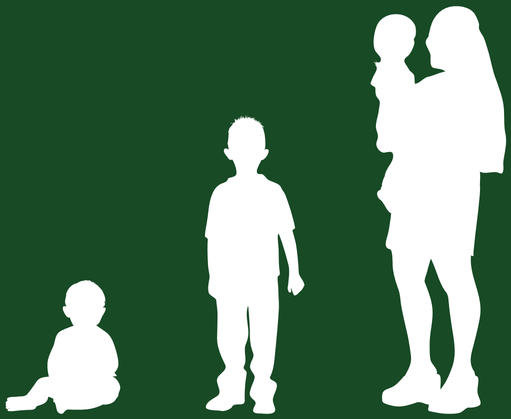
- "City as a Future Owner" Team: the City has a role as the future owner of a child care facility to ensure the space being proposed and built meets its requirements. This role is separate from the City's regulatory or approval roles (i.e. Development Permit and Building Permit issuance) and the team involves staff from Community Services, Parks, and Engineering and Public Works.

The main emphasis in the Child Care Design Guidelines is on the needs and requirements of child care provided outside the caregiver or child's home, rather than in-home multi-age care, family child care or occasional care. The reason for this is that these types of child care provide the largest number of spaces, are the most regulated and may take place in the most diverse settings.

Child care environments contribute to the learning, relationships and well-being of the children and adults who spend time in them. It is crucial that the child care facility be designed with quality care in mind, and provides interesting, challenging, safe and appropriate indoor and outdoor spaces that children need to positively support their growth, early childhood education, and fun.

3.0

Developing a Child Care Facility: Overview of the Process



The City will work with the development community, child care operators and Vancouver Coastal Health Community Care Facilities Licensing to help create high quality, licensed child care facilities. To facilitate the process, it is important for project applicants to follow an appropriate methodology in order to promote successful applications. An overview of the process would include:

- Determination of community needs and identification of a site. Preliminary project discussions with CCFL and City staff;
- Discussion of size of program and financial viability. A detailed business plan is recommended;
- Review of the typical approvals process; and
- Review of Provincial requirements of an application for a Child Care License with Community Care Facilities Licensing (CCFL) at Vancouver Coastal Health.

3.1 City Approvals

A rezoning or development permit may be required for a child care project. Approval of these applications will be required before applying for a building permit. A breakdown of steps to complete a child care facility and the roles for each milestone are outlined in Table 2.

Table 2: Typical Process for the Development of a New City-owned Child Care Facility

Process	Details	Role of the Developer	Role of the City	Role of Child Care Operator
1. Rezoning Approval	• City approval that allows land use and density. • A rezoning application must show site plan, building amenity location, size, sun orientation, parking/ loading and garbage/ recycling locations. • Must demonstrate that sufficient indoor and outdoor space can be provided with adequate circulation, access and egress to meet City zoning regulations, Child Care Design Guidelines and Technical Specifications, and Provincial (CCFL) regulations.	Submitted by the Developer/ Architects	Coordinated with Development Applications and City as a Future Owner Group	
2. Construction Agreement	• A construction agreement will be registered to secure the facility construction. • This agreement may be completed prior to rezoning adoption; in the case of the construction agreement not being in place prior to rezoning adoption, a no development covenant will be put in place to restrict building permit issuance until the agreement is registered on Title.	Coordinated with the Developer	Coordinated with Development Applications and the Legal Department	
3. Development Permit	• City approval that confirms architectural form and character. • A development permit includes design drawings that incorporate City zoning regulations, the Child Care Design Guidelines considerations, the Provincial [CCFL] regulations and a high level of urban design.	Submitted by the Developer/ Architects	Coordinated with Development Applications	
4. Building Permit	• City approval that allows construction to begin, comprised of working drawings and specifications that demonstrate compliance to the BC Building Code, Richmond Zoning Bylaw requirements. • Child care facilities typically are considered "Assembly" type occupancies in the BC Building Code. [The City's Building Approvals Department should be consulted regarding Code requirements for these occupancies].	Submitted by the Developer/ Architects	Coordinated with City as a Future Owner Group Approved by Building Approvals	
5. Final Inspection Card (Occupancy)	• City final inspection approval of the constructed facility, indicating that it is ready for occupancy.		Issued by Building Approvals	
6. Richmond Fire Rescue (RFR)	• City final inspection approval of the constructed facility, indicating that it is ready for occupancy.		Requested by City as a Future Owner Group Approved by Richmond Fire Rescue	
7. Child Care Facility Application	• The operator will be required to submit a child care facility application to the City's Building Approvals Department and ensure CCFL has stamped the plans. The City's Building Approvals Department will review the proposed licensed capacity and staff numbers to confirm the facility's occupancy load is consistent with previous City approved building plans. The application must be approved prior to a Provincial child care license being issued.		Approved by Building Approvals	Requested by Child Care Operator

Process	Details	Role of the Developer	Role of the City	Role of Child Care Operator
8. Licensing Approval	• Once the City issues a Final Inspection Card, CCFL will inspect the completed facility to ensure all Provincial requirements have been met, to enable issuance of a final license to the Licensee/ Operator.			Requested by Child Care Operator Approved by Child Care Facilities Licensing (VCH)
9. Substantial completion letter is issued by the City as Future Owner	• The City as Future Owner will issue a Certificate of Substantial Completion once the facility is constructed and finished, with Occupancy & RFP approvals, in accordance with IFC plans and the Terms of Reference, and the CoR Child Care Design Guidelines.		Issued by City as a Future Owner Group	
10. Legal Title to the Facility	• A legal title to the child care facility is created and ownership is transferred to the City.		Coordinated by City as a Future Owner Group	

3.2 Required Consultants

- Architect
- Landscape Architect
- Code Consultant
- Mechanical Consultant
- Electrical Consultant
- Structural Consultant
- Civil Consultant
- Interior Design Concept Expertise (in-house or external contract)
- Cost Consultant
- Commercial Kitchen Consultant (if there is a commercial kitchen in the facility)

3.3 City Review as Future Owner of the Child Care Facility

The City has an additional role as the future owner of a child care facility to ensure the space being proposed and built meets its requirements. This role is separate from the approving role and involves staff from Community Services, Engineering and Public Works, and Real Estate Services. Their role will involve input into the type of real estate entity that is negotiated, and all plans and specifications. Staff from these City groups will follow the project from rezoning application through to final occupancy and post occupancy.

During the construction process, the City will participate in the regular site construction meetings, held by the developer, and will review the construction phase of the amenity at the following milestones:

- Framing complete;
- Mechanical, electrical and data rough-in complete;
- After data cable installation;
- Before T-bar ceiling installation;
- After millwork installation;
- After painting is complete;
- After subgrade preparation for exterior works;
- After exterior surface works and landscaped areas are in place;
- After irrigation system is installed;
- Deficiency review;

- Final walk-through;
- Owner demonstration/orientation.

A project schedule, that includes the above milestones, is to be provided to the City at project commencement and updated regularly. The City is to be provided with two weeks' notice prior to each inspection.

The City will also attend warranty reviews, after completion of the construction, as needed.

3.4 Provincial Regulations and Licensing Approvals

- The child care operator is responsible for applying for a license for City-owned child care facilities. The City will select an operator through a request for proposals process. In the absence of a secured child care operator, the City will act on the operator's behalf through staff or consultants.
- Specific details, requirements and directions are provided by CCFL to ensure proposed programs comply with all current Child Care Licensing Regulations. A Community Care Facility License is approved by Vancouver Coastal Health – CCFL.

3.5 Establishment of a Maintenance Period for Landscaping

- A one year maintenance period is established for landscaped areas outside of child care fence and on the City property. The maintenance period begins on the date that substantial completion was awarded by the City.
- The developer is required to maintain the exterior works for one year from the date that substantial performance is awarded.
- Landscaped areas are to be maintained as outlined in the "Establishment Maintenance" section of the current edition of the Canadian Landscape Standard for the duration of the Establishment Maintenance Period.
- A final field review of the landscaped areas is to be scheduled within the growing season (April 1 to September 15) at least one month prior to the end of the Establishment Maintenance Period to ensure that all deficiencies have been addressed prior to maintenance take over by the Operator. The developer, the maintenance contractor, childcare operator and City Parks to be present.

4.0

Facility Design Considerations

4.1 Context and Environmental Concerns

4.1.1 Location in the Community

A child care facility should be strategically located to serve local needs in the community, and centrally located, close to other community facilities such as community centres, schools, libraries and parks.

A child care facility may be provided in a stand-alone building, but as Richmond grows as an urban centre, child care facilities may be successfully located in mixed use projects and commercial zones, provided that attention is given to design the project to mitigate negative elements such as traffic or building systems noise, emissions or noxious fumes. Child care facilities should not be located close to major traffic routes, such as highways, or near industrial uses. A child care facility is also restricted in high aircraft noise areas, as outlined in the Official Community Plan.

4.1.2 Adjacent Uses and Security Considerations

Safety and security are important considerations when planning a child care facility. Typically, the facility is located so that it is highly visible from the street with a well-lit entry to reduce the possibility of vandalism. However, the safety and security of the children is of paramount importance, meaning the boundaries of the child care facility have to be carefully designed to allow for controlled access and exit from the facility. Designers of child care facilities can benefit from knowledge of "CPTED" principles, or "Crime Prevention Through Environmental Design". CPTED principles can inform the process of designing a successful child care facility.

4.1.3 Zoning

The City of Richmond's Official Community Plan [OCP] and Zoning Bylaws guides the growth and development in the city. When reviewing a possible site for a child care facility, the zoning and allowable uses for the site must be determined and early contact with City staff is encouraged to ensure there are no land use regulatory issues associated with a specific property.

4.1.4 Relationship to Grade

Child care facilities should be designed to provide barrier-free, same level access from the exterior to the interior of a building. This allows for wheelchair accessibility, freedom of movement for strollers, and eliminates tripping hazards for users. If a child care facility is proposed for an above grade building level, or on upper floors of a building, an elevator is required. The elevator needs to be of sufficient size and capacity to handle triple strollers, and transport landscape materials for outdoor play areas.

4.1.5 Relationship of Indoor and Outdoor Spaces

Ideally, outdoor spaces are provided at the same grade as the indoor space and contiguous with it. The two should be planned together. If minor changes in grade cannot be avoided, ramps could be installed to ensure accessibility of all indoor and outdoor spaces.

4.1.6 Urban Design Considerations

A child care facility has the potential to be a highly visible and attractive focus in the community, with the opportunity to share architectural and landscape features with the public realm in a positive and attractive way. The urban design possibilities of the child care facility need to be carefully and creatively considered.

4.1.7 Importance of Natural Light

Natural lighting is important in child care facilities. It is recommended that window areas be generous, but measures should be taken to avoid solar heat gain and glare. A window area of at least 20 per cent minimum of the wall area is preferred in child care activity spaces, and an even higher percentage could be considered to promote day-lighting and less artificial lighting.

4.1.8 Relationships with Neighbours

When designing and selecting locations for child care, consideration should be given to residential and commercial neighbours, and thought given to proximity to others, noise, visual aspects of the facility (e.g. window placement), lighting at night, window coverings, privacy for child care users and others.

4.1.9 Access

Walking, Biking, Transit

- As Richmond continues to grow as an urban centre, in areas of higher residential density, the preferred means of access to a child care facility will be as a pedestrian. Richmond’s flat topography is highly amenable to walking and biking. A barrier-free, accessible, pedestrian oriented access to the child care facility is important.
- Barrier-free design also promotes ease of movement for parents with bicycles, bicycle trailers and strollers. Covered and secured storage needs to be provided for these items. A family stroller storage area needs to be provided in a convenient location preferably close to the facility’s entrance.

Vehicular Access, Drop-Off and Parking, Parking and Loading Regulations, and Emergency Access

- Although Richmond will continue to grow as a pedestrian-oriented urban centre, many trips to the child care facility may be by car, and service and emergency vehicles must be able to also access the child care facility.
- The City of Richmond Zoning Bylaw sets minimum staff, visitor and bicycle parking and loading space requirements. Consideration also needs to be given to the location of drop-off areas where parents can leave their vehicle for a short time, and safely deliver their child to the child care facility without having to cross other moving traffic areas. As sometimes there is competition for drop-off spots, consider providing “staging areas” where parents can line up and orderly wait in their vehicles for a drop-off space to become available.
- Locate child care parking spaces, close to the front door if parking is provided in a surface parking lot. If the parking is provided in a parkade, then locate the parking close to the elevator. The goal is to provide convenient access for families and address security considerations for the staff opening and closing the facility. The size of parking and drop-off spaces are recommended to be generous and practical for use by parents with small children. A 10 foot wide parking stall is preferable. Parking stalls for the child care facilities are to be signed, with times noted (ideally, reserved and dedicated for the child care facility’s use 24 hours per day, seven days per week).
- Ensure a safe passage route is provided in parkades to minimize conflicts between cars and people.
- Other vehicle movement considerations will include access for service and delivery vehicles, garbage trucks, and emergency vehicles. As all of these parking, loading and traffic movement issues can be quite complex, early contact with the City’s appropriate departments is encouraged.
- Shared parking for a child care facility with commercial or residential units is not permitted.

4.1.10 Security

Fences and Boundaries

- For rooftop or above grade play space for child care facilities on upper levels of a building, fences should be set back from the roof parapet line to prevent feelings of vertigo, yet still provide opportunities for long views by including generous areas of glazing. All rooftop fences and glazed screens must be non-climbable and a minimum of eight feet high.
- Outdoor play spaces must be secure to keep children safe. Fences must be non-climbable and secure. For at grade outdoor play spaces, fencing that has open or glazed portions is desirable, to permit “casual views” of passer-by activity.

Gates and Security

- Gates along perimeter and separation fencing should be equipped with latches that are difficult for children to open. Child-proof latches along perimeter fencing need to be placed on the outside of fencing out of reach of children. Gates may also be equipped with self-closing devices or local alarms.

- Child-proof latches however, should not compromise safe egress and fire-exiting from the child care facility, as required by BC Building Code. Gates that serve as fire exits may require non-locking panic hardware. This could be a 15 second delayed panic hardware, however it must be non-maglock with a localized alarm, and hard-wired to the facility's fire alarm system. Consult the Developer's Code Consultant and City's Building Approvals Department for more information.

Access Control

- Controlled access to the child care facility and program areas is required to ensure safety for the children and staff. Child care facilities require a locked front door, ideally with glazing that enables staff to see who is at the door before allowing entry. Most facilities will not have a staffed reception area where guests can be greeted; conditions need to be in place to allow staff to visually confirm who is at the door, converse with them without having to open the door, and to permit entry with an electronic door release.
- If access to the child care entry is in a remote location from the front door, such as a front yard gateway entrance, an enterphone with video monitoring and a staff-controlled entry buzzer are strongly recommended.
- Doors that lead into each program space must be secured with card or keypad controlled access.
- Gates or doors in security sensitive locations, or where exiting is onto a high risk location such as a main road, are also alarmed so that staff are aware that a gate or door has been opened and can monitor who has entered or exited. An override button is also installed to avoid the alarm sounding when authorized entry or exit is made.

Limiting Access in Mixed Use Buildings/Shared Facilities

- Unless they are accessed directly from the street or some busy pedestrian thoroughfare like an interior mall, child care facilities in multi-use buildings must have access routes that are well-lit and secure. If the child care facility is located on an upper floor, elevator access should be designed so that it is safe for children and families, with the elevator not opening directly into the child care facility when the upper floor is reached, but rather into an entrance lobby with controlled access into the child care facility. Alternately, a dedicated elevator that serves only the child care facility could be considered, with access control installed at the lower entry level.

4.1.11 Public Art

The integration of public art animates the built and natural environment with meaning, contributing to a vibrant city. Where public art is provided with a child care facility, special care should be taken to ensure that the art work is relevant and safe for children and contributes in a positive way to the child care environment.

4.2 Facility Design – Interior Spaces for Child Care

4.2.1 City of Richmond Design Guidelines and Provincial Child Care Licensing Regulations

While many options may be considered for the size and age specific types of a child care program, one fundamental concern in developing a child care facility is the economic viability of the child care service. Typically, the greater potential for viability, and for which there is significant demand in the city, is for group (all-day) child care programs (as outlined in the definitions).

For all licensed child care facilities, there is a core standard of indoor and outdoor spaces that must be provided, and the size of each of these components should fulfill the City of Richmond's recommended minimum area requirements, which (as noted), are informed by provincial legislation and enforced by Vancouver Coastal Health's CCFL.

Please refer to Appendix A: Space Summary Tables for various types of child care programs. Designers and developers are advised to contact the City about areas set out in its Guidelines. CCFL should be contacted concerning meeting Provincial licensing regulation. Potential operators will need to independently assess the financial/economic viability of different options within the context of their operations.

4.2.2 List of Program Spaces and Activity Areas and Settings – Group Child Care

A. Spaces and Areas Required

The following table sets out the basic complement and character of interior spaces for Group Child Care. Further description of each program area is listed in Appendix K.

Table 3: Space Requirements for a Licensed Child Care Program

Space	Description
The Entry	The front door is the face of a child care facility and benefits from a design that provides a warm and welcoming sense of arrival.
The Cubby Area	Located near the entry and/or access to the outdoor play area. Provides storage space for children's bags as well as room for changing into outdoor play gear.
The Activity Room	Typically located in close proximity to the entry and adjacent the Cubbies. The activity room is the largest of the child care program spaces, with the other spaces typically arranged contiguous to it.
The Gross Motor and Nap Room	For all full-day programs, a nap room that meets CCFL size requirements is required. This room is also used for gross motor and play activities in Group Care (30 months to school age) programs, and should be designed so it can open up to the activity room to promote shared use of the two spaces. It should be located away from noisy areas.
The Quiet Room	The quiet room is a separate room or area with a door for quiet activities involving one staff and a small group of children.
The Kitchen	Open to the activity room, the kitchen is used for preparation and clean-up of snacks and lunches.
Child Care Support Spaces	Other spaces support each child care program: 1. Storage spaces: active storage, semi-active storage, storage rooms, sleeping mat/cot storage, stroller storage, emergency equipment storage 2. Children's washrooms 3. Accessible washroom and staff washroom 4. Administrative office 5. Staff break room 6. Parents room 7. Laundry room/ space 8. Janitor's room 9. Garbage and recycling room 10. Service rooms: mechanical, electrical and IT/data room or closet

B. General Interior Design Considerations

Circulation

- Generally, avoid corridors and provide "open plan" types of space planning.
- Ideally, support spaces open directly into activity areas.

Column Free Design

- Avoid columns that impede activity, flow of movement or supervision and sight lines for educators/staff. Column placement should not impede program design.
- Avoid columns at exterior walls that could create entrapment areas for children.

Opening Windows

- To provide fresh air ensure windows can be opened. However, restrictors are required to ensure windows cannot be opened more than 4 in.
- Provide window screens for all operable windows.

Ceilings

- It is ideal if the activity room, and the gross motor and nap room areas have ceilings with at least 10 ft. of clearance from floor to finished ceiling.
- Where ceiling heights exceed 10 ft., sound dampening measures may be required.

Acoustics

- It is recommended that interior noise levels in all spaces occupied by children not exceed a sound pressure level of 45 dB(A) and that exterior noise levels not exceed 55 dB(A).

4.2.3 Space Summary – Facility Design Interior Spaces

As has been noted, the minimum allowable size of licensed child care programs is specified in Provincial regulations, which also sets out staff to child ratios. These regulations may change from time to time and, where there is inconsistency with this information, the regulations shall be deemed accurate on any regulated requirements.

Typically, more dense urban settings require interior spaces that are larger than the Provincial minimum areas noted in the regulations. It should be acknowledged that the regulations are minimum standards and may not represent current best practice (see Appendix A for minimum space requirement summaries for the various licensed child care categories).

The number of child care spaces in each group noted below is in accordance with Child Care Licensing regulations and are also the optimal group size in terms of economic viability for each category of child care.

Child Care – Optimum Sizes

a) Infant Group (Group Child Care Under 36 Months) serves children from birth to approximately 18 months: maximum group size is 12 children.

b) Toddler Group (Group Child Care Under 36 Months) serves children approximately 18 – 36 months: maximum group size is 12 children.

c) Infant/Toddler Group (Group Child Care Under 36 Months) serves both age groups in a combined program: maximum group size is 12 children.

d) 3–5 Group (Group Child Care 30 Months to School Age) serves children 30 months to school age: maximum group size is 25 children.
e) Preschool serves children 30 months to school age for no more than 4 hours per day: maximum group size is 20 children.
f) School Age Group (Group Child Care School Age) serves children kindergarten age to 12 years old: maximum group size is 24 or 30 children depending on ages of children enrolled if Kindergarten and Grade 1 children are enrolled the maximum group size is 24 children. If children in Grade 2 to Grade 7 are enrolled then the maximum group size is 30 children.
g) Multiage care is a unique type of child care for children with a wider range of ages: maximum group size is 8 children.

See Appendix A for Group Child Care Space Summaries

4.2.4 Special Considerations for Partial Day Child Care

While the emphasis in Richmond is on delivering full day child care, at times the financial viability of program delivery is enhanced by space for other programs, such as preschool or school age care. School age child care is in very high demand and inclusion of this type of care in facilities is desirable.

The maximum time that children may be in care in a program licensed as preschool is 4 hours per day. School age care may be for longer than 4 hours, and could be for full day care on professional days and school breaks.

A. Preschool Facilities

A preschool child care facility is targeted for children aged 30 months to school age. Children may attend up to a maximum of 4 hours per day.

Outdoor play spaces associated with a preschool facility are recommended to be contiguous, and securely fenced, similar to an outdoor space associated with group child care facilities.

See Appendix A for a space summary of minimum net areas for a 20 space preschool facility.

B. School Age Care Facilities

A school age care program must be designed to be appropriate to the age, interests and skills/development of the children enrolled. Children in these programs will range in age from 5-12 years.

The outdoor play space for school age care is recommended to be contiguous with the child care facility.

4.2.5 Shared Facilities

Program Types and Scales of Operations

In order to enhance the operational and economic viability of child care facilities in Richmond, the City encourages developers and operators to look at shared facilities, where programs are licensed for and serving different age groups can be delivered under the same roof. Ideally, the City would like to encourage group programs for infants and toddlers in combination with care for 3 to 5 years olds. In this way, support spaces can be combined, and facilities can be delivered with less total building area and hence less cost.

Additionally, a shared facility with different age groups also allows for a sequenced graduation of children, provides care for sibling groups in one location, and provides stability and familiarity for families and children as children age.

Common Program Types for Shared Facilities

A. 37 Space Facility

12 spaces of Group Child Care (Under 36 Months) for a combination of Infants and Toddlers

25 spaces of Group Child Care (30 Months to School Age)

B. 61 Space Facility

12 spaces of Group Child Care (Under 36 Months) for a combination of Infants and Toddlers

25 spaces of Group Child Care (30 Months to School Age)

Shared space: 20 spaces of Preschool (operating less than 4 hours per day for children 30 Months to School Age) and/or 24 spaces of Group Child Care (School Age)

C. 69 Space Facility

12 spaces of Group Child Care (Under 36 Months) for Infants

12 spaces of Group Child Care (Under 36 Months) for Toddlers

25 spaces of Group Child Care (30 Months to School Age)

20 spaces of Preschool (operating less than 4 hours per day for children 30 Months to School Age)

D. 81 Space Facility

12 spaces of Group Child Care (Under 36 Months) for a combination of Infants and Toddlers

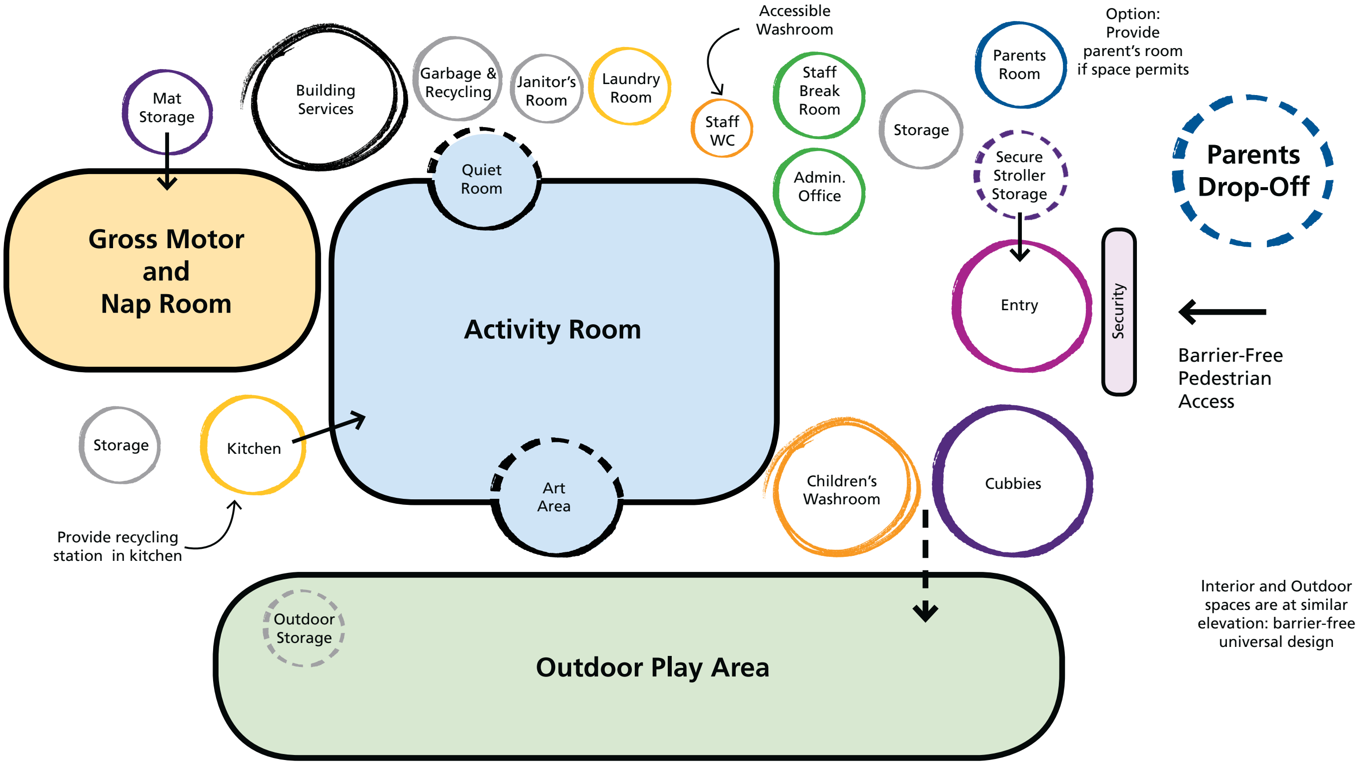
25 spaces of Group Child Care (30 Months to School Age)

20 spaces of Preschool (operating less than 4 hours per day for children 30 Months to School Age)

24 spaces of Group Child Care (School Age)

It is advised that the developer or operator discuss the make-up of the various shared facility opportunities with City staff and Vancouver Coastal Health's CCFL officials, to gain a better understanding of the potential of Shared Facilities, and the area, equipment and appliance requirements for the various shared options.

Figure 1: Group Child Care (30 months to School Age) – Optimum Spatial Inter-Relationships for Child Care Facilities: Interior Spaces


Accessible Washroom
Option: Provide parent's room if space permits
Parents Room
Mat Storage
Building Services
Garbage & Recycling
Janitor's Room
Laundry Room
Staff WC
Staff Break Room
Storage
Quiet Room
Admin. Office
Secure Stroller Storage
Parents Drop-Off
Gross Motor and Nap Room
Activity Room
Entry
Security
Barrier-Free Pedestrian Access
Storage
Kitchen
Art Area
Children's Washroom
Cubbies
Provide recycling station in kitchen
Outdoor Storage
Outdoor Play Area
Interior and Outdoor spaces are at similar elevation: barrier-free universal design

4.2.6 Early Childhood Development Hub [ECD Hub]

Conceptually, the ECD Hub is a facility, including at least two types of licensed child care groups, with additional program areas to allow for enhanced community use and offering a continuum of supports and services for families. The activities housed could include family resource and drop-in, parenting programs, and child-focused health services.

The complement of additional program areas could include, but not limited to:

- A 1,000 to 2,500 sq. ft. multi-purpose room;
- Office space and meeting rooms;
- Community gathering space;
- Reception area;
- Resource lending library;
- Commercial kitchen.

Ideally, the ECD Hub should be well situated to serve a neighbourhood, located on a transit route, and suitable as a setting for child development, family support and wellness services.

The additional area of the ECD Hub cannot be used to add to the size of the licensed components of the child care facility, unless there is an opportunity for it to meet the standards of a licensed child care program. This would require additions such as, but not limited to, dedicated contiguous outdoor play space, cubbies and additional washrooms.

4.3 Facility Design – Outdoor Activity Areas

Safe, secure, challenging and interesting, creative, open ended outdoor play areas are a fundamental requirement of successful child care facilities. The City of Richmond is committed to the provision of high quality and appropriately sized outdoor play areas that complement indoor spaces, in order to provide opportunities for active play throughout the day. Ideally, the children will have the opportunity to use the outdoor play areas a number of times during the day, to enjoy the benefits that fresh air, exercise and creative play provides.

This space is also required to enable child care operators to meet the Active Play Guidelines that form a component of the Child Care Licensing Regulations.

To maximize the use and potential of the outdoor play areas, they should be located adjacent to and complement interior spaces, and is at the same grade as the interior. The following lists the design attributes that will promote successful outdoor play areas:

4.3.1 Environmental Concerns

Environmental concerns that must be addressed include:

A. Wind Protection

Exposure to wind limits the use of outdoor play areas, especially on decks or rooftop locations. Locating building mass to shelter play areas from prevailing winds and

weather, and the installation of screens and solid fences, as well as extending building walls to serve as windbreaks, are ways to protect from the negative aspects of wind exposure.

B. Sun Exposure During Playtimes

It is important that the outdoor play areas benefit from exposure to sunlight for at least three hours per day at the winter solstice, two hours of which occur during the typical playtimes of 9:30 to 11:30 am or 1:30 to 4:00 pm.

North-facing siting for outdoor play areas may be a problem unless full sun access can be assured during these times.

Though exposure to sunlight is very important, some shade opportunities for hot summer days should be provided through the planting of deciduous trees and the strategic siting of shared structures (which may also provide some shelter on rainy days for outdoor play).

C. Provide Non-Glare Surfaces

Building material, colour value and sheen selection are important in the outdoor play areas.

Do not provide specifications for shiny materials, glossy finishes or bright reflective colours.

D. Protection From Car Traffic Noise And Fumes

Outdoor play areas should not be located where they are negatively impacted by traffic noise or exhaust.

E. Pay Close Attention To The Location Of The Building’s Mechanical Equipment And Vents

Do not locate the building’s mechanical exhaust vents in the outdoor play areas. Building mechanical or electrical equipment must be located where equipment noise, exhaust or vibrations do not negatively impact the outdoor play areas (including mists from cooling towers).

Overhead hazards (e.g. balconies, roof decks) may pose a safety risk and efforts should be made to minimize the risk of falling objects.

4.3.2 Covered and Uncovered Play Areas

The outdoor play areas are required to include covered as well as uncovered play space, all organized in play settings and activity zones that are appropriate to the ages, skills and interests of the children enrolled and to offer specific areas for exploration by children. It is recommended that outdoor play areas be contiguous with the indoor activity areas.

Outdoor play areas should offer a range of opportunities for play (e.g. active, social, dramatic and quiet) and a mix of soft landscaping, hard surfacing, and structures. They should incorporate a variety of natural materials, surfacing and textures to provide interest and stimulation.

Minimum required playable areas for outdoor play are mandated by Provincial legislation. "Playable area" is the necessary sq. footage (not including items such as planters) required for licensing and is set at 65 sq. ft. (6 sq. m.) per child. However, the City requires 75 sq. ft. (7 sq. m.) per child as a minimum in order to provide sufficient outdoor space. The City recommends that outdoor spaces meet at least 10 sq. m. per child within the City Centre area. Further information on outdoor space requirements are listed in Appendix A.

A. Covered Play Area

A covered play area is required to provide sheltered play opportunities on inclement days, and shade for play on hot summer days. The use of porches and decks is encouraged.

The covered play area should:

- Be located adjacent to the cubby area entry door;
- Be multipurpose and provide opportunities for play or small group activities, as well as for outdoor meals and active play on rainy days;
- Include secure outdoor storage to house outdoor play equipment and other items; and
- Be equipped with an adult height shelf to accommodate sunscreen, first aid supplies, and the like.
- Include exterior childproof electrical outlets on building fence.

B. Uncovered Play Areas

The uncovered play areas are to be designed to provide distinct zones to accommodate different types of play.

Physical, Active Play Area

- As per the “Standard of Practice for Active Play (Director of Licensing)” it is an expectation that children in licensed child care have space and opportunities to practice fundamental movement skills, and engage in free play, facilitated games and activities.
- An area with stationary equipment or space for loose parts for climbing, jumping, sliding, swaying and balancing.
- Off-the-shelf play equipment is acceptable, however, custom-made play equipment constructed of natural materials is preferred as it offers greater prolonged interest and stimulation.
- May include a “Trike Path”, a fun element for active play. Care must be taken to ensure the route of the path is separate from other main circulation routes and does not impact quiet play zones.

Nature Play

- Opportunities for informal nature play and discovery to be incorporated throughout the outdoor play areas. For example, raised garden beds, sensory and play value plants, soil, logs, rounded boulders, access to water and wind elements.

Social Zone

- A quiet place to sit or talk with peers or staff.
- Seating for informal gatherings, social connection, conversation, storytelling, and songs.
- Allow for shade in summer and sun exposure in winter.

Dramatic Zone

- Consider including a play house and/or a platform that can be used as a stage or informal seating.
- Sand Play or Water Play:
  - A sandbox needs to be included in each play area, and consideration needs to be given to how it will be covered and secured when not in use. Many sand play elements are contained within a separate closed structure that can be opened up to the rest of the play space when in use;
  - Provide a minimum of 12 in. of sand depth for an infant or toddler sandbox, and 18 in. for 3–5 group care and preschool groups;
  - Locate the sandbox away from entrances to interior spaces to prevent sand being tracked inside.

C. Hard Landscaping

Hardscape materials, such as paving, walls and accents, to be long-lasting, accessible, and easy to maintain. The City encourages a mix of materials in outdoor activity areas with an emphasis on natural materials and nature play.

The following is to be considered when selecting hardscape materials:

- Surfaces to be non-slip and universally accessible;
- All exposed edges on walls, furnishings and landscape accents such as boulders to be rounded and smooth to the touch. Boulders to be no higher than 18 in. in play areas;

- Protective surfacing, that meets Licensing Standard of Practice: Safe Play Space requirements, to be provided under stationary active play equipment/elements: Depths and extents of protective surfacing to adhere to the current edition of the Canadian Standards Association Playground Standard. Protective surfacing materials for consideration, include:
  - Engineered wood fibre;
  - Poured-in-place rubber;
  - Artificial turf;
- When using pea gravel or play sand, all paved surfaces to be positively drained slopes to be 2% minimum and 5% maximum and be directed towards surface drains. (Note: surface drains to be included at poured-in-place rubberized surfacing as it becomes impermeable over time);
- An engineered wood chip system such as "Fibar System 300" to be at least 1 ft. deep (install 16 in. deep, as this material compresses over time).
- Provide a minimum of 3 different surfaces.

D. Planting

Planting and soft landscaping (e.g. trees, plants, shrubs, perennials, grasses and groundcovers) offer shade, seasonal interest, screening and opportunities for informal play and discovery. Significant areas of soft landscaping are to be provided throughout the Outdoor Play Areas.

The following is to be considered when designing soft-landscaped areas and selecting plant species:

- All plant species to be native or adapted to the local climate and low maintenance. Native, evergreen and plant species with seasonal interest should be incorporated throughout the outdoor play areas;
- Automatic irrigation to be provided in all plant beds. The irrigation system to follow City requirements and details, available in Schedule H of the following document: https://www.richmond.ca/__shared/assets/Richmond_Supplemental_Specifications35748.pdf;
- Lawn to be avoided in high traffic areas, but other tactile materials should be considered (e.g. artificial turf);
- Note that the sub-grade under planted areas is to be scarified and draining freely prior to placement of growing medium;
- Growing medium depths to be:
  - 900mm min. for trees;
  - 450mm min. for shrubs and perennials;
  - 300mm min. for groundcovers and grasses;
- Toxic plant material must not be used (see Appendix J for a list of typical plants to avoid).

E. Outdoor Play Equipment

Outdoor play equipment, whether prefabricated or custom, provides physical challenges that are essential for healthy child development. Preference is for play equipment that mimics the natural environment through the use of natural materials and creative structures. Play equipment should provide challenges and promote adventure play through the use of different elevations and materials, but should also be accessible for children of varying abilities.

- All play equipment and associated surfacing needs to be safe and comply with Fire and Life Safety Requirements. It is recommended that early contact be made with the City's Building Approvals Department to review fire and life safety concerns.
  - General fire and life safety requirements:
    - Use non-combustible materials within 10 ft. of a fire exit path;
    - Locate wood structures 15 to 20 ft. away from other structures;
    - Do not locate steps in a fire exit path.
- Play equipment to provide physical challenge that is age and skill appropriate. Taller equipment to be placed at the edge of play areas to maximize use of available space, and have resiliant surfacing below as required.
  - Height Standards for Climbing Equipment:
    - Toddlers: 3 ft.;
    - Preschoolers: 5 ft.;
    - School-Age Children: 7.5 ft.
- When determining locations for play equipment, consider sun exposure and potential heat gain, and:
  - Ensure that play equipment and surfacing do not become too hot for their intended use (e.g. slides becoming too hot to sit on or surfacing too hot to walk on); lighter coloured materials will absorb less heat;

  - Provide some shaded areas within play zones;
  - Ensure that slides are coated or located in shade or part shade;
  - Use lighter to medium shades of colours for play equipment and surfacing.
- Provision of customized play equipment made from natural materials is preferred.
  - General requirements for wood and/or custom play equipment include:
    - Yellow Cedar to be used for all play equipment/ elements and other exposed wood that is handled by children;
    - Peeled logs are preferred over dimensional lumber as it lasts longer and is more robust;
    - Pressure-treated wood should not be used except when in contact with soil;
    - Where pressure treated wood is used, it should be treated with CCA-C50 wood preservative (Preservatives that contain arsenic are not acceptable);
    - Where guard rails are required around platforms on play equipment, they must be non-climbable and typically 4 ft. high minimum.
- Protective surfacing zones to be provided under and around play equipment, and allow adequate space for entering and exiting the zone to avoid accidental collisions.

F. Fences And Boundaries

- Non-climbable perimeter fences of sufficient height (typically 6 ft. minimum at grade) are required to prevent children from leaving the play area, and to prevent strangers from being able to reach or climb into the play area.
- Ensure that fencing is designed to allow for supervision of the play area from other outdoor and indoor areas within the child care program area.
- Consider fencing that allows for communication and engagement between children in different programs through the use of windows/openings (ensure to avoid head entrapment).
- Openings in fences should be no more than 4 in. in width.
- On rooftops/slab, an 8 ft. minimum height (from last foothold) perimeter fence is to be provided.

G. Outdoor Storage

Ample weatherproof outdoor lit storage should be provided for each group's play area.

- Provide sufficient lockable secure storage for outdoor toys and play equipment, wheeled vehicles, gardening equipment and maintenance tools. [Note that trikes and push toys can take up considerable space].
- Provide appropriate shelving for various items to fit in the secure storage, including play items such as balls and sandbox items, as well as sanitizer, tissues and music equipment.

H. Lighting

- Lighting that enhances play activities and allows for use of the Outdoor Play Areas on a daily basis at various times including during darker winter days or in inclement weather to be included.
- Light fixtures to be placed in plant beds and incorporated into play equipment (e.g. climbers and play huts) and/or site furnishings (e.g. perimeter fences).
- Light fixtures that produce glare should not to be used.
- Solar powered and/or LED lights are highly encouraged.
- Outdoor light fixtures to be automatic and tied to photo cells.

I. Common Outdoor Space

When two or more child care programs share the same outdoor area, provide play spaces for the various age groups. These may be separated by low fencing or planting. Provide age specific-sized play equipment, design features and play structures in each area.

Community spaces used by other facility user groups (e.g. in ECD Hubs) must be separate, secured and ensure no unauthorized access is permitted into the licensed child care spaces.

J. Rooftop Outdoor Play Areas

Outdoor Play Areas designed on building slab have their own very specific design requirements, for both new and adaptive re-use of existing buildings:

- Design the roof structure to support the weight of play equipment/elements and substantial areas of planting, with sufficient soil depth or planter depth to accommodate shrubs and small trees. Locate heavier elements over columns and beams to minimize costs.
- Extensive green roofs not to be incorporated on any portions of the child care facility.
- Intensive green roofs (i.e. planters) are encouraged.
- Include hose bibs for each program playground and provide irrigation for planted areas (see Appendix I: City of Richmond Irrigation Design Guidelines for Rooftop and Grade-related Projects).
- Include housekeeping slabs for anchoring of heavier elements in order to not penetrate roofing membranes. Consider installing modular and sectional play elements that allow for incremental roof repair in the future.
- Perimeter fencing to be non-climbable and high enough to deter objects being thrown over it. Provide a fence top with an overhang that extends back into the play area, and set the fence back from the parapet to avoid sensations of vertigo.
- Allow for lines of visibility from the play area for supervision.
- Protect play areas from wind.
- Do not locate the play area on the north side of a tower. Provide for some sun access, however be mindful that roof areas can get very hot in sunny weather. Provide for shade from the hot sun for at least one-third of the play area through trees or shade structures.
- Locate mechanical systems and equipment outside of the play areas, in order to mitigate negative impacts from associated noise and fumes.
- Consider potential need for repair of roofing membranes in the future. Provide for enhanced positive slopes for drainage at a minimum of ¼ in. in 1 ft., and accessible and serviceable clean-outs and silt traps at roof drains.
- For mixed-use developments, drainage, lighting and irrigation to be separated from other building uses/ areas.
- Use resilient, lightweight and non-slip surfaces, cushioned under play equipment fall zones as per CCFL Licensing requirements.
- Use wind tolerant and drought-resistant trees and plants.
- Ensure outdoor play areas are buffered from traffic and other disruptive noise; it is ideal to achieve a sound pressure level of 55 dBA.
- Residential balconies, decks or overhangs to be located away from children’s outdoor play area in order to minimize the potential of falling debris from balconies and to mitigate potential noise complaints from future residents.
- In the case that a residential or commercial balcony is placed above the outdoor play area of a child care program, ensure any glass used within the balcony structure is tempered and laminated.
- Suggested suitable small deciduous trees for shade and colour, suitable for rooftop planters are shown in Table 4.

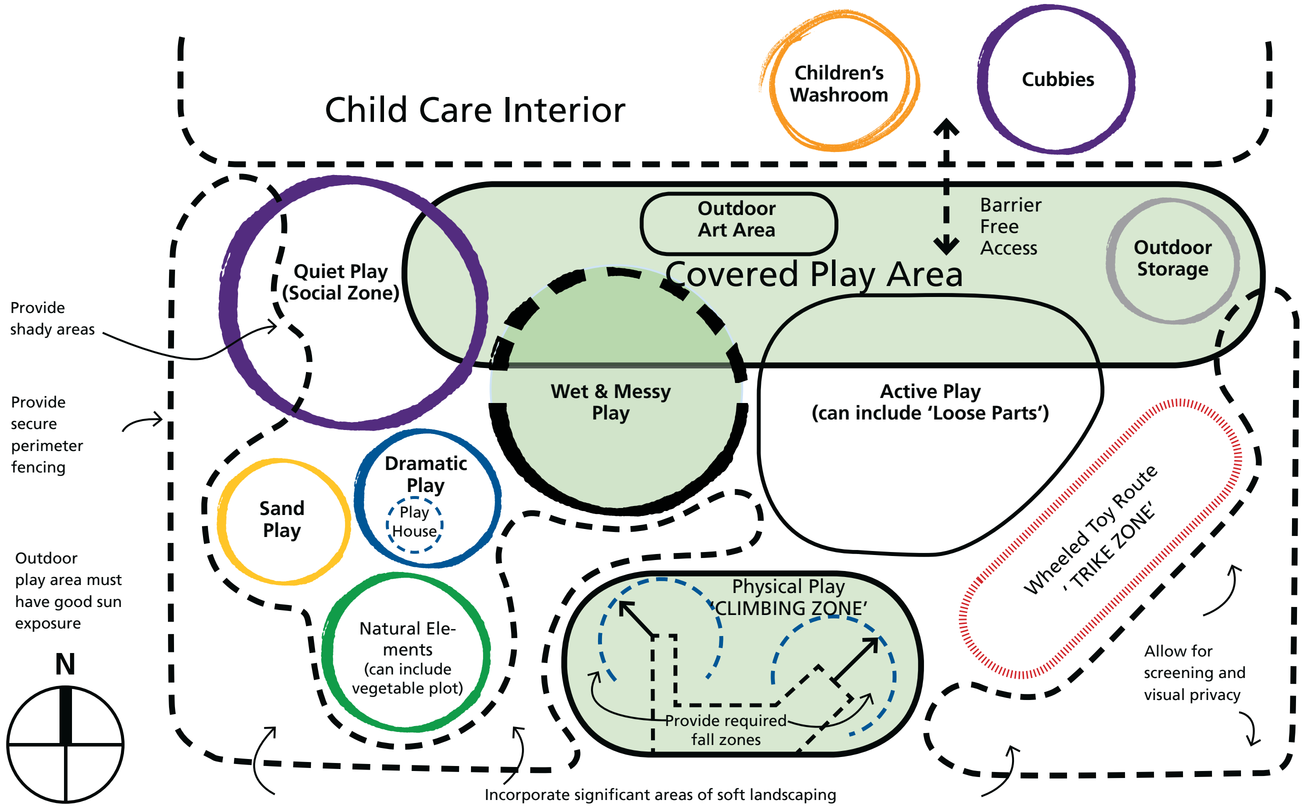
Table 4: Suitable Trees for Rooftop Outdoor Play Areas

Botanical Name	Common Name	Exposure Part
Acer campestre	Hedge Maple	Sun to light shade
Acer circinatum	Vine Maple	Part shade
Acer griseum	Paper bark Maple	Part shade
Acer japonicum	Japanese Maple	Part shade
Acer palmatum	Smooth Japanese Maple	Part shade
Cornus kousa Hybrids	Kousa Dogwood ‘Aurora’, ‘Celestine’, and ‘Starlight’	Sun to light shade
Cercis canadensis	Redbud	Sun to light shade
Magnolia stellata ‘Royal Star’	‘Royal Star’ Star Magnolia	Sun to light shade
Parrotia persica	Persion Ironwood	Sun to light shade
Pyrus calleryana ‘Chanticleer’	‘Chanticleer’ Flowering Pear	Sun to light shade
Styrax japonicus	Japanese Snowbell tree	Sun to light shade
Pinus contorta	Shore Pine	Sun
Picea omorika	Serbian Spruce	Sun

4.3.3 Outdoor Play Areas Space Summary

See Appendix A for a summary of the required outdoor play areas, for each category of child care.

Figure 2: Group Child Care–Optimum Spatial Inter-Relationships for Outdoor Play Areas


Child Care Interior
Children’s Washroom
Cubbies
Barrier Free Access
Outdoor Art Area
Covered Play Area
Outdoor Storage
Quiet Play (Social Zone)
Provide shady areas
Provide secure perimeter fencing
Wet & Messy Play
Active Play (can include ‘Loose Parts’)
Wheeled Toy Route ‘TRIKE ZONE’
Sand Play
Dramatic Play
Play House
Outdoor play area must have good sun exposure
N
Natural Elements (can include vegetable plot)
Physical Play ‘CLIMBING ZONE’
Provide required fall zones
Allow for screening and visual privacy
Incorporate significant areas of soft landscaping

5.0

Facility Technical Considerations

5.1 Purpose

The Technical Considerations are intended to be read in conjunction with the Facility Design Considerations (section 4.0) and augment design standards by:

- Outlining the design, construction, material and building system requirements for child care facilities.
- Providing a tool for preparing cost estimates early in the design process.
- Providing a checklist for consultants, who are ultimately responsible for ensuring that the completed facility meets the standards and conforms to the regulations of all authorities having jurisdiction.
- Providing clarity for turnkey developments (where the developer is turning over a completed facility to the City) regarding all facility requirements.

5.2 Applicable Regulations

Developers and consultants must ensure that all applicable regulations are met, to the satisfaction of all authorities having jurisdiction. Regulations include, but are not limited to:

- British Columbia Building Code
- City of Richmond Zoning Bylaw
- Provincial Community Care and Assisted Living Act
- Provincial Child Care Licensing Regulation
- Director of Licensing Standards of Practice - Safe Play Space
- LEED: Construction for New Stand-alone Facilities
- Commercial Interiors for Tenant Improvements
- Universal Design
- Building Envelope Regulations
- Energy Utilization and Building Performance Regulations – [ASHRAE 90.1 (2010)]

5.3 Technical Considerations For Child Care Facility Design And Construction

5.3.1 Building Construction

- Refer to BC Building Code

  A. Interior Floor to Floor Height

    - To be minimum 3.66 m (12 ft.) to allow sufficient space for mechanical and electrical equipment and maintain a minimum of 3m (10 ft.) clear ceiling heights throughout facility.

  B. Exterior Concrete Finishes

    - Shape all exposed concrete edges: min.16mm chamfer.
    - Provide a light broom finish to pavement or sidewalks for a sand-textured finish.

5.3.2 Building Envelope And Roofing

- Design and construct according to the requirements of the City's Building Approvals Department for approvals, and the City's Engineering and Public Works – Project Development Department, for design review and technical considerations.
- If the floor of a child care facility is over an unheated space, consider the use of in-floor radiant heating loops set into a concrete floor topping, or increase the insulation R-values in the floor system beyond that required by the Building Code or ASHRAE 90.1 standards.
- Exterior Openings
  - Doors and windows to meet CAN/CSA-A440 standards and best practices for Building Envelope

  - construction, including National Research Fenestration Council standards for Air Leakage, U-Factors, and Solar Heat Gain.
  - Install windows with sill heights that allow children to look out and see their surroundings (bottom sill approximately 18" to 2' off the floor).
  - Place restrictors on windows to limit the opening dimension to 4 in.
  - Ensure opening windows are not a hazard at exterior pathways.
  - Provide screens on all operable windows.
  - Pay attention to solar heat gain issues, and consider the installation of roof overhangs, shading structures or special glazing.
  - Typically, all glazing is tempered, but review if glazing needs to be a protected opening with respect to fire and life safety code compliance concerns.
- Roofing
  - Provide a 10 year roof membrane manufacturers guarantee (RCABC) and a written Contractor's Labour and Materials Guarantee for a period of sixty (60) months, five (5) years from the certified date of *Total Performance* of the work.
  - Provide roof edge safety barriers, fall protection and fall arrest as per the BC Building Code and WorkSafe requirements.
  - For approved green roofs, ensure the green roof supplier and the roofing supplier coordinate their work to ensure proper installation of roofing systems and assurance of roofing warranty coverage.
  - Consider provision of an electronic leak detection system below occupied roofs, with a web-base controller and connected to Direct Digital Control (DDC) to allow for remote non-proprietary monitoring of alarms.
- All exposed Architectural and Structural metal
  - Exposed edges, seams, connectors and hardware to have no acute angles or sharp edges.
  - Mock up typical metal locations.
  - Glazed canopies are to be both tempered and laminated such that when a panel breaks it will be held in place and not fall into the playground below.

5.3.3 Building Systems

- Heating, Ventilation and Air Conditioning–if not a stand-alone facility, the child care facility should have its own systems, separate from the rest of the building of which it is a part.
  - Filters and other maintenance items must be easily accessible.
- Acoustic Design
  - Protect the child care facility from external noise or that from adjacent occupancies.
  - Consider enhancing Sound Transmission Control (STC) ratings above those required by the Building Code.
- Interior
  - All units must be accessed without the use of temporary scaffolding or lift equipment.
  - No units installed in nap room ceilings.
  - If in an underground parking area: no units to be installed over child care parking spaces.
- Cooling Tower
  - Cooling tower should be designed, installed, operated, and maintained in accordance with ASHRAE Standard and Guideline to minimize the risk of dissemination of legionella bacteria.

5.3.4 Floors

- Provide walk-off mats at entries.
- Provide floor drains in all washrooms, the janitor's room, the laundry room, garbage room and in the mechanical room.
- At high traffic locations in the facility, such as the main entrance, lobby, entrances from the playground, and elevator use more durable flooring material such as ceramic tile.
- Provide resilient flooring in activity and wet areas. Resilient (smooth, non-absorbent, non-slip and washable) flooring required in kitchens, washrooms, laundry, janitorial closets, art areas, table areas and entry/cubby areas. Use sheet vinyl, not tiles, with welded seams.
- Carpet installed in nap rooms, quiet rooms, staff rooms and offices. Use of a neutral-coloured carpet tile is preferred in nap rooms and quiet rooms. Install a minimum ¼ in. thick underlay.
- Base to be rubber, continuous throughout, and minimum 100mm (4 in.) high.

5.3.5 Walls And Partitions

- Painted drywall is the typical finish.
- Review wall assembly types, and select those with enhanced acoustic performance.
- Use low volatile organic compound (VOC) paints and sealants, and mold and mildew resistant paints in

kitchens and washrooms.

- Ensure no sharp corners within child height (rounding of corners is preferred).
- Provide rounded/curved corner guards to avoid sharp edges.
- Provide backing in walls and partitions to secure millwork, railings and fittings as required.
- For ceramic tiled areas, use larger-sized tiles at washroom walls to minimize grout lines. Darker-coloured anti-microbial epoxy grout is preferred.
- Gloss levels:
  - G5 (semi-gloss): kitchen, washrooms, laundry, janitor's room and all doors, door frames and interior trims.
  - G3 (eggshell): typical for walls (matte finishes not acceptable).
- Wall protection is required in high traffic areas and should be considered for all other areas. Wall protection paneling to a height of at least 3 ft. above finish floor is recommended in activity areas (install on impact-resistant drywall).
  - Provide mock-up of wall panel corner and trims for approval.

5.3.6 Ceilings

- Painted drywall is one potential finish, but it can create a noisy interior environment. Acoustic T-Bar ceilings are preferred in activity rooms, nap rooms and cubby areas.
- Acoustic T-bar ceilings:
  - Install commercial quality.
  - Use low VOC paints and sealants (refer to gloss levels in Section 5.3.5).
  - Provide access for above ceiling services, except in nap rooms.
  - Finished interior ceiling to be at a preferred 3m (10 ft.) height to reduce noise, to be child friendly and for ease of maintenance including changing light bulbs. Should the ceiling be higher and accepted by the City, additional acoustic treatment is required.
  - 75% T-bar with NRC .70 or better.
- All kitchens and washrooms to have washable ceilings (can be tiles).
- Provide drywall ceiling in all areas/rooms that have showers.

5.3.7 Doors And Hardware

- Doors into any area should be glazed with tempered and laminated glass. The intent is to allow for visibility through glazing in doors by small children.
- If accordion doors are installed, ensure they have appropriate mid-door supports and are easy for staff to manoeuvre, lock and unlock.
- Avoid any installations that create "pinching" or scraping hazards, such as door grilles.

- All cabinets must have minimum 125 degree opening.
- Meet Association of Architectural Woodwork Manufacturers Association of Canada (AWMAC) standards for doors.
- Hardware
  - Should be commercial grade.
  - Should meet accessibility and universal design requirements.
  - Do not install door closers unless required by Code.
  - Door stops typically to be wall-mounted.
  - Sliding doors should have the ability to be pinned in place to prevent unsupervised sliding.
  - Swing doors to gross motor/nap rooms, and outdoor play areas should be equipped with “elephant’s foot” or similar hold-open devices.
  - Kick plates should be provided on the push side of doors with closers, and at all storage room doors.
  - System screw mounting plates required at all hinges.
  - Shelf clips that allow mechanical fastening to support brackets.

  Consider detailed specifications and supply product cut sheet for all hardware
- Locks, Security and Alarms
  - Use a City standard key system (C123 Keyway) where locks are provided.
  - Provide a lockbox embedded in the building façade for Fire Rescue [Refer to Fire Protection and Life Safety Bylaw No. 8306].
  - Review security and surveillance requirements and meet provincial guidelines.
  - Control access into the child care facility with the use of video enterphones. The enterphone should have one receiver in each activity room, one in each outdoor play area and one in the administration/staff office.
  - Equip doors to the building exterior, and certain interior doors with piezo type alarms, to prevent unsupervised wandering by children. Restrict access from elevators, parking areas and exits.
  - Where automatic door openers are provided, ensure security is not compromised by having an interlock function, so that the push plates controlling the door opening are not operable until staff allow the system to open.
- Gates
  - Use half height gate, with glazing (tempered) at children’s washroom, kitchen and cubby area.
  - Install additional support for half doors when not mounted in regular door frame.
  - Use heavy duty piano hinge for full height of gate.
  - Ensure there are no pinch points.
  - Gates should feature child-proof latches (i.e. bankers lock).
- Main door
  - Use an electric strike with card reader on the outside of the facility.
  - Easy to operate exit hardware on the inside of the facility.
  - Provide a power assist door operator for accessibility.
- Coordinate acceptable functions with security requirements to ensure that visitors with mobility challenges can use the enterphone, and staff can answer and release the door for the visitor to enter.

- A power assisted operator installed on inside of doors leading to unsecured areas (i.e. parking, street) needs to be activated by card reader.

Table 5: Lock Function Type and Commonly Used Locations in Child Care Settings

Name	Description	Where it is commonly used
Classroom	Outside unlockable/lockable by key; inside handle always unlocked.	Storage rooms Janitor rooms Program stroller storage rooms
Office	Outside unlockable/lockable by key; thumb turn or push button to lock from the inside.	Offices* Staff kitchen Parent meeting rooms
Dummy	Fixed knob or lever on one side only.	Decorative doors Cabinet doors
Passage	Latching door handles, neither of which lock.	Quiet rooms Kitchen full-size doors Preschool full-size washroom doors Gross Motor/ Nap rooms Playground gates**
Privacy	Lockable on inside commonly by thumb-turn action; emergency release on outside.	Staff washrooms Public washrooms
Storeroom/Storage	Always locked on outside requiring key for entry; inside handle always unlocked.	All electronically controlled card access doors Program entry doors Offices* Laundry Outdoor playground entry doors Stairway entry Playground gates**
Secure Gate Latch	Always locked; release on non-program side.	Interior gates on kitchen Children's washrooms Cubby gates

**Depends where the office is located (i.e. in program space or in public area).*

*** Depends on the connected spaces on either side of the gate (i.e. between programs or public space)*

- Keying:
  - C124 Keyway = City system
  - K1 = master (=K2, K3)
  - K2 = all interior doors, garbage room, exterior and interior storage
  - K3 = all exterior (entry) doors, lobby doors, underground parking
    - For millwork (cupboards, drawers, lockers etc.)
    - Individual key for each staff locker
    - All other drawers and cabinets keyed alike
    - Provide locking key box in staff office

5.3.8 Millwork

- All millwork to be child care facility standard for construction, as determined by the City as a future owner Team.
- All millwork to meet AWMAC requirements.
- Upper shelves to have a latch (for closed cabinets) or lip (for open cabinets) for earthquake safety measures.
- Millwork is not to be counted in licensed useable space calculations.

5.3.9 Room Considerations

A. Children's Washrooms

- Toilet Partitions
  - Acceptable products:
    - Plastic laminate covered high density particle board
    - Metal with baked enamel finish
    - Phenolic
- Hardware: heavy duty stainless steel with tamper-proof screws (concealed where possible).
- Countertops: plastic laminate with large-size ceramic tile backsplash with darker coloured anti-microbial epoxy grout is preferred.
- Accessories: typically recessed accessories are preferred.
  - Paper towel dispensers
  - Waste receptacle: consider under-counter receptacle with opening in washroom countertop
  - Soap dispenser
  - Toilet paper dispensers
  - Mirrors over children's sinks are required
- Plumbing
  - Toilets
    - Regular tank style water closets (WCs) with round bowls [small or "baby" child size toilets are not recommended].
    - Provide closed front ("residential") toilet seat without lids for all Children's Washroom toilets.
  - Sinks
    - Self-rimming drop in vanity sinks.
    - Faucets to have aerators for water conservation and have temperature control (120 degree F maximum). Provide mixing valves. A two handle fixed spout faucet is required.
- Infant and Toddler Diaper Change Area
  - 12 in. deep single compartment sink, with swing tap and hand spray attachment.
  - Change table millwork cabinet with space for steps and provide an opening in the countertop to access a disposal bin.
  - Provide for storage above the diaper change area, and above toilets (ensure headroom issues are not created). Counter to overhead cabinet distance to be a minimum 24."
  - Install lighting that does not shine directly into the eyes of children or cast shadows on the children being diapered and does not create excessive heat.
  - Additional space and/or special design attention is required for diaper change areas which accommodate children who need extra support.

Figure 3: Children's Washroom Sink Heights

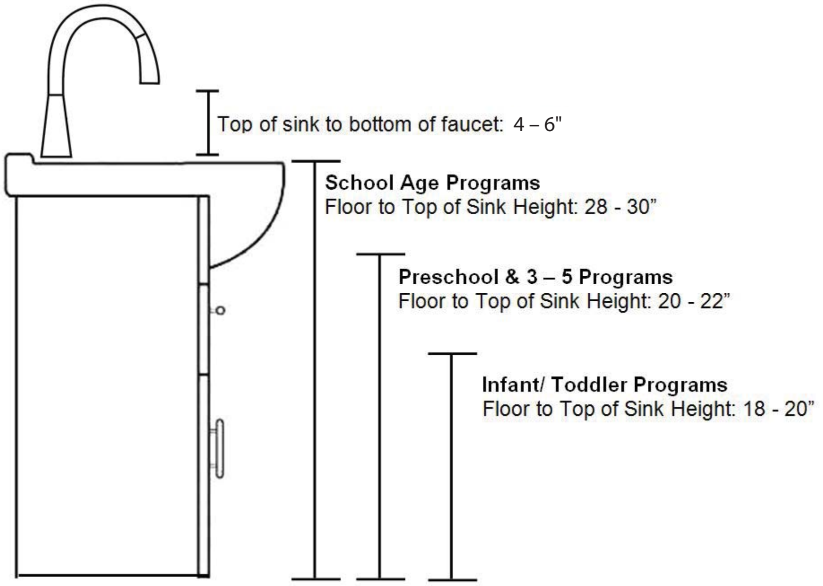

Top of sink to bottom of faucet: 4 – 6"
School Age Programs
Floor to Top of Sink Height: 28 - 30”
Preschool & 3 – 5 Programs
Floor to Top of Sink Height: 20 - 22”
Infant/ Toddler Programs
Floor to Top of Sink Height: 18 - 20”

Figure 4: Washrooms for Group Child Care 30 Months to School Age (25 Children)

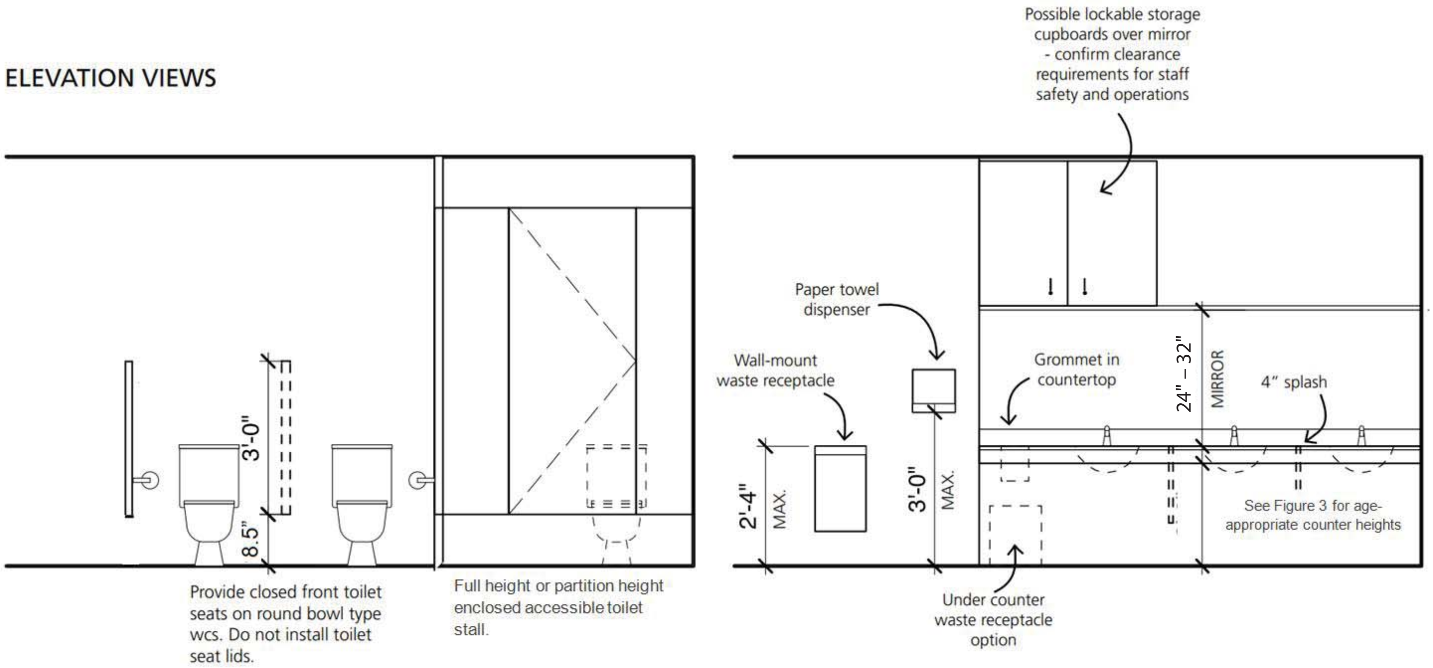

ELEVATION VIEWS
Possible lockable storage cupboards over mirror - confirm clearance requirements for staff safety and operations
3'-0"
8.5"
Paper towel dispenser
Wall-mount waste receptacle
Grommet in countertop
24" – 32"
MIRROR
4” splash
2'-4" MAX.
3'-0" MAX.
See Figure 3 for age-appropriate counter heights
Provide closed front toilet seats on round bowl type wcs. Do not install toilet seat lids.
Full height or partition height enclosed accessible toilet stall.
Under counter waste receptacle option

Figure 5: Washrooms for Group Child Care 30 Months to School Age (25 Children)

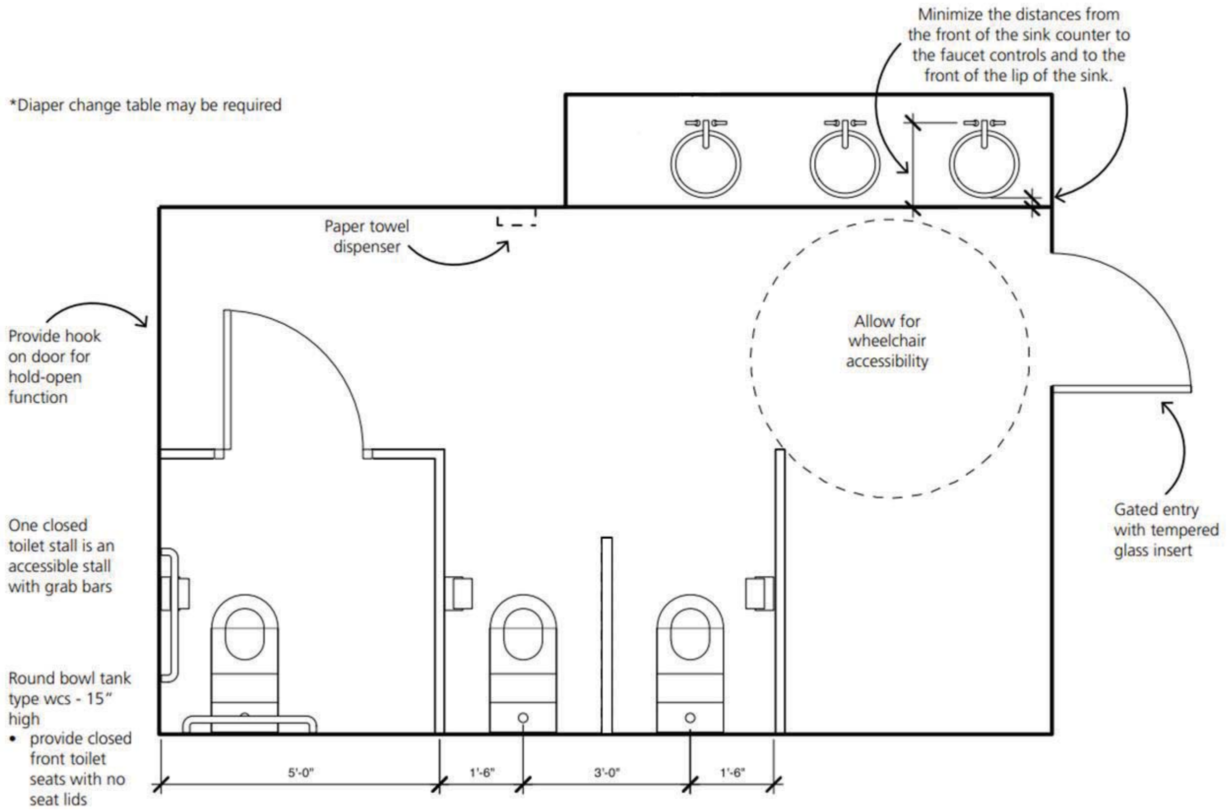
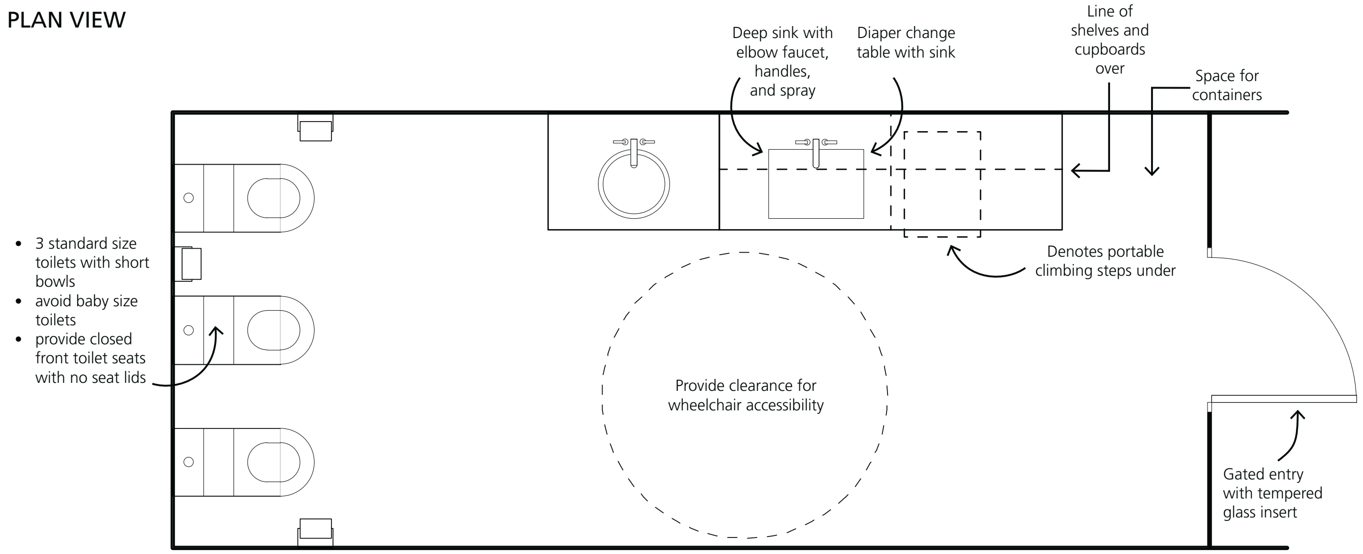

Minimize the distances from the front of the sink counter to the faucet controls and to the front of the lip of the sink.
*Diaper change table may be required
Paper towel dispenser
Allow for wheelchair accessibility
Provide hook on door for hold-open function
Gated entry with tempered glass insert
One closed toilet stall is an accessible stall with grab bars
Round bowl tank type wcs - 15" high
• provide closed front toilet seats with no seat lids
5'-0"
1'-6"
3'-0"
1'-6"

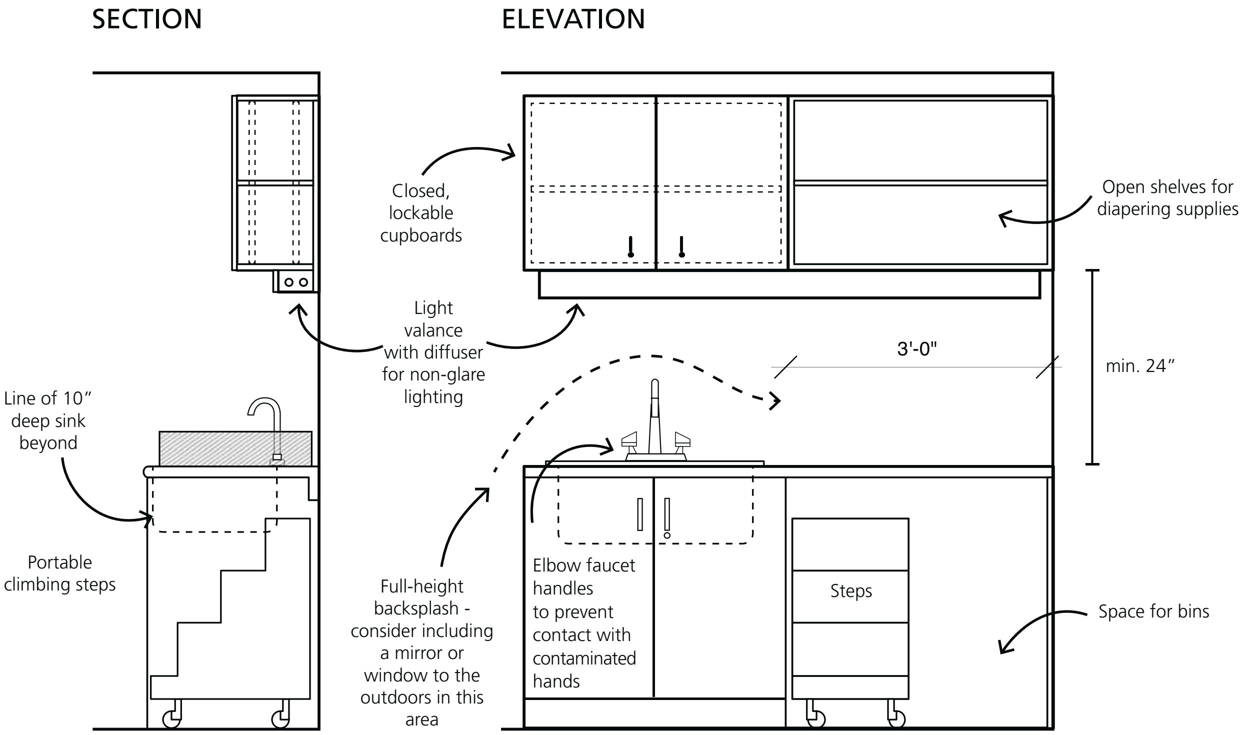
Figure 6: Washrooms for Infant and Toddler Group Care: Ages Under 36 Months (12 Children); suitable for children who require extra support


PLAN VIEW
Deep sink with elbow faucet, handles, and spray
Diaper change table with sink
Line of shelves and cupboards over
Space for containers
• 3 standard size toilets with short bowls
• avoid baby size toilets
• provide closed front toilet seats with no seat lids
Denotes portable climbing steps under
Provide clearance for wheelchair accessibility
Gated entry with tempered glass insert

- Locate this washroom and laundry room in close proximity to each other.
- Glass inserts in the walls adjacent to the gated entry are optional to enhance sightlines and permit supervision of the children.
- If only infants are being cared for then provide two diaper change table areas with both adjacent to a shared deep sink.

Figure 7: Washrooms for Infant and Toddler Group Care: Ages Under 36 Months (12 Children); suitable for children who require extra support

DIAPER CHANGE COUNTER


SECTION
ELEVATION
Closed, lockable cupboards
Open shelves for diapering supplies
Light valance with diffuser for non-glare lighting
3'-0"
min. 24"
Line of 10" deep sink beyond
Portable climbing steps
Full-height backsplash - consider including a mirror or window to the outdoors in this area
Elbow faucet handles to prevent contact with contaminated hands
Steps
Space for bins

B. Kitchen

- Appliances—“Energy Star” rating
  - Dishwasher: a kitchen that serves a child care program(s) with more than 25 children in total, provide a commercial style under-counter dishwasher with a sani-cycle.
  - Fridge and freezer unit is required. A second fridge is recommended in Shared Kitchens.
  - Additional freezer if the child care provides a lunch program.
  - 30 in. wide 4 burner stove with oven, with controls out of reach of children.
  - Range hood directly venting to the outdoors (Carbon filters are not acceptable).
  - Microwave oven: 2.0 cu.ft. and 1,100 watt minimum.
- Millwork
  - The following are Child Care Facility standards:
    - Plywood carcass construction.
    - Finished countertop with all outside corners eased.
    - Ensure no gaps in the countertops.
  - For 30 Months to School Age programs, provide a child height breakfast counter (25") between the kitchen and the activity area to allow children to observe Kitchen activities.
- Plumbing
  - Double bowl stainless steel kitchen sink and a separate stainless steel hand sink.
- All Kitchens must comply with National Food Code and Provincial Food Premises Regulations, as well as the BC Building Code.

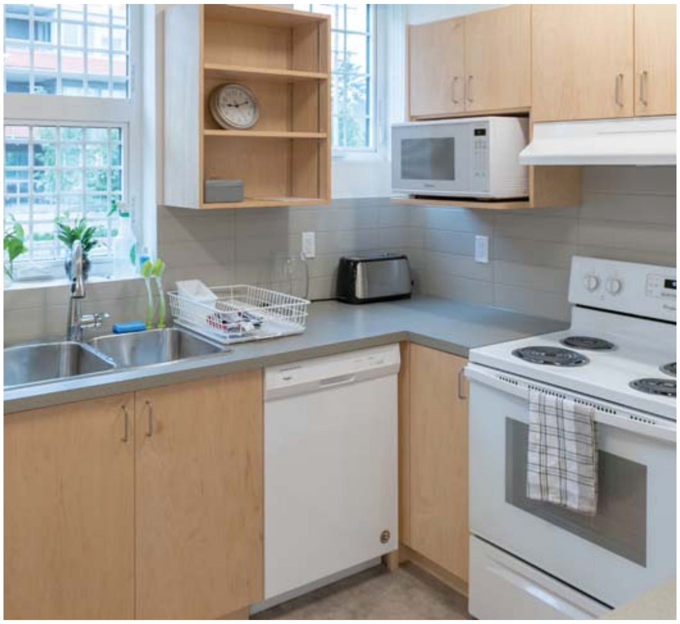
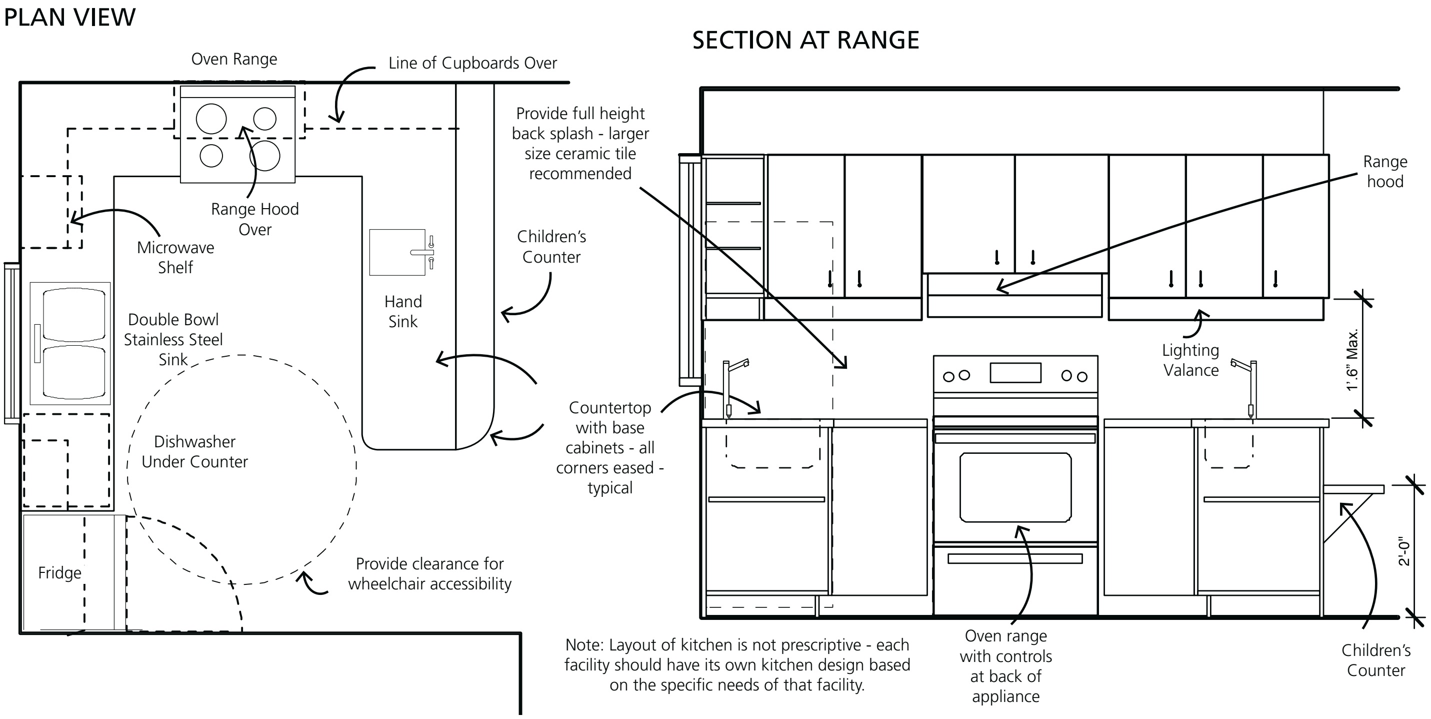


Figure 8: Kitchen Residential Type Use (No grease-laden cooking vapour)


PLAN VIEW
Oven Range
Line of Cupboards Over
Provide full height back splash - larger size ceramic tile recommended
Range Hood Over
Microwave Shelf
Children’s Counter
Hand Sink
Double Bowl Stainless Steel Sink
Dishwasher Under Counter
Countertop with base cabinets - all corners eased - typical
Fridge
Provide clearance for wheelchair accessibility
SECTION AT RANGE
Range hood
Lighting Valance
1'.6" Max.
2'-0"
Oven range with controls at back of appliance
Children’s Counter

Note: Layout of kitchen is not prescriptive - each facility should have its own kitchen design based on the specific needs of that facility.

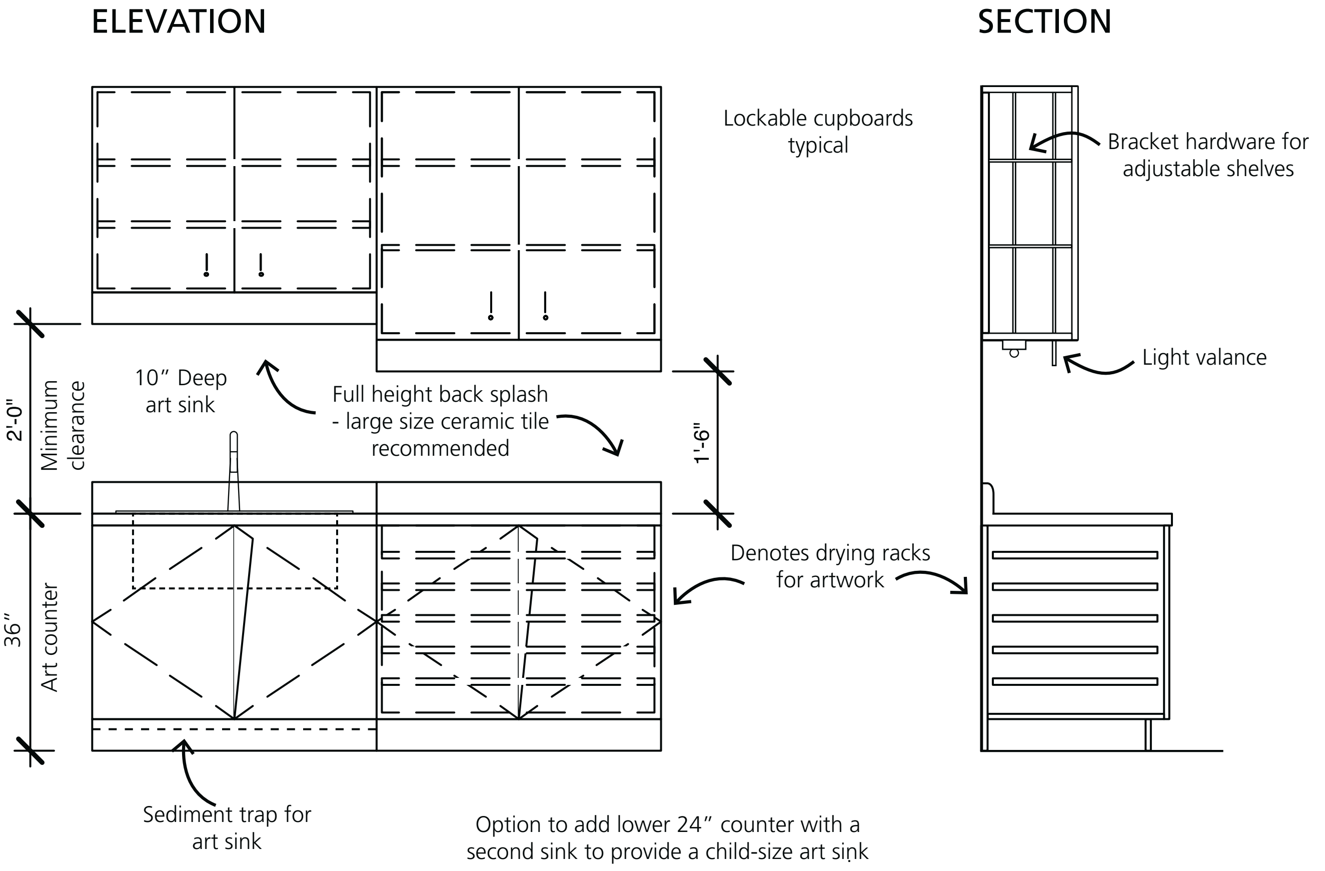
C. Gross Motor and Nap Room

- Glazed doors and windows:
  - Laminated tempered glass.
  - Elephant foot on doors.
  - Blinds to be installed on the nap room side and to be blackout type.
- Millwork:
  - Provide an earthquake safe shelf for music equipment (music shelf).
  - See *Storage Items* section for mat storage requirements.
  - Do not locate shelves above cribs in case of falling objects

D. Art Area

- Art Sink:
  - Stainless steel complete with faucet ledge.
  - 10 in. deep (must be deep enough to also allow washing of toys).
  - Provide a floor-mounted sediment trap for all art sinks that is accessible for clean-out.
  - Provide temperature control for hot water (120 degrees F maximum).
  - Consider providing a second, lower art sink for children.
- Millwork:
  - Provide drying racks or shelves for drying of wet paintings.
  - Provide closed upper and lower cabinets

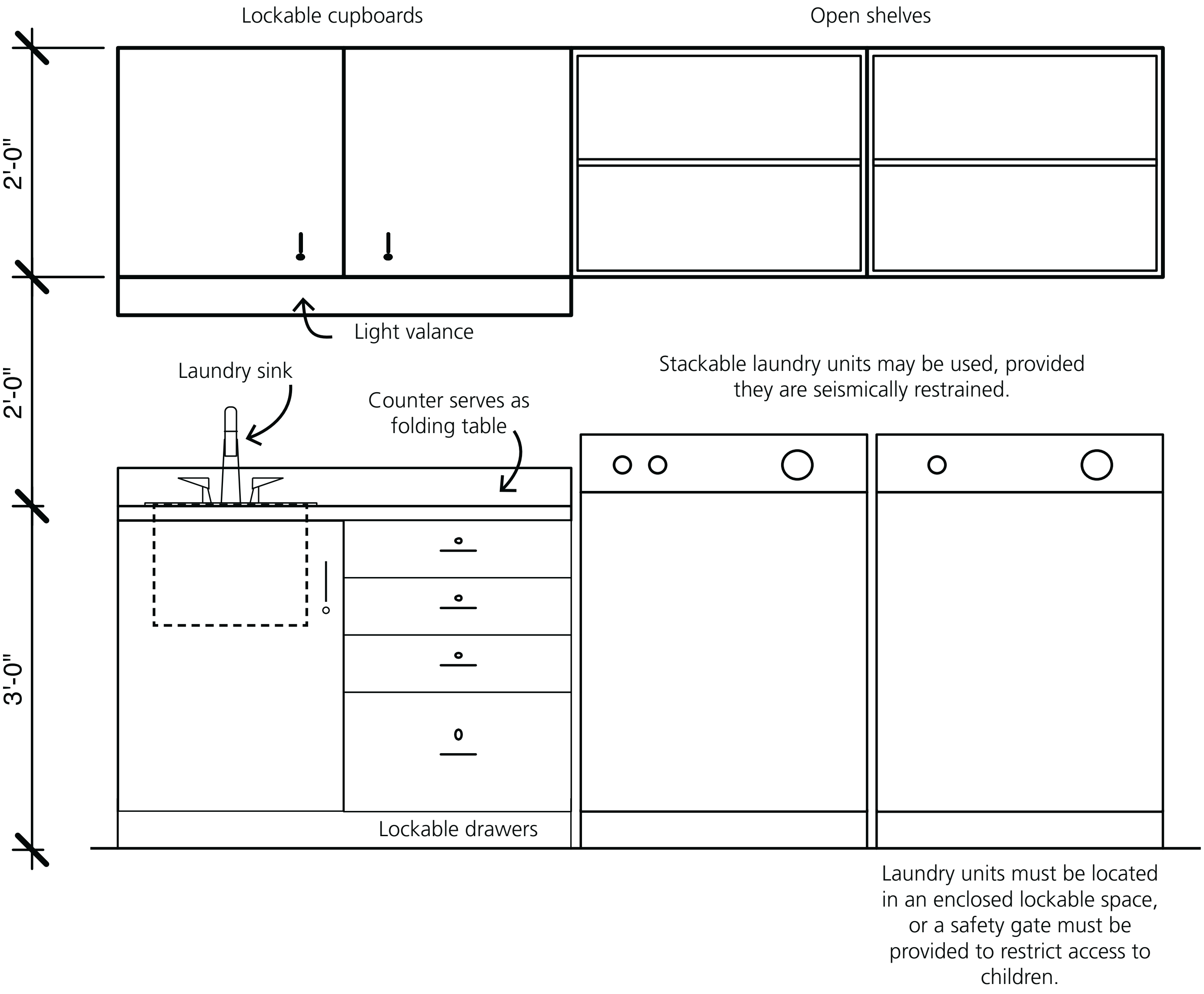
Figure 9: Art Area


ELEVATION
SECTION
Lockable cupboards typical
Bracket hardware for adjustable shelves
Light valance
10" Deep art sink
Full height back splash - large size ceramic tile recommended
2'-0"
Minimum clearance
1'-6"
36"
Art counter
Denotes drying racks for artwork
Sediment trap for art sink
Option to add lower 24" counter with a second sink to provide a child-size art sink

E. Laundry Room

- Provide 10 in. deep stainless steel laundry sink in counter.
- Standard temperature hot water (Room is not accessible to children).
- Side-by-side washer/dryer hook-up preferred.
- Combination units are not acceptable. Stackable units may be used providing they are seismically restrained Front loading washers and dryers, must be located in an enclosed, lockable space or a safety gate must be provided.
- Locate close enough to an exterior wall to accomodate the exhaust duct.
- Laundry vent to exterior must avoid children's outdoor play areas.

Figure 10: Laundry


Lockable cupboards
Open shelves
2'-0"
2'-0"
3'-0"
Light valance
Laundry sink
Counter serves as folding table
Stackable laundry units may be used, provided they are seismically restrained.
Lockable drawers
Laundry units must be located in an enclosed lockable space, or a safety gate must be provided to restrict access to children.

F. Cubbies

- Millwork:
  - Provide 3 coat hooks per cubby.
  - Boot shelf at bottom of cubby is best designed with recessed side walls for ease of cleaning.
  - Overhead cabinets require a security latch.
- Personal storage baskets for each child:
  - These are typically stored in each cubby on an upper shelf, but can also be located with the mat storage carts in the Gross Motor and Mat Room Storage Closet.

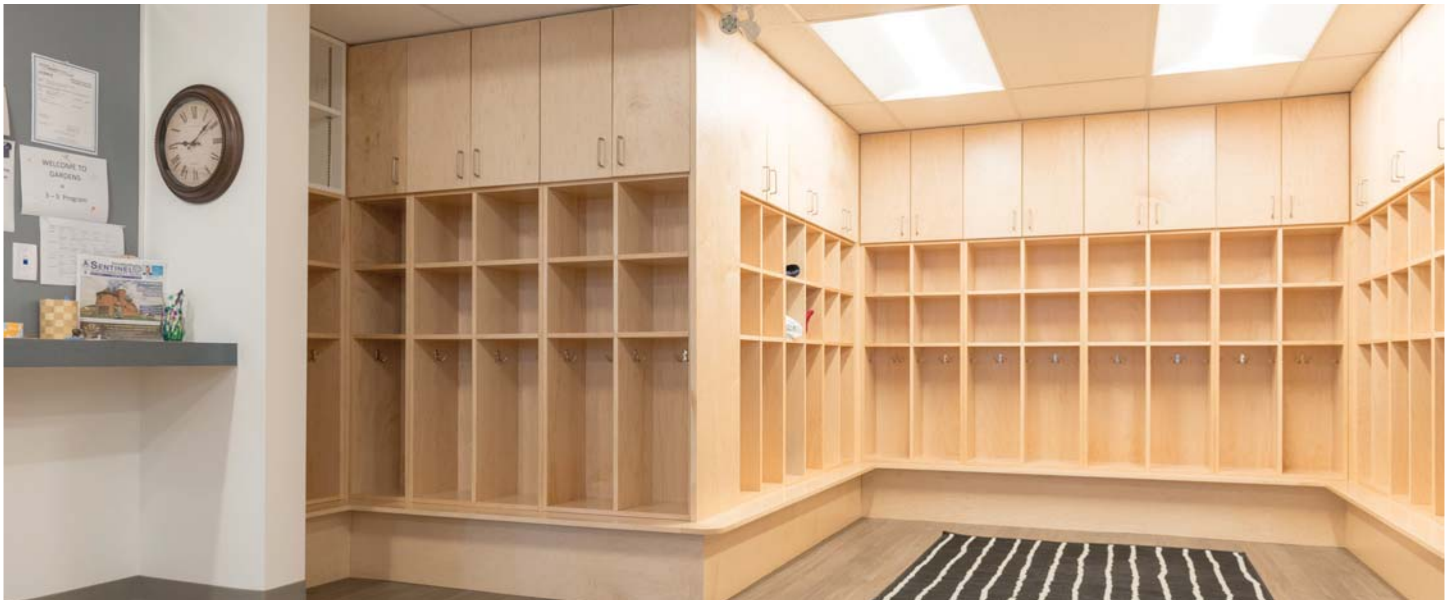
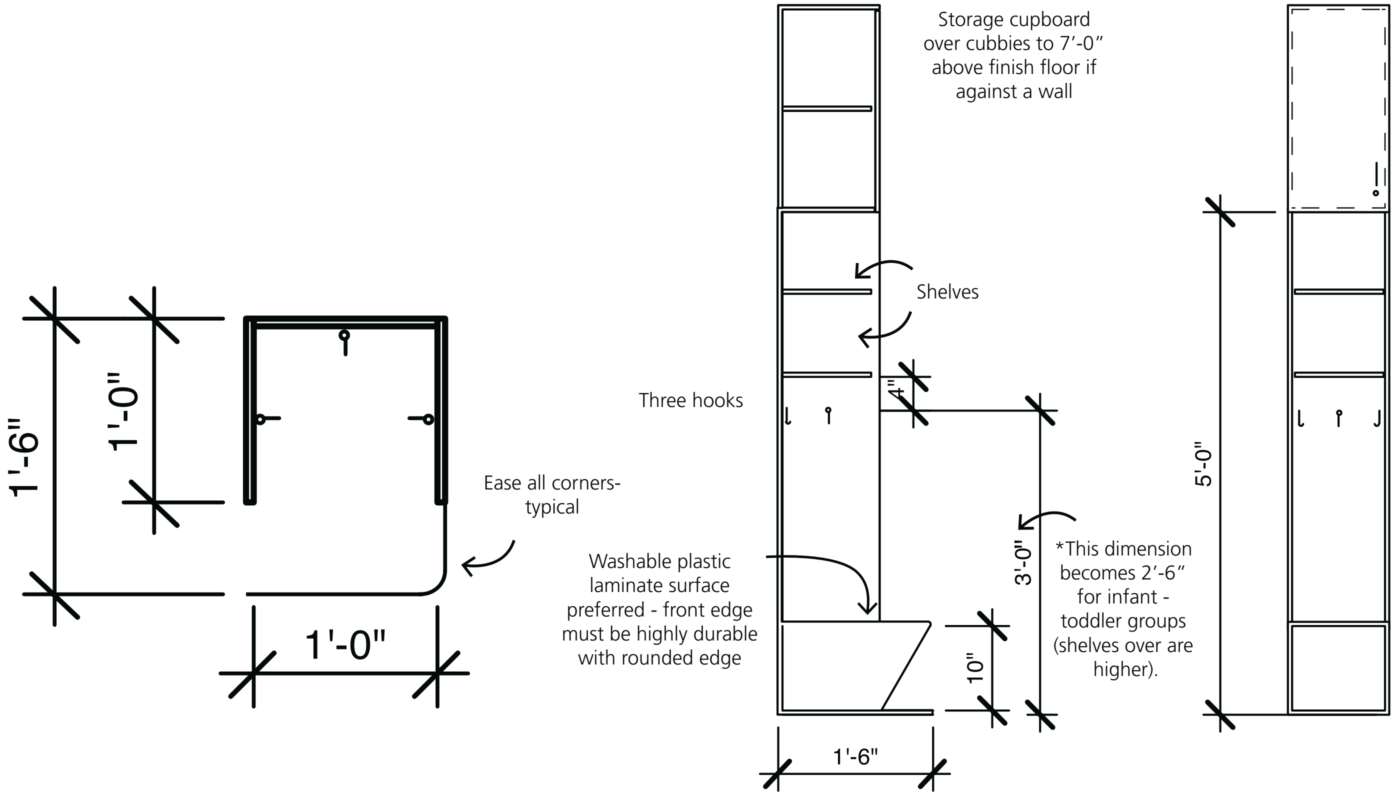


Figure 11: Cubbies for Group Care Child Care 30 Months to School Age


1'-6"
1'-0"
1'-0"
Ease all corners- typical
Storage cupboard over cubbies to 7'-0" above finish floor if against a wall
Shelves
Three hooks
4"
Washable plastic laminate surface preferred - front edge must be highly durable with rounded edge
3'-0"
*This dimension becomes 2'-6" for infant - toddler groups (shelves over are higher).
10"
1'-6"
5'-0"

G. Staff Office

- Millwork:
  - Built-in work counter/desk with pedestal.
  - Shelving with under cabinet lighting.
- Room for photocopier
- Staff lockers

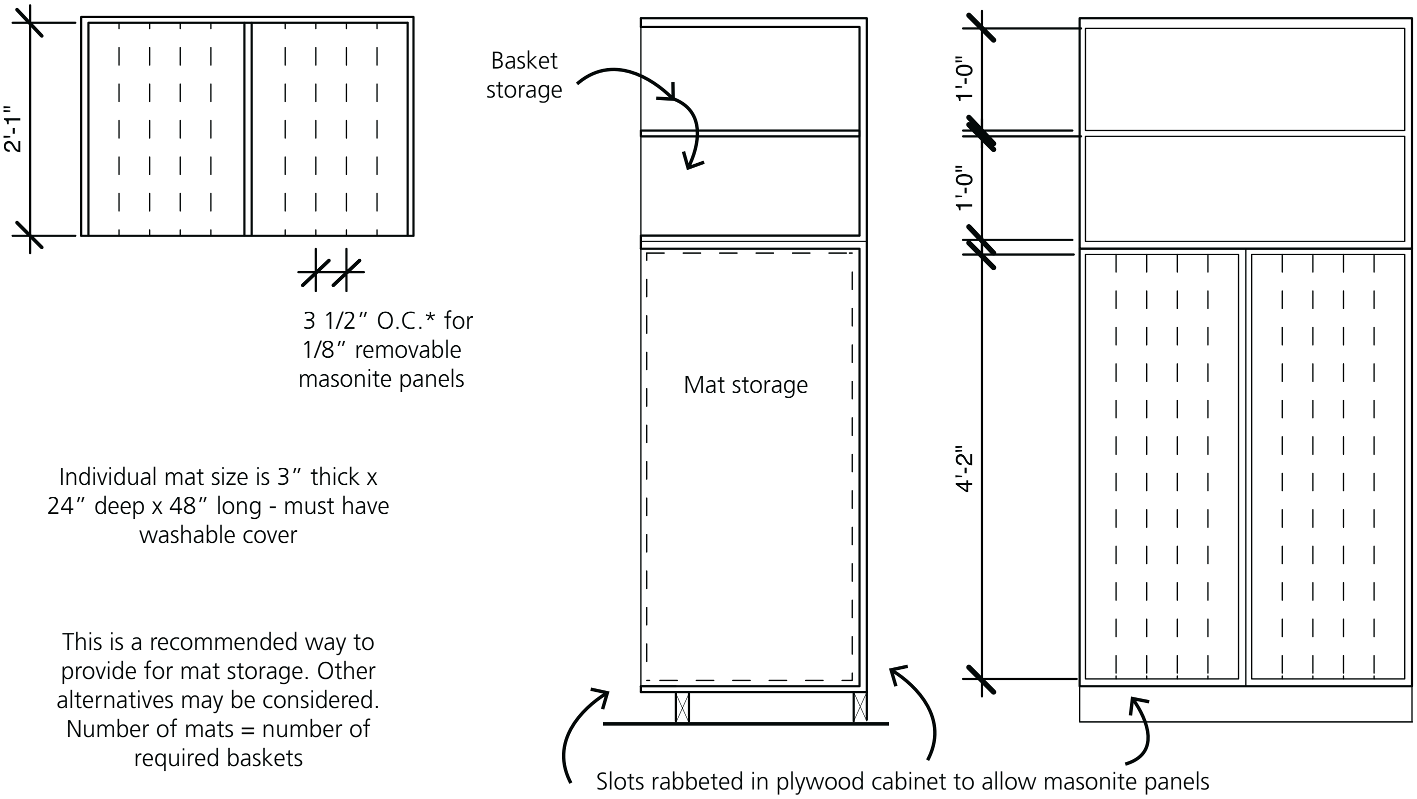
H. Storage

- Provide a sleep mat storage cabinet in nap room (or nearby)
- Metal Interlock Shelving
  - Configure as per specific requirements of the facility.

I. Janitor Room

- Provide eye wash station
- Provide storage for chemicals
- Provide mop sink
- Provide wall-mounted mop and broom storage

Figure 12: Sleep Mat Storage (for Gross Motor and Nap Room)



3 1/2" O.C.* for 1/8" removable masonite panels

Individual mat size is 3" thick x 24" deep x 48" long - must have washable cover

This is a recommended way to provide for mat storage. Other alternatives may be considered. Number of mats = number of required baskets

O.C. = overhead clearance

Slots rabbeted in plywood cabinet to allow masonite panels to slide in and out

5.3.10 Window Blinds

- To be commercial grade, chain operated roller style preferred.
- To be installed on all exterior windows, and in nap rooms, quiet rooms and parent rooms in the interior of the facility.
- All cords or chains to terminate 5 feet above the floor, or have a hook tie-off at that height.

5.3.11 Signage

- Comply with City of Richmond Sign Bylaw for exterior signs.
- Provide wayfinding signage as required, and at entries to each Group in Shared Facilities.
- Provide address sign that meets City Bylaw No. 8306 Fire Protection and Life Safety.
- Provide all signage required for Fire and Life Safety.
- Provide signage in parking areas, including signage for towing services.
- Provide all required accessibility signage and room identification signage.
- Provide an illuminated exterior sign, with the facility name and address, that can be seen from the street.

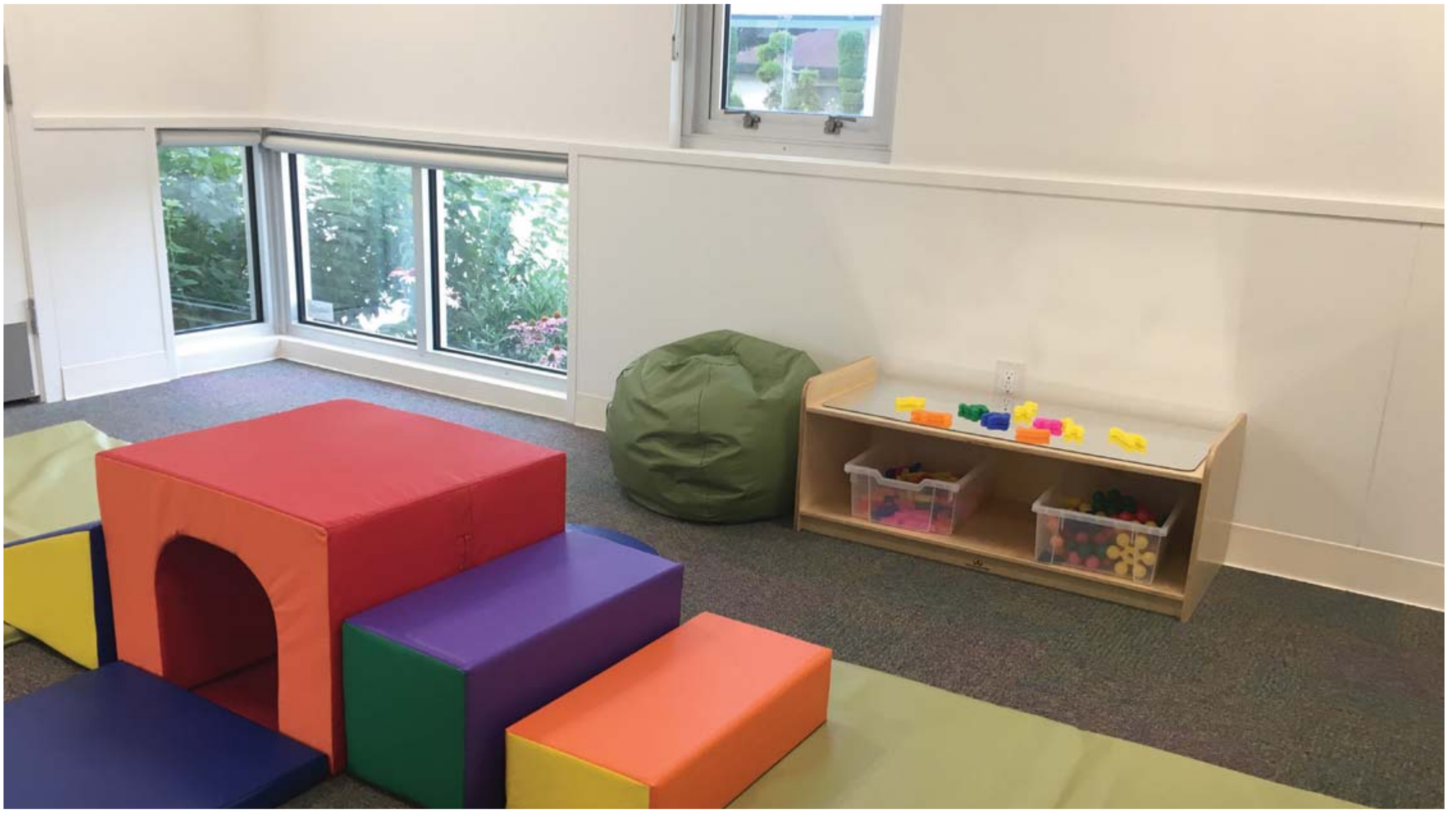
5.3.12 Mechanical Considerations

A. General

- Where the City of Richmond will be responsible for equipment maintenance, City standards for operations and upkeep will be required and all equipment is to be labeled. Consult with the City's Project Development Department and refer to the City's Operations and Maintenance Guide.
- The mechanical room must be lockable, and a sign mounted indicating that service rooms cannot be used for storage.

B. HVAC

- All rooms to be adequately ventilated (to meet ASHRAE 62).
- HVAC unit, equipment and system must be approved by the City.
- If baseboards heaters or radiators are used, ensure children cannot touch hot surfaces. All electric heaters or radiators to be ceiling mounted.
- All equipment to be easily accessible for maintenance purposes. Avoid any access that requires an extension ladder, scaffold or lift equipment.



- Ductwork to be designed to avoid sound transmission. Do not locate equipment in Nap Rooms.
- Provide all required exhaust, fresh air, and heat recovery ventilation. Pay special attention to provide satisfactory exhaust ventilation from washrooms, laundry and kitchen areas.
- Provide dedicated BTU meter for child care facility for the HVAC system.
- Consider fumes which may be caused by rooftop mechanical equipment or boilers. Identify air intakes location.
- Consider location of the cooling tower (if available). Refer to ASHRAE Guideline.
- Duct work and mechanical systems should be cleaned at the end of the project and prior to occupancy.

C. Mechanical Controls

- To be DDC, with the ability to tie into the City of Richmond's Direct Digital Control networks (see City's DDC Guidelines in Appendix C).
- Ability to individually control all rooms.
- Install permanent, hard-wired carbon dioxide and monoxide monitoring systems, in at minimum the activity rooms and the gross motor/nap rooms.
- Sensors and controls should be able to control the degree of fresh air intake, in relation to space needs and applicable standards.
- Label all controls, and ensure that they are inaccessible to children.
- Access control panels must be lockable and tamper-proof.
- Systems that allow for monitoring of hydro, water and gas consumption for the child care facility, separate from other building occupants.
- Refer to the City's Sustainable High Performance Building Policy for system performance standards.

D. Plumbing

It is preferred that specification and supply cut sheets for all plumbing fixtures (toilets, faucets, mixing valves, change table sinks, hand wash sinks, hose bibs, sediment traps) are provided for City review.

- Hot water temperature should be adjustable. Temperature controlled water to be provided at all plumbing fixtures accessible to children. Water temperature to be at a maximum of 49 degrees C or 120 degrees F. Provide mixing valves as required with high temperature limit controls.
- High temperature water to be provided to the kitchen, dishwasher, laundry and janitor's sinks.
- All faucets to have aerators for water conservation. Faucets in children's washrooms to be two handle fixed spout faucet. Faucets in adult and staff washrooms can be hands free.
- Provide adequate numbers of hose bibs, on each side of the exterior of the building, in the outdoor play area, and in the garbage and recycling area. Provide drains so no standing water occurs. Include hose bibs that are frost-free with a vacuum breaker and are vandal-resistant.
- Ensure positive drainage of all outdoor play areas.
- All area drains (on and off slab) to include sediment traps.
- Roof drains to be bi-level whenever possible.
- All roof drains in planters to include inspection chambers and clean-outs.
- Provide roof deck drains, sediment traps and bi-level clean-outs.
- Provide floor drains with trap primers in washrooms, kitchen, laundry room, janitor, and service rooms.
- All art sinks to have sediment traps.
- Label all piping, valves and shut-offs as per City standard.
- Provide domestic hot water recirculation line.
- Provide adequate isolation/shut off valve. Individual shut off valve for each specific location/room/outside hose bib.

Fixtures:

- Children's toilets to be tank style, with round bowls.
- Number of fixtures and Children's Washrooms to meet CCFL requirements.
- Provide closed-front toilet seats without lids for all children's toilets.
- Floor-mounted mop sink in the Janitor's Room to have an approved backflow prevention valve on hot and cold supply.
- Provide a dedicated water meter for the child care facility.

5.3.13 Electrical Considerations

A. Power

All outlets to be childproof with shatterproof faceplates.

- Provide outlets at the location and height of music shelves.
- Provide dedicated circuit T-slot (15/20A) Ground Fault Circuit Interrupters (GFCI) receptacles in the Kitchen, and adequate numbers of GFCI outlets in the Outdoor Play Areas.
- Provide dedicated circuits for special equipment, including fridges, washer and dryer, freezer, photocopier, and security card, DDC and access equipment.
- Where the building has an emergency power generator, the emergency lighting system, including exit lights, shall be powered by separate emergency battery packs installed in the child care facility.
- Provide a separate hydro meter for the child care in a shared facility.
- Label all electrical outlets, electrical panels and junction boxes as per City standard.

B. Lighting

- Provide CCFL Guideline Lighting Levels as a minimum:
    - 40 ft. candles (420 lux) in children's activity rooms. Review Infant Program lighting levels with CCFL.
    - 50 ft. candles (540 lux) in the kitchen, offices and washrooms.
- All lighting must be dimmable.
- LED lighting is preferred. Temperature between 2700 K and 3500 K where appropriate. Research possible incentive external funding sources for lighting, general power consumption, and energy conservation.
- Maximize the use of daylight to meet illumination needs and reduce the use of artificial lighting.
- Provide one fixture wall sconces in all gross motor/nap rooms and quiet rooms, to serve as a night light.
- Minimize the number of fixture types and lamp types (e.g., No MR 16 lamp type fixtures).
- Emergency lighting shall have run times with the most stringent occupancy requirement.

C. Lighting Controls

- Lighting systems must be operated through Direct Digital Controls (DDC), with the ability to be monitored by the City of Richmond's Direct Digital Control network. See City's Corporate DDC Guidelines in Appendix C for more information.

- Provide for varying lighting levels in activity rooms, by arranging switching so that lighting fixtures can be controlled in groups. Wall sconces to be controlled by dimmer in the gross motor/nap room and quiet room.
- Install occupancy sensors to control lighting in rooms with infrequent use. Provide for photo sensors and an over-ride switch for outdoor lighting and connected to DDC system.
- Use the DDC system to monitor all lighting and controls to achieve high levels of energy use and operational efficiency.
- Use the DDC system to monitor total lighting energy consumption for the Facility.

D. Cable

- Provide cable outlets in the activity room, staff room and the parent room.

E. Telephone

- Provide a minimum of one jack in the kitchen, parent room, staff break room and administration office, and two jacks in the activity room.
- Provide a telephone and enterphone connection at the reception, activity room and covered outdoor play area.
- If there is an elevator (and the facility is dedicated for City use), add one additional line.
- Add 2 lines to the main fire alarm panel.
- All Tel/Data cabling shall be Cat6 with RJ45 jacks at user plates and 24 port Cat6 RJ-45 panels in IT/Communication rooms.

F. Data

- All data cabling shall be Cat 6.
- Minimum Data Outlets Required:
    - 3 outlets in each office (allows for computer, printer and walk-in laptop)
    - 1 outlet for DDC controls
    - 3 outlets in each activity room
    - 1 outlet in the parent room
    - 2 outlets for the staff room
    - allow space for City fibre network connection
- Outlets in ceilings for Wi-Fi, sufficient for coverage in all public and staff use areas.

G. Fire Alarm

- Ensure non-proprietary alarm system is installed.
- Any pull stations located at child height require a cover.

H. Security

- Access
    - Review which type of entry security system is appropriate for the facility (e.g. bell, buzzer, intercom, video enterphone, etc.).
    - It is recommended that a security consultant be engaged to assist with the appropriate security solution.
    - Consider the installation of card readers with pass cards or fobs for controlled access.
    - If card readers are installed, they should match the type and method of communication and control used at other City facilities.
    - Allow for door frame preparation for future electronic access if electronic locking devices are not installed.
- After-hours security
    - Provide an intruder alarm system.

I. Electrical Room

- Provide adequate wall space for cable service, telephone termination, security, network switches, City fibre termination, City VOIP phone switch, Data and Telephone Cabling panels. Typically an 8 ft. x 8 ft. wall space with ¾ in. plywood backing (fire-retardant) is required.
- Provide a separate communications conduit (minimum 2 in.), from the Electrical Room to the outside, and take to the nearest City Communication conduit/ junction box, or capped off at the property line as a minimum. Ensure a review with City Engineering staff.
- If generator power is available, provide it to all communications power plugs.
- Install a minimum of two separate dedicated communications circuits in the Electrical Room, or in a separate Communications Room.
- Avoid plumbing in electrical and IT room walls or ceilings.
- Avoid placing transformers in the room. Place transformers as far away as possible from IT cabling or equipment.
- Flooring should be non-static (typically sealed or painted concrete).

5.3.14 Additional Interior Design Considerations

A. General Finish

- No rough or sharp surfaces are permitted. All corners should be rounded and edges eased, particularly at countertops, window sills and corners (1/8 in. radius is satisfactory).

B. General Architectural Millwork Specification [Masterformat Section 06 40 00]

- Typically ¾ in. plywood interiors with ½ in. plywood backs, natural wood veneer or sheathed in laminate. Drawers from plywood construction.
- Good quality melamine on MDF is acceptable except in wet areas.
- Use rubber cove base over ¾ in. plywood at toe-kicks.
- Plastic laminate finish over plywood core is preferred for countertops and splashes.

C. Gates And Access Control For Various Programs–Type And Location

- Program areas require controlled access, especially in shared facilities, by means of a half-height gate or door.
- Washrooms
    - Infant washroom – gated.
    - Toddler washroom – gated or open.
    - 3–5 care and Preschool groups’ washrooms – open.
- Kitchen
    - Infant group – gated or full door.
    - Toddler group – gated or full door.
    - 3-5 care and Preschool groups – gated.

- Cubbies
  - Infant group – gated or open.
  - Toddler group – gated or open.
  - 3–5 care and Preschool groups – open.
- Gates
  - To have heavy-duty continuous hinges and avoid pinch points.

D. Mailbox

- Typically, one large mailbox, accessible from the interior of the facility, to be installed at the main entrance.

E. Notice Boards And Tackboards

- Provide corkboard with trim tackboards and white boards.
- Typical locations include the entry area on the exterior and interior of the facility, offices and parent rooms, the kitchen, the children's washrooms, the activity areas (where children's artwork can be displayed above parent sign-in counter, usually located in the cubby area) and staff counters in the activity rooms.

F. Accessibility Items

- Railings at ramps and exterior steps in the landscape.
- Consider child-height handrails that do not create climbability problems.

G. Elevator Design Considerations

- Elevator design to be a closed cab.
- If the child care facility has a dedicated elevator, ensure that the elevator controllers are non-proprietary.
- The cab size of the elevator must be able to accommodate families (person capacity) and strollers of various sizes (size capacity).
- Elevators serving child care facilities with rooftop play areas must be able to accommodate freight for the purposes of maintaining the play areas. A minimum capacity of 4,000 pounds is recommended.

H. Seismic Bracing

- All furnishings greater than 4 ft. high should be secured to prevent tipping.

I. Chemical Considerations

- Building products to not contain harmful ingredients (e.g. Formaldehyde, Volatile Organic Compounds).
- Design for good indoor air quality through ventilation and by using non-toxic finishes.

J. Garbage and Recycling Room or Enclosure

- Provide in addition to child care space.
- May be located as an exterior space in parking/loading area or as a dedicated garbage room in a parking structure.
- See City of Richmond Waste Management Design Guidelines for most recent standards on garbage and recycling specifications.

Appendix A:

Space Summary Tables

1.0 A Shared Child Care Facility

A child care facility generally includes space for two or more licensed child care programs. For additional information about common program types in a shared facility see section *4.2.5 Shared Facilities.* The table below outlines required shared areas and other areas to be included in a new child care facility or provided in an existing multi-purpose building where a child care program is being added as part of a renovation or addition.

New child care facilities being built as City capital projects or community amenity contributions being provided by a developer related to a condition of rezoning must include the **minimum net activity areas, support areas and outdoor areas** as noted for each program type. While the tables below depict child care programs with a minimum outdoor play area of 75 sq. ft. or 7 sq. m. per child, the City recommends that outdoor spaces meet at least 10 sq. m. per child within the City Centre area.

Efficiencies may be achieved by sharing the following spaces, but these are minimum size requirements and adjustments will depend upon the number of child care programs and types being housed in a shared facility. To determine the gross floor area and account for walls, circulation, stairways, elevators and service rooms, add in the range of 20% to 30% to the combined net indoor area inclusive of shared and other areas. The gross floor area will also depend on efficiencies and construction.

Table A-1: Shared Areas And Other Areas

Activities	Square Feet	Square Metres
Shared Areas		
Entry	200	18.6
Parent Car Seat and Stroller Storage	43	4.0
Program Stroller Storage	75	7.0
HC Wheelchair Accessible Washroom (or as required to meet the Building Code requirements)	50	4.6
Staff Washroom with Shower (two may be required depending on number of staff)	50	4.6
Staff Room	108	10.0
Kitchen (minimum size if shared by two programs)	200	18.6
Laundry	43	4.0
Janitor	43	4.0
Total Required Shared Areas	**812**	**75.4**
Other Areas		
Administration Office (required for centres serving 69 children or more in addition to program staff offices)	100	9.3
Parent Room (required for centres serving more than 37 children)	75	7.0
Garbage/Recycling (room or enclosure required)	110	10.21
Service Rooms - Mechanical, Electrical and IT (required, size is based on equipment)	To be determined	To be determined

**Garbage/Recycling Room or Exterior Enclosure: is to be provided in addition to the functional child care space. In a stand-alone building situation it may be located as an exterior space associated with the parking and loading area or in a multi-use building or development it may be provided as a dedicated garbage room located in a parking structure near the garbage collection point. The recommended minimum size of the garbage/recycling room may increase depending on the total facility size. Additional requirements can be found in the City of Richmond Waste Management Design Guidelines.*

2.0 Types of Age-Related Group Child Care Programs with Number of Spaces Noted

Size and Number of Spaces are based on required staff and economic viability considerations. Refer to the Shared Facilities space summary when planning a new facility.

2.1 Infant Care (Group Child Care Under 36 Months)—12 Spaces: Program Serves Children Birth to 18 Months Old

Table A-2: Indoor Space

Activities		Square Feet	Square Metres
A.	Indoor Activity Areas		
A.1	Main Activity Area (based on a min. of 40 sq. ft. or 3.7 sq. m. per child)		
	• Open Play Area	161	15.0
	• Climbing, crawling, interactive	215	20.0
	• Quiet area, reading, cozy corner	101	9.4
	• **Subtotal**	**477**	**44.4**
A.2	Nap Rooms (2 required at 13 sq. m. each)	280	26.0
	Total Indoor Activity Areas	**757**	**70.4**
B.	Support Spaces		
B.1	Kitchen*	100	9.3
B.2	Children's Washroom & Diapering Area	80	7.4
B.3	Storage		
	• General Storage	86	8.0
	• Nap Room Storage	50	4.6
B.4	Other		
	• Cubby Area	130	12.1
	• Parent Sign-in Counter	22	2.0
	• Staff Communications Counter/Storage	32	3.0
	• Staff Office	100	9.3
	Total Support Spaces	**600**	**55.7**
	NET INDOOR AREA**	**1,357**	**126.1**

Table A-3: Outdoor Space

Activities		Square Feet	Square Metres
C.	Outdoor Activity Areas (min. outdoor play area of 75 sq. ft. or 7 sq. m. per child)		
C.1	Covered Area	323	30.0
C.2	Open Area	646	60.0
	Total Outdoor Activity Areas	**969**	**90.0**
C.3	Outdoor Storage	86	8.0
	NET OUTDOOR AREA	**1,055**	**98.0**

**A bottle warming area with a sink, counter, microwave and under counter fridge may still need to be provided for programs serving infants and toddlers even if two programs are sharing a kitchen.*

*** Does not include entry area, stroller storage, laundry, janitor, HC washroom, staff room, staff washroom with shower, service and garbage/recycling room, which are also required, if not already provided in a shared facility. Does not include gross-up (20–30%).*

2.2 Toddler Care (Group Child Care Under 36 Months)—12 Spaces: Program Serves Children 18 Months Old Up to 36 Months Old

Table A-4: Indoor Space

Activities		Square Feet	Square Metres
A.	Indoor Activity Areas		
A.1	Main Activity Area (based on a min. of 40 sq. ft. or 3.7 sq. m. per child)		
	• Table area (for eating, art, water play)	215	20.0
	• Open play area	215	20.0
	• Quiet area, reading, cozy corner	101	9.4
	• **Subtotal**	**531**	**49.4**
A.2	Nap Rooms (one required at 26 sq. m. or two rooms at 13 sq. m. each)	280	26.0
	Total Indoor Activity Areas	**811**	**75.4**
B.	Support Spaces		
B.1	Kitchen*	100	9.3
B.2	Children’s Washroom & Diapering Area	80	7.4
B.3	Storage		
	• General Storage	86	8.0
	• Nap Room Storage (preferably located in Nap Room)	50	4.6
B.4	Other		
	• Cubby Area	130	12.1
	• Parent Sign-in Counter	22	2.0
	• Staff Communications Counter/Storage	32	3.0
	• Staff Office	100	9.3
	Total Support Spaces	**600**	**55.7**
	NET INDOOR AREA**	**1,411**	**131.1**

Table A-5: Outdoor Space

Activities		Square Feet	Square Metres
C.	Outdoor Activity Areas (min. outdoor play area of 75 sq. ft. or 7 sq. m. per child)		
C.1	Covered Area	323	30.0
C.2	Open Area	646	60.0
	Total Outdoor Activity Areas	**969**	**90.0**
C.3	Outdoor Storage	86	8.0
	NET OUTDOOR AREA	**1,055**	**98.0**

**A bottle warming area with a sink, counter, microwave and under counter fridge may still need to be provided for programs serving infants and toddlers even if two programs are sharing a kitchen.*

*** Does not include entry area, stroller storage, laundry, janitor, HC washroom, staff room, staff washroom with shower, service and garbage/recycling room, which are also required, if not already provided in a shared facility. Does not include gross-up (20–30%).*

2.3 Infant/Toddler Care Combined (Group Child Care Under 36 Months)—12 Spaces: Program Serves Children Birth to 36 Months Old

Table A-6: Indoor Space

Activities		Square Feet	Square Metres
A.	Indoor Activity Areas		
A.1	Main Activity Area (based on a min. of 40 sq. ft. or 3.7 sq. m. per child)		
	• Table Area (for eating, art, and water play)	215	20.0
	• Open Play Area (for climbing, crawling, interactive play)	215	20.0
	• Quiet area, reading, cozy corner	101	9.4
	• **Subtotal**	**531**	**49.4**
A.2	Nap Rooms (two required at 13 sq. m. each)	280	26.0
	Total Indoor Activity Areas	**811**	**75.4**
B.	Support Spaces		
B.1	Kitchen*	100	9.3
B.2	Children's Washroom & Diapering Area	80	7.4
B.3	Storage		
	• General Storage	86	8.0
	• Nap Room Storage	50	4.6
B.4	Other		
	• Cubby Area	130	12.1
	• Parent Sign-in Counter	22	2.0
	• Staff Communications Counter/Storage	32	3.0
	• Staff Office	100	9.3
	Total Support Spaces	**600**	**55.7**
	NET INDOOR AREA**	**1,411**	**131.1**

Table A-7: Outdoor Space

Activities		Square Feet	Square Metres
C.	Outdoor Activity Areas (min. outdoor play area of 75 sq. ft. or 7 sq. m. per child)		
C.1	Covered Area	323	30.0
C.2	Open Area	646	60.0
	Total Outdoor Activity Areas	**969**	**90.0**
C.3	Outdoor Storage	86	8.0
	NET OUTDOOR AREA	**1,055**	**98.0**

**A bottle warming area with a sink, counter, microwave and under counter fridge may still need to be provided for programs serving infants and toddlers even if two programs are sharing a kitchen.*

*** Does not include entry area, stroller storage, laundry, janitor, HC washroom, staff room, staff washroom with shower, service and garbage/recycling room, which are also required, if not already provided in a shared facility. Does not include gross-up (20–30%).*

2.4 3–5 Care (Group Child Care 30 Months to School Age)—25 Spaces

Table A-8: Indoor Space

Activities		Square Feet	Square Metres
A.	Indoor Activity Areas		
A.1	Main Activity Area (based on a min. of 40 sq. ft. or 3.7 sq. m. per child)		
	• Table Area (for eating, art, water play)	360	33.4
	• Open Play Area	549	51.0
	• Quiet Area, Reading, Cozy Corner or Room	100	9.3
	• **Subtotal**	**1,009**	**93.7**
A.2	Gross Motor/Nap Room	360	33.4
	Total Indoor Activity Areas	**1,369**	**127.1**
B.	Support Spaces		
B.1	Kitchen*	100	9.3
B.2	Children's Washroom	118	11.0
B.3	Storage		
	• General Storage	100	9.3
	• Sleeping Mat or Cot Storage	50	4.6
B.4	Other		
	• Cubby Area	150	13.9
	• Parent Sign-in Counter	22	2.0
	• Staff Communications Counter/Storage	32	3.0
	• Staff Office	100	9.3
	Total Support Spaces	**672**	**62.4**
	NET INDOOR AREA**	**2,041**	**189.5**

Table A-9: Outdoor Space

Activities		Square Feet	Square Metres
C.	Outdoor Activity Areas (min. outdoor play area of 75 sq. ft. or 7 sq. m. per child)		
C.1	Covered Area	628	58.3
C.2	Open Area	1,256	116.7
	Total Outdoor Activity Areas	**1,884**	**175.0**
C.3	Outdoor Storage	100	9.3
	NET OUTDOOR AREA	**1,984**	**184.3**

**A shared kitchen may be considered between two programs, see Shared Facility Summary Table.*

*** Does not include entry area, stroller storage, laundry, janitor, HC washroom, staff room, staff washroom with shower, service and garbage/recycling room, which are also required, if not already provided in a shared facility. Does not include gross-up (20–30%).*

2.5 Preschool (30 Months to School Age, max. 4 hours/day)—20 spaces

Table A-10: Indoor Space

Activities		Square Feet	Square Metres
A.	Indoor Activity Areas		
A.1	Main Activity Area (based on a min. of 40 sq. ft. or 3.7 sq. m. per child)		
	• Art, Water Play, Eating Area	210	19.5
	• Open Play Area	490	45.5
	• Quiet Area, Reading, Cozy Corner	100	9.3
	Total Main Activity Areas	**800**	**74.3**
B.	Support Spaces		
B.1	Kitchen*	100	9.3
B.2	Children’s Washroom	97	9.0
B.3	General Storage	100	9.3
B.4	Other		
	• Cubby Area	121	11.2
	• Parent Sign-in Counter	22	2.0
	• Staff Communications Counter/Storage	32	3.0
	• Staff Office	100	9.3
	Total Support Spaces	**572**	**53.1**
	NET INDOOR AREA**	**1,372**	**127.4**

Table A-11: Outdoor Space

Activities		Square Feet	Square Metres
C.	Outdoor Activity Areas (minimum outdoor play area of 75 sq. ft. or 7 sq. m. per child)		
C.1	Covered Area	506	47.0
C.2	Open Area	1,001	93.0
	Total Outdoor Activity Areas	**1,507**	**140.0**
C.3	Outdoor Storage	86	8.0
	NET OUTDOOR AREA	**1,593**	**148.0**

**A shared kitchen may be considered between two programs, see Shared Facility Summary Table.*

*** Does not include entry area, stroller storage, laundry, janitor, HC washroom, staff room, staff washroom with shower, service and garbage/recycling room, which are also required, if not already provided in a shared facility. Does not include gross-up (20–30%).*

2.6 School Age Care (Kindergarten to 12 Years of Age)—24 Spaces*

Table A-12: Indoor Space

Activities		Square Feet	Square Metres
A.	Indoor Activity Areas		
A.1	Main Activity Area (based on a min. of 40 sq. ft. or 3.7 sq. m. per child)	956	88.8
	Total Indoor Activity Area	**956**	**88.8**
B.	Support Spaces		
B.1	Kitchen**	108	10.0
B.2	Children's Washrooms	150	13.9
B.3	Storage	100	9.3
B.4	Other		
	• Cubby Area	150	13.9
	• Parent Sign-in Counter	22	2.0
	• Staff Communications Counter/Storage	32	3.0
	• Staff Office	100	9.3
	Total Support Spaces	**662**	**61.4**
	NET INDOOR AREA* **	**1,618**	**150.2**

Table A-13: Outdoor Space

Activities		Square Feet	Square Metres
C.	Outdoor Activity Areas (minimum outdoor play area of 75 sq. ft. or 7 sq. m. per child)		
C.1	Covered Area	603	56.0
C.2	Open Area	1,205	112.0
	Total Outdoor Activity Areas	**1,808**	**168.0**
C.3	Outdoor Storage	86	8.0
	NET OUTDOOR AREA	**1,894**	**176.0**

**24 spaces is the maximum group size for a school age program that includes children who are in Kindergarten or Grade 1.*

***A shared kitchen may be considered between two programs, see Shared Facility Summary Table.*

**** Does not include entry area, stroller storage, laundry, janitor, HC washroom, staff room, staff washroom with shower, service and garbage/recycling room, which are also required, if not already provided in a shared facility. Does not include gross-up (20–30%).*

2.7 School Age Care (Kindergarten to 12 Years of Age)—30 Spaces*

Table A-14: Indoor Space

Activities		Square Feet	Square Metres
A.	Indoor Activity Areas		
A.1	Main Activity Area (based on a min. of 40 sq. ft. or 3.7 sq. m. per child)	1,195	111.0
	Total Indoor Activity Area	**1,195**	**111.0**
B.	Support Spaces		
B.1	Kitchen**	108	10.0
B.2	Children's Washrooms	150	13.9
B.3	Storage	100	9.3
B.4	Other		
	• Cubby Area	180	16.7
	• Parent Sign-in Counter	22	2.0
	• Staff Communications Counter/Storage	32	3.0
	• Staff Office	100	9.3
	Total Support Spaces	**692**	**64.2**
	NET INDOOR AREA* **	**1,887**	**175.2**

Table A-15: Outdoor Space

Activities		Square Feet	Square Metres
C.	Outdoor Activity Areas (minimum outdoor play area of 75 sq. ft. or 7 sq. m. per child)		
C.1	Covered Area	753	70.0
C.2	Open Area	1,507	140.0
	Total Outdoor Activity Areas	**2,260**	**210.0**
C.3	Outdoor Storage	86	8.0
	NET OUTDOOR AREA	**2,346**	**218.0**

**30 spaces is the maximum group size for a school age program that only serves children in Grade 2 or higher (i.e. no children in the program are in Kindergarten or Grade 1).*

***A shared kitchen may be considered between two programs, see Shared Facility Summary Table.*

**** Does not include entry area, stroller storage, laundry, janitor, HC washroom, staff room, staff washroom with shower, service and garbage/recycling room, which are also required, if not already provided in a shared facility. Does not include gross-up (20–30%).*

Appendix B:

City of Richmond Building Equipment, Monitoring and Integration Requirements (Updated December 2018)

1.0 Definitions

ASHRAE: The American Society of Heating, Refrigerating and Air-Conditioning (ASHRAE) is an international standards organization for numerous building related systems. It is the organization's mission to advance the arts and sciences of heating, ventilating, air conditioning and refrigerating to serve humanity and promote a sustainable world. The Society and its members focus on building systems, energy efficiency, indoor air quality, refrigeration and sustainability within the industry.

BACNet: Is an ANSI/ASHRAE standard communication protocol for direct digital control networks and automated building mechanisms. It was designed to be used for applications such as heating, ventilation, and air-conditioning control, lighting, access control, and fire detection systems and their associated equipment.

Canadian 2011 NECB: The National Energy Code of Canada for Buildings (NECB) 2011 provides minimum requirements for the design and construction of energy-efficient buildings and covers the building envelope, systems and equipment for heating, ventilating and air-conditioning, service water heating, lighting, and the provision of electrical power systems and motors.

Energy Star®: Is an international standard for energy efficient consumer products. The Energy Star ® name and symbol are administered and promoted in Canada by Natural Resources Canada. Energy Star® qualified products meet strict technical specifications for energy performance—tested and certified. Devices carrying the Energy Star® identification, such as computer products and peripherals, kitchen appliances, buildings and other products, generally use 20–30% less energy than required by federal standards.

Energy Star® Certified: Refers to Energy Star ® certified products and buildings that meet strict North American energy performance standards. Typically these products and buildings use 20–30% less energy and cause fewer greenhouse gas emissions than comparable products and buildings.

Energy Star® Portfolio ManagerTM: Is an online tool you can use to measure and track energy use, water consumption, and greenhouse gas emissions, and benchmark your building's performance against similar type buildings in Canada. Portfolio ManagerTM uses a 1-100 Energy Star® performance scale: a score of 50 indicates average energy performance (50th percentile) while a score of 75 or more indicates top performance (75th percentile). A score of 75 or more in a particular year allows for the facility to be Energy Star® Certified. The initial Canadian version of the benchmarking tool in 2014 in Canada is solely applicable to K-12 school and commercial office facilities, other building types, such as community centres, will be added over time.

HVAC: Heating Ventilation and Air Condition (HVAC) is the technology of indoor environmental comfort. HVAC system design is a sub discipline of mechanical engineering, based on the principles of thermodynamics, fluid mechanics, and heat transfer.

HVI: Home Ventilating Institute (HVI) is a non-profit association offering a variety of services for manufacturers including, but not limited to, test procedures, certification and verification programs for airflow, sound and energy performance, and market support. Its mission is to serve consumers and members by advancing residential ventilation for healthy, energy-efficient homes.

IESNA: The Illuminating Engineering Society of North America (IESNA) is a non-profit organization that publishes standards for the lighting industry. The mission of the organization is to advance knowledge and disseminate information for the improvement of the lighted environment to the benefit of society. The IESNA lighting standards are developed through technical committees that include hundreds of qualified individuals from the lighting and user communities.

MERV: The minimum efficiency reporting value (MERV), is an ASHRAE measurement scale designed to rate the effectiveness of air filters. The scale is designed to represent the worst case performance of a filter when dealing with particles in the range of 0.3 to 10 micrometres. The MERV rating is from 1 to 16. Higher MERV ratings correspond to a greater percentage of particles captured on each pass, with a MERV 16 filter capturing more than 95% of particles over the full range.

MSTP: Multiple Spanning Tree Protocol (MSTP) is an open source communication protocol language connecting terminal controllers to main direct digital control processing system, and is defined by the applicable networking standard IEEE 802.1Q.

NRCan: Natural Resources Canada (NRCan) works with other government departments, the provinces and territories, and other Canadian and international partners to address energy needs while considering new policies, practises, and technologies. NRCan's expertise in the areas of energy efficiency, and energy sources and distribution allows us to provide useful energy resources and help Canadians benefit economically, environmentally, and socially from the secure and sustainable production and use of Canada's energy resources.

SEER: The Seasonal Energy Efficiency Ratio (SEER) rating of a unit is the cooling output during a typical cooling-season divided by the total electric energy input during the same period. The higher the unit's SEER rating the more energy efficient it is. In North America, the SEER is the ratio of cooling in British thermal unit (BTU) to the energy consumed in watt-hours.

TCP/IP: Transmission Control Protocol/Internet Protocol (TCP/IP) is the principal communications protocol in the Internet protocol suite for relaying datagrams across network boundaries.

Virtual Metering: Refers to the function of monitoring energy use of specific systems or pieces of equipment, based on demand and run time, through a building's direct digital control system and analog current transducers.

2.0 Optimize Maintenance And Energy Performance

This section is intended to provide a basis by which corporate facilities can be maintained and monitored to maximize efficient resource use, and reduced maintenance and operational costs.

2.1 Operation Plan

Each facility should have an operational plan developed that at a minimum includes an occupancy schedule, equipment run-time schedule, design set points for HVAC equipment, and design lighting levels. This plan should be regularly reviewed and optimized as needed.

2.2 Measuring Energy Efficiency

Two options can be used to measure energy efficiency performance in comparison to typical buildings of similar type and function:

2.2.1 Option 1 Target an Energy Star® rating of 75% or higher, if eligible to receive an energy performance rating using the U.S. EPA's Energy Star® Portfolio Manager Tool (Canadian edition).

2.2.2 Option 2 If a building is not eligible to receive an energy performance rating using the U.S. EPA's Energy Star® Portfolio Manager Tool (Canadian edition), target increased energy efficiency of 20% as compared to typical buildings of similar type and function using national average energy data (National Resources Canada, Energy Star, et al).

2.3 Measurement and Verification

Track the energy and water use of specific systems, end uses (i.e. lighting, HVAC, plug loads, etc.), and the building overall, to allow for continuous optimization. If possible, accomplish this requirement using the building automation system.

2.4 Benchmarking and Tracking Building Energy Consumption

Regularly compare energy performance data with previous years' energy performance data, to ensure operational energy efficiency is being maintained.

2.5 Ongoing Commissioning

Complete re-commissioning activities on an approximately five year cycle to address changes in facility occupancy, use, maintenance and repair. Make periodic adjustments and review of building operating systems and procedures essential for optimal energy efficiency and service provision.

2.6 Building Automation System

Employ full building automation system for increased control and programming capability of mechanical system and lighting systems. It is required that City of Richmond pre-qualified building automation system supply and install contractors be used for new and replacement installations. Please see Section 5.0 for more details.

2.7 Local Thermostat

If applicable, use programmable thermostat that include energy efficient options including but not limited to: night set back, programmability for each day, optimal start, and zones separated by function.

2.8 Heat Recovery Ventilation Systems

Heat recovery ventilation systems used in corporate facilities need to be Home Ventilating Institute (HVI) certified with 85% efficiency.

2.9 Air or Ground Source Heat Pumps

Air or ground source heat pumps used in City facilities should be Energy Star® certified with a minimum target for energy efficiency of SEER 16.

2.10 Gas Fired Rooftop unit

Gas fired rooftop units used in City facilities will target a minimum energy efficiency rating of SEER 13.

2.11 Heat Pump Rooftop units

Heat Pump rooftop units used in City facilities will target a minimum energy efficiency rating of SEER 16.

2.12 Rooftop units

Economizer should be used for all rooftop units 5 tons or greater. All rooftop units, air handling units, Energy recovery ventilators (ERV), Heat recovery ventilators (HRV) and makeup air units, and shall use industry standard sized filters.

2.13 Natural Gas Boiler

Natural gas boilers used in City facilities will target a minimum efficiency rating of 95%.

2.14 Air Conditioning

Air conditioning equipment used in City facilities should be Energy Star® certified.

2.15 Air Compressor

All pneumatic air compressors should be equipped utilizing automatic condensate drain system. Air compressors for corporate truck maintenance activities require a minimum of 200 PSI operating pressure.

2.16 Domestic Hot Water

Domestic natural gas hot water boilers used in City facilities should be Energy Star® certified with a target minimum efficiency rating of 80%. Domestic electric hot water boilers used in City facilities should be Energy Star® certified with a target minimum efficiency rating of 90%.

2.17 Appliances

Appliances (i.e. refrigerators, laundry machines, stoves, etc.) used in City facilities should be Energy Star® certified.

2.18 Ozone Depleting Compounds

Refrain from using Ozone Depleting Substances. Ozone Depleting Substances include CFCs, HCGCs, halons and others used in refrigerants, fire extinguishing systems and chemicals (i.e. sterilants and solvents).

2.19 Electric motor and pump

Use high efficiency motors and pumps, whenever possible. Targeting 25% better than Canadian 2011 NECB performance curves for motors and pumps.

2.20 Improved Lighting Efficiency

As budgets allow, high efficiency lighting technology and controls is preferred for all new installations, please refer to Section 6.0 Optimize Lighting System for further guidance on lighting guidelines.

2.21 Lighting Levels

Refer to the IESNA standards for target lighting levels depending on building type and room function. In addition, please refer to Section 6.0 Optimize Lighting System for further guidance on lighting guidelines.

2.22 On-Site Renewable Energy

Implement renewable energy generation project, when lifecycle costs are effective at facilities to further reduce conventional energy purchases. Refer to NRCan website.

2.23 Equipment

All equipment, devices, controls needs be well supported by a knowledgeable local technical support staff, local sales representatives and local field service/factory trained representatives to assist in the selection, application and servicing of all equipment. All replacement parts and components need to be readily available (preferred less than 10 day delivery wait time) and cost effective.

3.0 Optimize Water Efficiency

This section is intended to provide a basis by which City facilities can reduce indoor potable water use, reducing the burden on local water supply and wastewater.

3.1 Water metering

New City facilities will include water meters. Where feasible, these meters will be remotely monitored by the building's automation and monitoring system. Where possible, it is preferred that an additional water meter is installed to monitor the water consumption for outdoor activities, and that this meter also be monitored through the building's automation system.

3.2 Indoor plumbing fixture and fitting efficiency

The following table outlines the targeted water fixture efficiency flush/flow rates for civic facilities for both new construction and replacement projects, and the maximum flush/flow rates as per current BC building codes.

Where feasible, it is preferred that purchased fixture products water usage is on the lower end of the range to maximize water conservation.

Table B-1: Targeted Fixture Flush/Flow Rates for the City of Richmond

Fixture Type	Flow Rate (Litres per minute [LPM] or Litres per flush [LPF])
Dual-flush toilets	High flush = 6.0 LPF Low flush = 3.4 to 4.1 LPF
Urinals	1.9 LPF
Lavatory faucet	1.9 to 8.3 LPM
Kitchen faucet	5.7 to 8.3 LPM
Showers	5.7 to 9.3 LPM

These values are derived from LEED® for existing buildings water efficiency criteria, from the UBC LEED® implementation guide – 2014, and from the BC Water Conservation Amendments – Ministerial Order M105.

3.3 Water-Efficient Products

Where applicable reduce the use of potable water through the use of fixtures with automatic controls. In addition, for water using appliances it is required that Energy Star® certified products are used wherever possible.

3.4 Water Harvesting

Whenever possible and practicable re-use storm water for landscaping and irrigation.

4.0 Enhance Indoor Environmental Quality

The intent of this section is to provide a basis for optimizing indoor environments to promote occupant comfort, health, and enjoyment of the space.

4.1 Minimum IAQ Performance

Meet or exceed most current ASHRAE Standard 62.1, Ventilation for Acceptable Indoor Air Quality.

4.2 Ventilation and Thermal Comfort

Meet or exceed most current ASHRAE Standard 55, Thermal Environmental Conditions for Human Occupancy.

4.3 Filtration Media

Utilize Minimum Efficiency Reporting Value (MERV) of at least 11 for equipment that requires filtration material. Where applicable, GeoPleat or Mini-Pleat filter with MERV 13 must be used. Filter media used in all HVAC equipment needs to be of standard sizing.

4.4 Day lighting and Lighting Controls

Automated lighting controls (occupancy/vacancy sensors with manual-off capability) are provided for appropriate spaces including restrooms, conference and meeting rooms, employee lunch room, training rooms and offices. Where possible and feasible, there should be no on schedule for DDC controlled lighting and occupancy sensors should be used to solely recognize inactivity, with switches used to turn lights on.

4.5 Low-Emitting Materials

Use low emitting materials for building modifications, maintenance, and cleaning. In particular, specify the following materials and products to have low pollutant emissions: composite wood products, adhesives, sealants, interior paints and finishes, solvents, carpet systems, janitorial supplies and furnishings.

4.6 Environmental Tobacco Smoke Control

Prohibit smoking within and in the vicinity of the building as per the City of Richmond Public Health Protection Bylaw, Worker Compensation Board (WCB) Occupational Health and Safety Regulations, and Vancouver Costal Health Authority regulations.

5.0 Integrate Building Automation Systems

The intent of this section is to provide a basis for optimizing the City's building control and energy monitoring capacity to maximize maintenance and operational efficiency, and efficient building resource use. In addition, this section will be used to standardize the City's DDC systems and graphic interface in new and existing buildings.

5.1 Prequalified Supply and Installation Contractors

One of the City's prequalified Supply and Installation Contractors for Direct Digital Controls (DDC) Systems must be used for the mechanical and lighting control of City-owned and/or operated space.

5.2 Lighting Control

Lighting control is to be tied into separate DDC controllers (unless exempted by the City where in they may be tied in to HVAC DDC controllers), which will be provided by one of the prequalified contractors, with the location and number to be specified by the Electrical Design Consultant as part of the electrical design tender package.

5.3 DDC Graphics and Monitoring

Graphics for the operator interface must be prepared to meet City requirements, which highlight energy efficiency and comfort. Graphic functionality for energy use monitoring will include, but is not limited to, energy use breakdown between electricity and natural gas, further segregation of each fuel type by each functional end use (e.g. ventilation, cooling, heating, pumping, lighting, plug loads, etc. – note that this requires tagging of end use into multiple categories), and by specific systems and equipment. The operator interface for City will run on the City's web-servers. This work must be coordinated through the City's IT group to arrange loading of graphics, databases, and for security requirements.

5.4 Energy Data

All energy data collected will be stored on the City's Sequel Server. The City will provide connection credentials so that the supplied system can store the data. The system must also be capable of delivering this data using BACnet over Ethernet, or BACnet of TCP/IP to third party data repositories capable of accepting BACnet data.

5.5 DDC Access and Datapoints

The DDC system will be remotely accessed by the City's web based operator interface. Data will be collected at intervals not to exceed 15 seconds for all points during the commissioning process to ensure system stability and tuning. These data points must include measurable variable, manipulated variable, and setpoint variable for each loop, as well as other variable measurements and outputs. VPN network connectivity will be provided by the Supply and Installation Contractor for secure access of sufficient bandwidth to support this.

5.6 Energy Use Monitoring

Any energy use monitoring shall be done through sub-meters that are BACnet enabled, or through virtual metering.

5.7 Water Metering and Monitoring

A water meter will provide instantaneous and aggregated water consumption information of each mechanical makeup water system such as cooling tower, chilled water system, heating water system, heat pump system, Geo/ground loop and Solar system. The information will be delivered using BACnet over MSTP, BACnet over Ethernet, or BACnet over TCP/IP.

5.8 Hydronic Monitoring

All hydronic loops that introduce or extract energy flows to the subject premises will be monitored. These will include measurement of flow and differential temperature. The calculation of energy and power will be performed at the meter. The flow, inlet and outlet temperatures will be transmitted along with the flow information to the DDC system. The information will be delivered using BACNet over MSTP, BACNet over Ethernet, or BACNet over TCP/IP.

5.9 Points List Review

Once the mechanical and lighting DDC points list has been initially defined, the City requests that they are provided to the City along with the mechanical and electrical specifications, to allow for the timely opportunity to review and comment before finalization.

5.10 Segregated Electrical Panels

Lighting, mechanical, and plug loads need to be segregated on separate electrical panels for energy monitoring purposes.

5.11 Electrical Directory Review

Once the preliminary electrical directories for each electrical panel have been defined, the City requests that they are provided to the City, to allow for a timely opportunity to review and comment before finalization.

5.12 Inspections

City personnel or the City's DDC consultant will conduct its own inspections of the system design, installation and functionality, and will prepare its own deficiency lists during the construction process and final inspection. The deficiency lists will need to be corrected prior to City sign off on completion of the facility.

6.0 Optimize Building Lighting Systems

City lighting guidelines and requirements are intended to provide the basis for optimizing building interior and exterior lighting controls and associated electrical use, and to standardize the type of lighting used depending on its function.

6.1 General Guidelines

6.1.1 All interior building lighting shall be supplied from 120 volt power systems.

6.1.2 Lighting design shall incorporate the principles of sustainability and its products and systems shall be energy conserving, long life, have a low cost of ownership and be accessible for service and maintenance.

6.1.3 For interior building lighting solutions, Light Emitting Diode (LED) lighting is preferred.

6.1.4 For exterior lighting applications (wall mounted fixtures, low mast light fixtures in parking lot), LED lighting is preferred.

6.1.5 Daylight harvesting opportunities shall be implemented in areas where natural daylight is available.

6.1.6 Uniformity and low brightness contrast shall be achieved by judicious use of luminaires and their locations.

6.1.7 All lighting shall be designed to suit the task and task location rather than the general lighting. The most current ASHRAE 90.1, IESNA and WorkSafeBC standards shall be taken into consideration and photometric calculations submitted where requested.

6.1.8 The designer shall take into account 4 to 5 year fluorescent lighting group relamping program, if applicable. All maintenance factors shall be maximized in due respect to the anticipated clean environment in the facilities.

6.1.9 When mounting luminaires in high ceiling spaces, consideration must be given to ensure access for maintenance activities. Indoor lighting shall be accessible either from ladders on flat surfaces such as floors or stair landings or from powered lifts with a maximum lift of 6.1 m. Building access, floor construction, and elevators shall permit entry and use of existing standard lift equipment for proper and safe maintenance. If special equipment is required for lighting maintenance, then the consultant shall, prior to tender, prepare and submit a Lighting System Maintainability Plan for review and approval and it shall contain documentation describing the special equipment, access arrangements for special equipment, and a maintenance schedule and spare parts list.

6.1.10 The lighting design proposed for all public areas such as corridors and stairways shall ensure the life safety of building occupants at all times and shall also minimize lighting energy required to zero, if possible, when the building is un-occupied (i.e. lights off until occupancy has been detected or an emergency has occurred). A portion of the lighting fixtures shall be wired to an emergency power panel if an emergency generator is available. Lighting circuits fed from emergency power panels shall be arranged so that they may be switched or dimmed.

6.1.11 In general, where feasible and economical LED lighting is preferred for all interior spaces. It is preferred for interior LED luminaires, such as troffers, that the driver be mounted in an easily accessible location (i.e. not behind the luminaire, so as to reduce maintenance time if replacement is needed).

6.1.12 If there is not a strong business case for interior LED lighting, then linear fluorescent lighting is preferred. Linear fluorescent luminaires shall be equipped with 120 volt program start electronic ballasts and T8-25 watt lamps or with T8-32 watt lamps in low temperature locations. Bent ‘U’ tube fluorescent luminaires are not acceptable. Lighting solution proposals using T5 linear fluorescent systems are not acceptable. When required in high ceiling areas, T5 High Output (HO) solutions are acceptable. Suspended luminaires shall be direct/indirect. Full indirect suspended luminaires are not acceptable.

6.1.13 Non-linear specialty fixtures such as pot lights, cylinders, wall sconces, wall washers and other decorative lighting shall be minimized and shall not exceed 10% of the total quantity of fixtures in the building project. When used, it is preferred that these luminaires not be enclosed and incorporate vertically aligned medium base screw-in LED lamps.

6.1.14 HID fixtures such as Metal Halide (MH) or High Pressure Sodium (HPS) are not acceptable.

6.2 Lamp and Ballast Guidelines

6.2.1 Use of LED lamps is encouraged and as substitutes for traditional applications involving CFL, MR-16, PAR 20, PAR 30, BR30, PAR 38 lamps, and linear fluorescent lamps. LED lamps shall be Energy Star rated.

6.2.2 Lamps shall be the longest life available. Preference will be given to lamps and lighting containing the lowest amount of mercury and other toxic components.

6.2.3 If applicable, it is preferred that T8 fluorescent lamps be extra-long life or extended life lamps rated for 40,000 hours operation with 3 hours per start.

6.2.4 T8–25 watt lamps with 3500° K color temperature shall be the typical lamp used for linear fluorescent lighting.

6.2.5 T8–32 watt High Lumen fluorescent or LED lamps shall be the typical lamp used in low temperature locations.

6.2.6 T5 HO fluorescent lamps shall be extra-long life or extended life lamps.

6.2.7 Where T5 HO lamps are used in enclosed fixtures, lamps rated for higher temperatures shall be used.

6.2.8 All fluorescent lighting ballasts shall operate from 120 volt input voltage and shall be program start electronic type with standard ballast factor. Ballasts shall have parallel lamp operation.

6.2.9 Ballast output frequency shall be greater than 42 kHz.

6.2.10 Dimming ballasts shall be program start with either line voltage or 0-10 volt control.

6.2.11 Ballasts shall have lamp end-of-life detection and shutdown circuitry that meets the most current ANSI standards.

6.3 Energy Allowances

6.3.1 All interior lighting shall not exceed the energy density limits as defined in the most current ASHRAE 90.1 lighting power densities standard, using either the whole building area method or the space by space evaluation method. For the whole building area evaluation method, the standard is currently 0.90 watt per square foot.

6.3.2 All exterior building lighting shall not exceed the lighting power density limits as defined in the most current ASHRAE 90.1 standard.

6.4 Lighting Controls

6.4.1 All interior lighting (including stairwells) shall have controls such that when the lighting is not needed, it will automatically be either turned off or dimmed to a low output condition, and shall conform to the most current relevant ASHRAE 90.1 standard.

6.4.2 All lighting control systems shall be fully tested and commissioned and a Lighting System Commissioning Report shall be prepared and certified by a responsible professional as per the most current relevant ASHRAE 90.1 standard.

6.4.3 As per the DDC integration requirements, where low voltage relay controls are provided for new building projects they shall include a BACnet compatible DDC interface device to allow for all scheduling functions related for the lighting systems to be controlled by the buildings DDC system.

6.4.4 All exterior building mounted lighting and exterior building area lighting shall be controlled by photocell or astronomical time clock. Lighting that may be powered from the building electrical system shall be controlled by the DDC.

6.4.5 Occupancy sensors shall be dual technology type with both Passive Infrared (PIR) and acoustic/ultra-sonic sensors, and may be either line voltage or low voltage types. Low voltage occupancy sensors with 1 or 2 poles and local power packs are preferred. Slave power packs are not acceptable.

6.4.6 Offices shall have light control switches at all entrances, exits and vestibules. These interior spaces shall also have occupancy sensors integrated with the control switch or mounted at a high level in a corner and arranged for semi-automatic operation such that manual operation of the local switches is required to energize the lighting while occupancy sensors and local switches will de-energize the lighting. Large spaces may need more than one sensor.

6.4.7 Corridors, lobbies and similar public spaces shall have occupancy sensors, mounted at high levels, and arranged for full automatic operation.

6.4.8 Occupancy sensors are not permitted in interior spaces that may be or may become hazardous, such as electrical and mechanical service rooms.

6.4.9 Where feasible, all offices, corridors, stairways and other public spaces shall incorporate daylight harvesting via use of interior mounted photocells and arranged to take advantage of free illumination while maintaining acceptable minimum illumination levels within the space.

6.4.10 LED dimmers shall be compatible with the LED lamps used and their drivers.

6.5 Exit Signage

6.5.1 Exit lighting shall be provided in accordance with the BC Building Code and the Canadian Electrical Code as amended by BC Electrical Safety regulations.

6.5.2 All exit signs shall be illuminated by LED light sources and shall have an emergency power NiCad battery.

6.5.3 Exit signs shall be powered at 120 volts from emergency power panels, if available.

6.5.4 The “Running Man” style EXIT sign that conforms to the CAN/ULC-S572 standard is preferred.

6.6 Emergency Lighting

6.6.1 Emergency lighting must be installed in accordance with the latest revision of the B.C. Building Code and City of Richmond’s Bylaw No. 8306 (Fire Protection and Life Safety).

6.6.2 Provide standby emergency generator if motor loads require emergency power.

6.6.3 All battery pack lighting, remote heads and exit lights shall be LED type and manufactured by ‘Ready-Lite’ or an approved equal. ‘Ready-Lite’ is available from local suppliers and shall be stocked by the City of Richmond. It is important that there is stock in standard sizes so that repairs can be done quickly and effectively as required for the life safety system.

6.6.4 The battery packs shall be long life type and either 12 volts DC or 24 volts DC and shall be in accordance with CSA C22.2 No. 141.

6.6.5 All battery packs shall be mounted on the wall using anchors capable of supporting the weight, or mounted on an appropriately sized shelf, supplied from ‘Ready-Lite’ or an approved equal.

6.6.6 Generator and Electrical rooms shall be provided with an emergency battery lighting pack.

6.6.7 If a 12 volt DC battery lighting pack is used for emergency lighting power, it shall be rated for 36 watt to 360 watt and should not be self-testing.

6.6.8 If a 24 volt DC battery lighting pack is used for emergency lighting power, it shall be either a 360 watt unit or a 720 watt unit, and should not be self-testing.

6.6.9 For both 12 volt DC and 24 volt DC systems, the heads and remote heads shall be 9 watts each.

6.6.10 Battery packs that are fed from a 120 volt AC. source shall have a 120 volt duplex receptacle mounted adjacent so that the battery pack can be plugged into the receptacle, to facilitate testing and replacement when needed.

Appendix C:

City of Richmond Direct Digital Control (For Buildings) and Energy Monitoring Guidelines – Non-City Managed New Construction for City-owned Spaces (Updated December 2018)

1.0 Requirements

1.1 One of the City's two prequalified Supply and Installation Contractors for Direct Digital Controls (DDC) Systems must be used for the mechanical and lighting control of City-owned and/or operated space—currently either ESC Automation or Control Solutions.

1.2 Lighting control is to be tied into separate DDC controllers, which will be provided by one of the prequalified contractors, with the location and number to be specified by the Electrical Design Consultant as part of the electrical design tender package.

1.3 Graphics for the operator interface must be prepared to meet City requirements, which highlight energy efficiency and comfort. Graphic functionality for energy use monitoring will include, but is not limited to, energy use breakdown between electricity and natural gas, further segregation of each fuel type into energy use of separate end uses, to further segregation of energy use of specific systems and equipment. The operator interface for the City will run on the City's web-servers.

1.4 The DDC system will be remotely accessed by the City's web based operator interface. Data will be collected at a maximum of 15 second intervals for all points during the commissioning process to ensure system stability and tuning. VPN network connectivity will be provided by the Supply and Installation Contractor for secure access of sufficient band-width to support this.

1.5 Any energy use monitoring and billing of a City space, which is located within a building that is not City-owned and managed, will be done through sub-meters that are BACnet enabled and not on a pro-rated basis.

1.6. A water meter that is BACnet enabled is required to monitor use of any mechanical makeup water system such as cooling tower, chill water system, heating water system, heat pump system, Geo/ground loop and Solar system.

1.7 A BTU meter that is BACnet enabled is required for the heat pump loop to monitor the energy usage of City space.

1.8 Once the mechanical and lighting DDC points list for the space has been initially defined, the City requests that they are provided to the City along with the mechanical and electrical specifications, to allow for the timely opportunity to review and comment before finalization.

1.9 Lighting, mechanical, and plug loads need to be segregated on separate electrical panels for energy monitoring purposes.

1.10 Once the preliminary electrical directories for each electrical panel have been defined, the City requests that they are provided to the City, to allow for a timely opportunity to review and comment before finalization.

1.11 City personnel or the City's DDC consultant will conduct its own inspections of the system design, installation and functionality, and will prepare its own deficiency lists during the construction process and final inspection. The deficiency lists will need to be corrected prior to City sign off on facility completion.

Appendix D:

City of Richmond General Lighting Guidelines (Updated December 2018)

1.0 General

1.1 Related City of Richmond Guidelines

1.1.1 High Performance Building Policy

1.1.2 City of Richmond Sustainable Operation and Maintenance Requirements

1.2 Coordination Requirements

1.2.1 City of Richmond Facilities

1.2.2 City of Richmond Project Development

1.2.3 City of Richmond Information Technology

2.0 Material And Design Requirements

2.1 General

2.1.1 All interior building lighting shall be supplied from 120 volt power systems.

2.1.2 Lighting design shall incorporate the principles of sustainability and its products and systems shall be energy conserving, long life, have a low cost of ownership and be accessible for service and maintenance.

2.1.3 For interior building lighting solutions, preference shall be given to Light Emitting Diode (LED) and linear fluorescent light sources.

2.1.4 For exterior lighting applications (wall mounted fixtures, low mast light fixtures in parking lot), preference shall be given to LED light sources. Fluorescent light sources may be used selectively.

2.1.5 Daylight harvesting opportunities shall be implemented in areas where natural daylight is available.

2.1.6 Uniformity and low brightness contrast shall be achieved by judicious use of luminaires and their locations.

2.1.7 All lighting shall be designed to suit the task and task location rather than the general lighting. ASHRAE 90.1-2010, IESNA and WorkSafeBC guidelines shall be taken into consideration and photometric calculations submitted where requested.

2.1.8 The designer shall take into account 4 to 5 year fluorescent lighting group relamping program. All maintenance factors shall be maximized because of the expected clean environment in the facilities.

2.1.9 When mounting luminaires in high ceiling spaces, consideration must be given to ensure access for maintenance such as lamp and ballast changing. Indoor lighting shall be accessible either from ladders on flat surfaces such as floors or stair landings or from powered lifts with a maximum lift of 6.1 m. Building access, floor construction, and elevators shall permit entry and use of existing standard lift equipment for proper and safe maintenance. If special equipment is required for lighting maintenance, then the consultant shall, prior to tender, prepare and submit a Lighting System Maintainability Plan to the City of Richmond for review and approval and it shall contain documentation describing the special equipment, access arrangements for special equipment, and a maintenance schedule and spare parts list.

2.1.10 The lighting design proposed for all public areas such as corridors and stairways shall ensure the life safety of building occupants at all times and shall also minimize lighting energy required to zero, if possible, when the building is unoccupied (i.e. lights off until occupancy has been detected or an emergency has occurred). A portion of the lighting fixtures shall be wired to an emergency power panel if an emergency generator is available. Lighting circuits fed from emergency power panels shall be arranged so that they may be switched or dimmed.

2.1.11 In general, where feasible and economical LED lighting is preferred for interior spaces. It is preferred for interior LED luminaires, such as troffers, that the driver be mounted in an easily accessible location (i.e. not behind the luminaire, so as to reduce maintenance time if replacement is needed).

2.1.12 If there is not a strong business case for interior LED lighting, then linear fluorescent lighting is preferred. Linear fluorescent luminaires shall be equipped with 120 volt program start electronic ballasts and T8-25 watt lamps or with T8-32 watt lamps in low temperature locations. Bent ‘U’ tube fluorescent luminaires are not acceptable. Lighting solution proposals using T5 linear fluorescent systems are not acceptable. When required in high ceiling areas, T5 High Output (HO) solutions are acceptable. Suspended luminaires shall be direct/ indirect. Full indirect suspended luminaires are not acceptable.

2.1.13 Non-linear specialty fixtures such as pot lights, cylinders, wall sconces, wall washers and other decorative lighting shall be minimized and shall not exceed 10% of the total quantity of fixtures in the building project. When used, it is preferred that these luminaires not be enclosed and incorporate vertically aligned medium base screw-in LED lamps.

2.1.14 HID fixtures such as Metal Halide (MH) or High Pressure Sodium (HPS) are not acceptable.

2.2 Lamps

2.2.1 Lamps shall be the longest life available. Preference will be given to fluorescent lamps containing the lowest amount of mercury.

2.2.2 It is preferred that T8 fluorescent lamps be Extra Long Life or Extended Life lamps rated for 40,000 hours operation. LED light fixtures only.

2.2.3 Preferred manufacturers are: General Electric, Osram Sylvania, or Philips.

2.2.4 T8–25 watt lamps with 3500° K color temperature shall be the typical lamp used for linear fluorescent lighting.

2.2.5 T8–32 watt High Lumen fluorescent or LED lamps shall be the typical lamp used in low temperature locations.

2.2.6 T5 HO fluorescent lamps shall be Extra Long Life or Extended Life lamps.

2.2.7 Preferred manufacturers are: General Electric, Osram Sylvania, or Philips.

2.2.8 Where T5 HO lamps are used in enclosed fixtures, lamps rated for higher temperatures shall be used.

2.2.9 Preferred manufacturers are Philips Extreme Temperature series or Sylvania Constant series.

2.2.10 Use of LED lamps is encouraged and as substitutes for traditional applications involving CFL, MR-16, PAR 20, PAR 30, BR30, PAR 38 lamps, and linear fluorescent lamps when economical. LED lamps shall be Energy Star rated.

2.3 Ballasts

2.3.1 All fluorescent lighting ballasts shall operate from 120 volt input voltage and shall be program start electronic type with standard ballast factor. Ballasts shall have parallel lamp operation. Acceptable manufacturers are: General Electric, Osram Sylvania, Philips/Advance or Universal.

2.3.2 Ballast output frequency shall be greater than 42 kHz.

2.3.3 Dimming ballasts shall be program start with either line voltage or 0-10 volt control.

2.3.4 Ballasts shall have lamp end-of-life detection and shutdown circuitry that meets ANSI standards.

2.4 Energy Allowances

2.4.1 All interior lighting shall not exceed the energy density limits as defined in ASHRAE 90.1-2010 section 9.5 (Building Area Method) or 9.6 (Space by Space Method). For the Building Area Method, the energy density limit is 0.90 watt per square foot.

2.4.2 All exterior building lighting shall not exceed the energy density limits as defined in ASHRAE 90.1-2010 section 9.4.3.

2.5 Lighting Controls

2.5.1 All interior lighting (including stairwells) shall have controls such that when the lighting is not needed, it will automatically be either turned off or dimmed to a low output condition, and shall conform to the new ASHRAE 90.1-2010 standard (sections 9.4.1, 9.4.2).

2.5.2 All lighting control systems shall be fully tested and commissioned and a Lighting System Commissioning Report shall be prepared and certified by a responsible professional as per ASHRAE 90.1-2010 standard (section 9.4.4).

2.5.3 Where low voltage relay controls are provided for new building projects they shall include a BACnet compatible Building Management System (BMS) interface device which shall be wired to the local BMS control panel. This will ensure that all scheduling functions related to lighting systems will be under the control of the BMS system.

2.5.4 All exterior building mounted lighting and exterior building area lighting shall be controlled by photocell or astronomical time clock. Lighting which may be powered from the building project electrical system shall be under the control of the BMS scheduling system.

2.5.5 Occupancy sensors shall be dual technology type with both Passive Infrared (PIR) and acoustic/ultra-sonic sensors, and may be either line voltage or low voltage types. Low voltage occupancy sensors with 1 or 2 poles and local power packs are preferred. Slave power packs are not acceptable.

2.5.6 Preferred manufacturers are Watt stopper, Sensor Switch, Leviton, or Hubbell.

2.5.7 Offices shall have light control switches at all entrances, exits and vestibules. These interior spaces shall also have occupancy sensors integrated with the control switch or mounted at a high level in a corner and arranged for semi-automatic operation such that manual operation of the local switches is required to energize the lighting while occupancy sensors and local switches will de-energize the lighting. Large spaces may need more than one sensor.

2.5.8 Corridors, lobbies and similar public spaces shall have occupancy sensors, mounted at high levels, and arranged for full automatic operation.

2.5.9 Occupancy sensors are not permitted in interior spaces that may be or may become hazardous, such as electrical and mechanical service rooms.

2.5.10 All, offices, corridors, stairways and other public spaces shall incorporate daylight harvesting via use of interior mounted photocells and arranged to take advantage of free illumination while maintaining acceptable minimum illumination levels within the space.

2.5.11 LED dimmers shall be compatible with the LED lamps used and their drivers.

2.6 Exit Signage

2.6.1 Exit lighting shall be provided in accordance with the BC Building Code and the Canadian Electrical Code as amended by BC Electrical Safety regulations.

2.6.2 All exit signs shall be illuminated by LED light sources and shall have an emergency power NiCad battery.

2.6.3 Exit signs shall be powered at 120 volts from emergency power panels, if available.

2.6.4 The “Running Man” style EXIT sign which conforms to the CAN/ULC-S572 standard shall be used.

2.7 Emergency Lighting

2.7.1 Emergency lighting must be installed in accordance with the latest revision of the B.C. Building Code and City of Richmond’s Bylaw No. 8306 (Fire Protection and Life Safety).

2.7.2 Provide standby emergency generator if motor loads require emergency power.

2.7.3 All battery pack lighting, remote heads and exit lights shall be LED type and manufactured by ‘Ready-Lite’ or approved equal. ‘Ready-Lite’ is available from local suppliers and shall be stocked by City of Richmond. It is important that City of Richmond have stock in standard sizes so that repairs can be done quickly and effectively as required for the life safety system.

2.7.4 The battery packs shall be long life type and either 12 volts DC or 24 volts DC and shall be in accordance with CSA C22.2 No. 141.

2.7.5 All battery packs shall be mounted on the wall using anchors capable of supporting the weight, or mounted on an appropriately sized shelf, supplied from ‘Ready-Lite’ or approved equal.

2.7.6 Generator and Electrical rooms shall be provided with an emergency battery lighting pack.

2.7.7 If 12 volt DC is used they shall be rated for 36 watt to 360 watt and should not be self-testing as clients do not understand the self-test and call unnecessarily.

2.7.8 If 24 volts DC are used they shall be either a 360 watt unit or a 720 watt unit only. They shall also be a basic model without meters or self-testing.

2.7.9 For both 12 volt DC and 24 volt DC systems, the heads and remote heads shall be 9 watts each.

2.7.10 Battery packs that are fed from a 120 volt AC source shall have a 120 volt duplex receptacle mounted adjacent so that the battery pack can be plugged into the receptacle. This is to facilitate testing and replacement when needed.

Appendix E:

City of Richmond Entrance Intercom/Video Systems Specifications for City of Richmond Buildings (Updated December 2018)

1.0 Entrance/Video Systems Specifications

1.1 All specified entry doors shall be controlled by an entry audio intercom which will communicate via a supplied phone line, existing phone line may be used if one exists.

1.2 Acceptable part numbers are Viking K-1200 or K-1200EWP, no exceptions allowed.

1.3 All Entry door stations will require a home run, minimum 1 in. conduit from the K1200 unit to a predetermined location as per the specified drawings.

1.4 The entry door unit will require a single gang box flush mount box mount at a height of no higher than 44 in.

1.5 In applications where flush mounting is not an option, then a surface mount conduit stubbed to the top of the surface mount K1200 unit will suffice.

1.6 The system will be programmed to allow communication to staff via locals or specified phone numbers as per instructions from location coordinator.

1.7 All required entry door locations shall have a 12 volt electric strike installed to release the door. Accepted brands are RCI S6514 series and/or Von Dupron, model number will be determined by the type of door installed and hardware operating such door and code requirements.

1.8 All strikes will require a home run, via a minimum ½ in. conduit supplied to a predetermined location as per the specified drawings. All conduit for strikes must terminate in the frame that houses the strike or directly to the device.

1.9 The Video monitoring system for each entry door will consist of a camera at the entry door location. Acceptable brand and part numbers will be Hikvision DC-2CD2122FWD-IS Armored Dome cameras, if using IP cameras or Hikvision DS-2CE55C2N if using Analogue camera. All cameras will be home run via a minimum ¾ in. conduit to a determined location as per specified drawings.

1.10 All cameras shall terminate to a Hikvision NVR or similar distribution hub located in an acceptable location for the project. The NVR will not contain a hard drive or allow recording of any images, unless proper procedures and authority is given by the City of Richmond, and all Guidelines of the Privacy Impact Assessment are met.

1.11 All video camera installations must adhere to the specifications of the personal information protection act, regarding video camera installations.

1.12 A video monitor shall be supplied at the locations determined by the specified drawings. The acceptable brand and part numbers of the monitors will be Wbox 19 or 22led or similar brand CSA approved led monitor.

1.13 Each monitor must be wall mounted with an approved monitor wall bracket; model shall be determined by the size and weight of the monitor at the specified location and height in drawing. A mounting plate of no less the 19mm plywood or similar product must be supplied at the monitor location, sufficient in size to support the weight and size of supplied monitor, drywall anchors not permitted. All monitors will require a home via a minimum ¾ in. conduit to the determined location as per the specified drawings.

1.14 No wiring may be exposed to the outside of a building unless in approved conduit for outdoor use.

1.15 A 120 VAC circuit must be supplied at each monitor location, all outdoor locations must have a GFI circuit installed as per electrical code.

1.16 A 120 VAC circuit must be supplied at the determined hub or home run location as determined by the specified drawings.

Appendix F:

City of Richmond Security, Fire Alarm Systems Specifications for City of Richmond Buildings, March 2015

1.0 Security Alarm Systems

1.1 All external doors shall be hardwired with a single, station Z 22AWG 4 conductor wire, or a ½ in. emt. conduit.

1.2 Conduit from each location to the security panel termination point.

1.3 The Security system must be a Napco brand security panel 1632, 9600 or X255 depending on size and location, no substitutions.

1.4 All buildings will require a minimum of one Napco RP1CAE2 keypad at or near a specified entry door or doors, each keypad will require a minimum Cat V 24AWG 8 conductor wire to that location to a the security panel termination point, or a ½ in. emt. conduit connecting to that location.

1.5 All rooms exposed to outer windows, or doors or rooms of sensitive nature shall require a dual-tech motion sensor, a Honeywell DT-8050M mounted at a maximum of 8 feet. Each of these locations shall require a minimum station Z 22AWG 4 conductor or preferably a CAT V 24AWG or a ½ in. emt. conduit is required and shall be terminated at the security panel termination point.

1.6 All cabling and/or conduit shall be home run to the security panel termination point and no splice points shall be allowed, conduit runs can be combined as long as size as conduit is increased based on how many conduit runs are combined.

1.7 A 24 in. x 24 in. space is required for the alarm panels at the wiring termination point, this may change with size of building.

1.8 No wiring may be exposed to the outside of a building unless in approved emt. conduit, all access points must be tamper proof.

1.9 A 120 VAC circuit, with an individual breaker and a double gang box shall be required to allow hardwiring of transformers. Plug in transformers/power bars are not allowed.

1.10 A minimum of 1 dedicated telephone line shall be required at the panel termination point for communications.

2.0 ULC Fire Alarm Monitoring Systems Specifications for City of Richmond Buildings

2.1 All fire alarm panels must be monitored for Alarm, Supervisory/Tamper and Trouble.

2.2 The Fire alarm monitoring system panel must be a DSC brand. 4116 ULC Fire Kit, no substitutions. Proprietary equipment not accepted.

2.3 Alarm monitoring panel must be mounted at a height of no higher than 72 in., while also being out of reach for children, and have unobstructed access to the panel at all times.

2.4 All cabling shall be home run to the monitoring panel termination point and must be in conduit. No exposed wiring shall be allowed and conduit runs can be combined as long as size as conduit is increased depending on how many conduit runs are combined. The use of CAT 5 or 6 cabling is prohibited as per ULC specifications.

2.5 A 24 in. x 30 in. space is required for the alarm monitoring panels at the wiring termination point.

2.6 No wiring may be exposed to the outside of a building unless in approved emt. conduit, all exposed panels must be tamper proof. All conduit must run into the monitoring panel through existing knockouts, no new knockouts allowed.

2.7 A 120 VAC circuit, with an individual marked breaker must be directly wired to the panel, with either Bx or conduit. No plug-in transformers/power bars are allowed.

2.8 A minimum of 1 dedicated telephone line phone line shall be required at the panel termination point for communications. All telephone lines must be in conduit and must be a direct line that does not connect to PBX or phone switch, line cannot be shared with a burglar alarm panel.

3.0 Access Systems Specifications for City of Richmond Buildings

3.1 All specified entry doors shall be controlled via a HID proximity card reader mounted outside the specified entry door or doors.

3.2 The Access system must be a Honeywell Webs-AX system, consisting of a minimum 1- H602 controller and expansion devices as deemed necessary. This is the only system that can be specified for the COR access system, no substitutions will be allowed.

3.3 Each controlled door shall require the following:

3.3.1 Door contact mounted at the top of each opening on the opening edge of each door, a hinged controlled contact is acceptable, 1 station Z 22AWG wire to each door contact.

3.3.2 Honeywell IS310 request to exit sensor mounted at the top of each door, station Z 22AWG or Cat V to each RTE sensor.

3.3.3 Hid brand Proximity card reader on the outside of each door controlled, at a height of the strike mechanism or no higher than 36 in., 22 AWG shielded 6 conductor to each card reader in the system, no substitutions.

3.3.4 12 volt DC electronic Strikes or similar locking hardware acceptable, no mag-locks are allowed, minimum 18.

3.4 AWG gauge 2 conductor to every electronic door lock in the system, wire size may increase with cable length.

3.5 A 24 in. x 48 in. space is required for the access panels at the wiring termination point, this could change depending on size of system.

3.6 No wiring may be exposed to the outside of a building unless in approved emt. Conduit and all outer access points must be tamper proof.

3.7 A 120 VAC circuit, with an individual breaker and a double gang box shall be required to allow hardwiring of transformers. Plug in transformers/power bars are not allowed.

3.8 A network drop is required at the access panel location.

4.0 Video Systems Specifications for City of Richmond Buildings

4.1 All digital video cameras must be a Hikvision or similar, no proprietary equipment or devices allowed.

4.2 All analog video cameras must be non-proprietary devices.

4.3 All video cameras must be designated for their appropriate application, outdoor cameras for outdoor applications, indoor cameras for indoor applications etc.

4.4 All recording devices must be Hikvision or Milestone, selection of equipment will be determined on scope of work and size of project, no proprietary equipment or software allowed.

4.5 No cameras can view sensitive or private areas and all installations must adhere to the strict provisions of the privacy act.

4.6 All equipment must have factory default password removed and changed to specified password determined by City of Richmond.

4.7 No access to the video playback files is allowed by City Staff unless special authorization from the City of Richmond Legal Department and access to these files must be locked out.

4.8 All video equipment installations must have the authorization by the City of Richmond legal dept. No installations to any City buildings is allowed without this written authorization, NO exceptions to this rule.

4.9 All installations must be done by a licensed contractor, licensed in the Province of BC for the installations and servicing of Video surveillance systems, NO exceptions allowed.

4.10 A 120 vac. circuit must be supplied at the NVR or DVR head end location.

4.11 A network drop is required at the access panel location.

Appendix H:

City of Richmond Rooftop Playground Design Guidelines (Updated December 2018)

Below are additional notes for the developer and consultant team for guidance in designing the outdoor play areas on slab.

1.0 Minimum Growing Medium Depths on slab:

A. 900mm for trees

B. 450mm for shrubs and perennials

C. 300mm for lawn

Note: Wherever possible, the slab should be dropped in order to achieve the above required minimum soil depths as a means to minimize use of retaining walls. All planters should be a minimum of 900mm width and include high efficiency irrigation. Soil loading to be reviewed by and co-ordinated with the project Structural Engineer. Inspection chambers are to be included at all slab drains located within planters. Ensure that all planters include drainage through inclusion of planter drains or block outs in planter walls located at the drainage layer below finished grade.

2.0 Growing medium to meet the current BC Landscape Standard for Level 2 "Groomed" and Level 3 "Moderate" Areas. A soil analysis report is to be provided to the Landscape Consultant and the City for review prior to placement on site. Soil analysis report to be performed on the proposed growing medium from samples taken at the supply source within three weeks prior to placement on site.

3.0 The top of slab should be a minimum of 250–300mm below the proposed finished grade in order to accommodate landscape build up (drainage and paving materials). The proposed exterior finished grade should match the proposed interior finished floor elevation (i.e. there should not be a step up or down to the exterior spaces from the building interior).

4.0 Wherever possible, bi-level drains should be used. Sand interceptors are to be included at all drains.

5.0 Preferred resilient surfacing on slab:

A. Poured in Place Rubber Surfacing. Dark colours such as black, red, or dark tinted colours should not be used.

B. Artificial turf.

C. Sand is recommended for play value, but not permitted for use as a resilient surface at play or climbing structures.

Note: All resilient surfacing are to meet CAN/CSA-Z614-14 guidelines. Engineered wood fibre and pea gravel are not permitted for use on slab.

6.0 Play equipment/elements to be fastened to a housekeeping slab(s) in order to protect the structural slab and membrane.

7.0 A raised edge that is 100mm minimum and 300mm maximum height is to be provided around sand play areas in order retain the sand. The raised edge should be either rounded concrete, or logs on side or end (peeled and free of splinters), or a combination of the two. Access to the sand area for the age group that it is servicing should be considered.

8.0 All exposed edges on hardscape and furnishings to be rounded or eased.

9.0 Landscape to be maintained at Level 4 "Open Space/Play" as outlined in the current version of the BC Landscape Standard.

Appendix I:

City of Richmond Irrigation Design Guidelines for Rooftop and Grade-Related Projects, November 2018

1.0 The requirements for both roof top and grade related details are that the:

- Controller to be Toro Sentinel Satellite SSAK-12-XXX-6-N-S (Note that the XXX is a placeholder for wall mounted vs. pedestal. Developer/Consultant to determine mounting based on project).
- Developer/Consultant to provide irrigation shop drawings to the City for review.

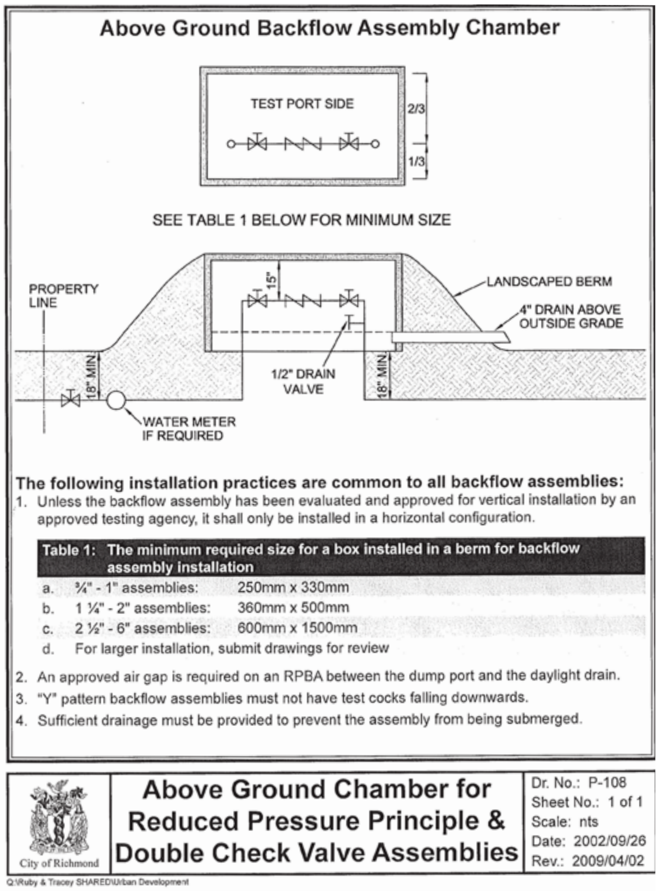
Note: A soil analysis report and irrigation shop drawings are to be submitted to the City Parks Department prior to placement of growing medium or installation of irrigation system. The Developer is to get in contact with Parks Operations (Asset Management) to review the irrigation shop drawings and to arrange for inspection by Parks Operations (Asset Management) upon installation of the irrigation system.

2.0 The following irrigation valve and sprinkler details are applicable for grade applications:

- Above Ground Chamber for Reduced Pressure Principle and Double Check Valve Assemblies
- IR-B-1
- IR-C-1
- IR-C-3
- IR-C-4
- IR-S-1
- IR-S-2
- IR-S-3

3.0 Only the following irrigation valve and sprinkler details are applicable in rooftop applications:

- IR-C-2
- IR-C-3
- IR-C-4
- IR-S-2



Above Ground Backflow Assembly Chamber

The following installation practices are common to all backflow assemblies:

1. Unless the backflow assembly has been evaluated and approved for vertical installation by an approved testing agency, it shall only be installed in a horizontal configuration.

Table 1: The minimum required size for a box installed in a berm for backflow assembly installation

a.	¾" - 1" assemblies:	250mm x 330mm
b.	1 ¼" - 2" assemblies:	360mm x 500mm
c.	2 ½" - 6" assemblies:	600mm x 1500mm
d.	For larger installation, submit drawings for review	

2. An approved air gap is required on an RPBA between the dump port and the daylight drain.
3. "Y" pattern backflow assemblies must not have test cocks falling downwards.
4. Sufficient drainage must be provided to prevent the assembly from being submerged.

City of Richmond

Above Ground Chamber for Reduced Pressure Principle & Double Check Valve Assemblies

Dr. No.: P-108
Sheet No.: 1 of 1
Scale: nts
Date: 2002/09/26
Rev.: 2009/04/02

Q:\Ruby & Tracey SHARED\Urban Development

Appendix J:

Toxic Plant List

Many plants commonly used in landscaping in North America have toxic properties that can be harmful to children. The use of these plants for soft landscaping in child care outdoor areas must be avoided.

The following list is not an exhaustive one, and landscape designers and developers are advised to also consult a local botanical garden for plant selection, as well as the American Medical Association (AMA) Handbook of Poisonous and Injurious Plants.

Table J-1: Toxic Plant List

BOTANICAL NAME	COMMON NAME	TOXIC PART
Aconitum spp	Monkshood, Wolfbane	all parts
Actaea spp	Baneberry, Cohosh	berries & roots
Aesculus spp	Horse Chestnut, Buckeye	fruit poisonous, choking hazard
Allium Canadense	Wild Garlic, Wild Onion	bulbs, flowers, stems
Anemone spp	Anemone, Pasque Flower	whole plant
Arisaema spp	Jack-in-the-Pulpit, Bog Onion	whole plant
Atropa belladonna	Deadly Nightshade	whole plant
Aucuba japonica	Aucuba, Japanese Laurel	fruit
Baptisia spp	Wild Indigo, Rattle bush	whole plant
Buxus sempervirens	Boxwood, Box	whole plant
Calla palustris	Water Arum, Wild Calla	whole plant, esp root
Caltha spp	Marsh Marigold	whole mature plant
Calycanthus spp	Carolina Alspice, Spice bush	seeds
Capsicum spp	Chili Pepper, Bird Pepper	fruit & seeds
Celastrus scandens	Bittersweet	fruit
Clematis spp	Clematis	whole plant
Colchicum spp	Autumn Crocus	whole plant
Convallaria majalis	Lily-of-the-Valley	whole plant
Daphne mezereum	Daphne, February Daphne	whole plant
Datura spp	Jimson Weed	whole plant, esp seeds
Delphinium spp	Larkspur, Delphinium	whole Plant, esp. seeds
Dicentra spp	Bleeding Heart	whole plant
Digitalis purpurea	Foxglove	whole plant
Dirca: palustris	Leatherwood	whole plant
Echium spp	Bugloss, Snake Flower	whole plant
Euonymus spp	Burning Bush, Spindle Tree	fruit
Euphorbia spp	Spurge, Gopher Purge	latex

BOTANICAL NAME	COMMON NAME	TOXIC PART
Galanthus nivalis	Snowdrop	bulb
Gelsernium sempervirens	Yellow Jesarnine	flowers
Gymnocladus dioicus	Kentucky Coffee Tree	seeds
Hedera spp	English Ivy	berry & leaf
Heliotropium spp	Heliotrope	whole plant
Helleborus niger	Christmas Rose	whole plant
Hyacinthus orientalus	Hyacinth	whole plant esp. bulb
Hydrangea spp	Hydrangea	flower bud
Ilex spp	Holly, English Holly	fruit
Iris spp	Iris, Flag	roots, flowers
Jasminum nudiflorum	Jasmine	seeds
Kalmia spp	Mountain Laurel	leaves, nectar
Laburnum spp	Laburnum, Golden Rain Tree	all parts
Lantana camara	Lantana	seeds
Leucothoe spp	Pepper Bush, Sweet Bells	leaves, nectar
Ligustrum vulgare	Privet	whole plant
Lobelia spp	Cardinal Flower	whole plant
Lonicera spp	Honeysuckle	possibly berries
Lycoris spp	Spider Lily	bulb
Morus rubra	Red Mulberry	unripe fruit and sap
Narcissus spp	Daffodil, Jonquil, Narcissus	bulb
Nerium oleander	Oleander	whole plant
Nicotiana spp	Flowering tobacco	whole plant
Ornithogalum spp	Star of Bethlehem	whole plant
Partbenocissus quinquefolia	Virginia Creeper	fruit
Pernettya spp	Pernettya	leaves & nectar
Physalis spp	Chinese or Japanese Lantern	fruit
Pieris spp	Lily-of-the-Valley Bush	leaves & nectar
Podophyllum pel tatum	May Apple	whole plant
Prunus spp	Cherries, Plums, Peaches	pit kernels only
Quercus spp	Oak	leaves and acorns at large quantities, also choking hazard
Ranunculus spp	Buttercup	sap, roots
Rhamnus spp	Buckthorn, Cascara	fruit & bark
Rheum rhabarbarum	Rhubarb	leaves
Rhododendron spp	Azalea, Rhododendron	leaves, nectar

BOTANICAL NAME	COMMON NAME	TOXIC PART
Rhodotypos spp	Jetbead	berries
Rhus vernix	Poison Sumac	whole plant, esp. sap of bark causes swelling
Ricinus conununis	Castor Bean	seeds
Robinia pseudoacacia	Black Locust	leaves, roots, bark
Sambucus spp	Elderberry	whole plant except cooked berries
Scilla spp	Squill, Star Hyacinth	whole plant
Senecio spp	Groundsel, Ragwort	whole plant
Solanum spp	Nightshade, Potato, Jerusalem Cherry	uncooked sprout, green skin
Sophora spp	Scholar Tree	seeds
Symphoricarpos spp	Snowberry, Waxberry	berries in large quantities
Taxus spp	Yew	most of the plant, but not the red aril around the seed
Wisteria spp	Wisteria	whole plant, esp. seeds and pods
Zantedeschia aethiopeca	Calla Lily	leaves
Zephyranthes atamasco	Zephyr Lily, Rain Lily	bulb
Aloe spp	Aloe	latex beneath skin
Amaryllis	Amaryllis, Belladonna	bulbs
Anthurium	Anthurium	leaves & stems
Arum	Arum, Solomon's Lily	whole plant
Caladium spp	Caladium, Elephants Ear	whole plant
Clivia spp	Kaffir Lily	whole plant
Crinum spp	Spider Lily	whole plant, esp bulb
Dieffenbachia	Dumbcane	leaves
Epipremnum aureum	Pothos	whole plant
Eriobotrya	Loquat	pitkemel
Hymenocallis spp	Spider Lily	bulbs
Monstera deliciosa	Monstera, breadfruit	leaves
Philodendron spp	Philodendron	leaves
Spathiphyllum	Spathe Flower, Anthurium	whole plant
Additional commonly used landscape plants that are toxic:		
Colchicum autumnale	Autumn crocus	whole plant
Cotoneaster spp	Cotoneaster	fruit in large quantities
Juniperus spp	Juniper	berries
Papaver spp	Poppy	seeds, pods, sap

Appendix K:

Requirements of Program Spaces and Activity Areas – Group Child Care

A. THE ENTRY: The front door is the face of a child care facility and benefits from a design that provides a warm and welcoming sense of arrival.

- Provide ample space to accommodate the entry and exit of children and parents. Provide for ease of staff supervision and security of the child care entry.
- Provide one means of entry only, supervised by staff with an alarm signaling unauthorized entry or exit. Additional entry doors and exit doors must also be alarmed.
- Provide the entry directly from the outdoors. If this is not possible, avoid long, poorly lit institutional corridors. Generally, avoid corridors as visual contact between staff and children is compromised.
- Provide for universal accessibility at the entry and throughout the child care facility.
- Provide space for strollers, and car or booster seats to be left by parents dropping off children or visiting. Security of strollers and other items for short-term storage are to be considered.
- Provide a sign-in counter for parents and a space for parents to leave their shoes before entering the child care proper.
- For energy conservation purposes in new buildings, vestibules at entries are required. Ensure that the ability for staff to keep a high level of surveillance on the front entry is not compromised by the design of the vestibule. Vestibules function best if they tend to be glass enclosures with automatic opening doors operated by push plates. Install a push plate on the exterior and the interior, in case someone becomes trapped in the vestibule.

B. THE CUBBY AREA: Provides storage space for children and should be designed to accommodate a range of stored items.

- Best located near the front entry, and also near the outdoor access to the children's outdoor play area.
- Cubby area to be based on one cubby per child, plus 10% extra cubbies to accommodate part-time children attending the child care program.
- Provide enough space for one staff and eight children to get dressed for outdoor play in inclement weather.
- Locate adjacent to the Front Entry and near the access to the Outdoor Play Area. This allows for soiled or wet children's clothes and boots to be removed before going in to the Activity Area.
- Each child requires their own cubby, with space for coats, rain gear, shoes or boots, and a change of clothes. See Technical Specifications section for detailed information. Note that the size requirement for cubbies differs between infant and toddler, and preschooler age groups. See Technical Specifications for more information.
- Provide for a staff cubby or closet beside the access to the outdoor play area.

C. THE ACTIVITY ROOM: Large, open space that has multi-purpose use.

- Typically located in close proximity to the entry and adjacent to the cubbies, the activity room is the largest of the child care program spaces, with the other spaces typically arranged contiguous to it.
- The area of the activity room is based on a minimum of 40 sq. ft. per child. Note that this area is devoted to children's activities, and does not include area provided for circulation through the activity room, or for built-in millwork. Consult City or CCFL staff for assistance in determining how acceptable area standards will be calculated.
- The room needs to accommodate a variety of activity settings in distinct zones.
- The use of moveable elements to define space is encouraged, along with a design that promotes flexibility.
- It is recommended that the design for the activity room include a furniture plan, and indicate how tables and chairs for eating can be accommodated along with other furniture, while leaving adequate play space areas.
- The room design should possess clear circulation paths that respect activity areas in an open plan environment. Separate hallways and columns that block clear sightlines should be avoided.
- Because the space is large in area, sufficient ceiling height is required. Ceilings of least ten feet in height from floor to finished ceiling are beneficial, rather than the standard eight feet.

- The activity room should have an art area with a counter, cupboards/storage and a deep art sink equipped with a sediment trap.
- The activity room is best designed to be open to and contiguous with the kitchen, allowing part of the activity area to be used for eating.
- Provide sufficient storage areas so the activity area can be left uncluttered.
- Provide a staff work counter, with an area for a notice board. This area could function as an answer station for the enterphone system.
- The activity room benefits from a direct relationship with the outdoor play area and the gross motor and nap room.
- Activity room requirements will differ depending upon the type of group care to be offered as defined by the ages of children served (see space summaries in Appendix A).

D. THE GROSS MOTOR AND NAP ROOM: Large room dedicated to sleeping/nap hours and/or gross motor activities.

- Nap rooms are required for full-day programs.
- For group care (30 months to school age) a generously sized gross motor/nap room is used both for sleeping and play activity.
- This room is another generously sized multi-purpose room in a child care facility, used for both play activity and for napping.
- Locate this room to open up to the activity room, to promote shared use of the two spaces. However, the room should be able to be closed off, so that children can nap without disturbance from other activities.
- To allow for staff supervision into the room, install generously-sized glazed wall areas and glazed doors.
- For a group care (30 months to school age), size the room to accommodate 25 children sleeping on mats—provide a 2 ft. x 4 ft. size sleeping mat for each child, plus 2 ft. circulation space between mats.
- Provide adequate storage for play equipment, sleeping mats or cots.
- For group care (under 36 months) for infants and toddlers separate nap rooms are recommended: one for cribs and one for mats or cots.
- There is no nap requirement for preschool or group care (school age) programs. A gross motor room is needed.

E. THE QUIET ROOM: Provides a quiet space for children, separate from the Main Activity Room.

- The quiet room is a separate room or area with a door for quiet activities involving one staff and up to three children.
- It is generally located adjacent the activity room, with glass partitions to allow visual surveillance in and out of the room.

F. THE KITCHEN: Often connected to the Main Activity Room but has a separate gate/door for entrance.

- Open to the activity room, the kitchen is used for preparation and clean up of snacks and lunches.
- The kitchen is an important component of the child care facility and requires careful design review. Every facility needs to have a kitchen that is suited to the needs of that specific child care program.
- The kitchen should be open and allow good sightlines to the activity areas and to nap areas.
- For safety reasons, in programs for children 5 and under, the kitchen is typically for staff only, and should be separated from the children's activity areas by a latching gate. To involve children in some kitchen activities, consider providing a child-height counter that separates the kitchen from the activity areas.
- Allow for wheelchair accessibility in the kitchen.
- Provide a pantry for food storage or ample amounts of cabinetry.
- Residential type kitchen exhaust hoods should vent directly to the outdoors and away from outdoor child care program play space.
- For commercial kitchens, refer to local regulations and BC Plumbing Code for direction on implementing grease traps.
- Provide a green waste and recyclables storage station built into the kitchen millwork.
- Kitchens serving a maximum of 37 children, with no hot meal program, are typically equipped as a "warming kitchen", with a residential style stove with warming and self-cleaning oven, and inaccessible operation knobs (i.e. located at back of stove), a microwave, a double sink and a separate hand sink, and a dishwasher. No grease-laden cooking vapours are permitted with such a "warming kitchen".
- Kitchens serving over 37 children or used to cook hot meals may be required to provide a commercial kitchen exhaust hood with fire suppression.

G. CHILD CARE SUPPORT SPACES: Multiple spaces that support the child care program.

- Storage: 6 Typical Storage Categories

A. Active storage: accessible by staff from the various child care activity areas.

B. Semi-active storage: shelves and cupboards accessible to staff above or near activity settings. All overhead storage must have ledge or latching capability for earthquake safety.

C. Storage room: for longer term storage, including seasonal items, and larger pieces of equipment.

D. Sleeping mat or cot storage: adjacent or in the nap room.
  - Provide purpose built-in millwork for mat or cot storage (mats must not touch each other).
  - Include shelf space above mat or cot storage for children's bedding. Provide sufficient shelf space to allow for individual storage baskets as each child's bedding must be kept separate from other children's bedding.
  - If built-in millwork is not provided, a trolley containing the mats or cots and bedding is an option. A storage closet with double doors could be provided to store the trolley and contents.
  - All sleeping mat, cot and bedding storage areas must address seismic safety concerns.

E. Stroller storage
  - Storage for parent strollers and car seats is best located in or adjacent to the entry.
  - Program stroller storage for triple sized strollers is also needed and best located close to the entry.

F. Emergency supply storage requirements
  - All storage shelves and items stored must be reviewed for seismic restraint and safety in case of an earthquake. Shelving should be secured to backing structures in walls, and provide for larger storage items to be able to be secured to shelving units with "bungee" cords or the like.
  - Additionally, emergency event supply storage shelving must be provided, allowing for storage of a sealed "comfort kit" for each child.

Typically, storage is provided throughout a facility, both indoors and outdoors. Besides providing storage rooms with double doors, plan to build in storage in such areas as above cubbies or in nooks or alcoves.

Children's Washrooms

Children's washrooms in child care facilities have very specific requirements, for the various child care types:

- For group care (under 36 months) and/or children who require extra support:
  - Provide a dedicated diapering area with everything within reach for the caregiver.
  - Provide a changing surface with an adjacent sink for washing-off of children and an area to store clean and soiled laundry.
  - Mixing valve on all children's washroom sinks to be accessible for maintenance.

Provide an accessible and lockable stair set for children's use to access the changing surface.

- For Group Care (30 months to school age)
  - Provide a washroom immediately accessible from the cubby and activity areas, nearby to the access door to outdoor play.
  - Staff must be able to visually supervise the entrance to the washroom.
  - Provide a large, accessible-size enclosed stall with a door that can be used for a diapering area.
- For Group care (school age), to ensure additional privacy for older children, individual stalls with doors are required.

Note: all Children's Washrooms (and all Washrooms and Service Rooms generally), must have floor drains.

Accessible Washroom and Staff Washroom

- Provide an accessible toilet room. The toilet room should also be equipped with a fold down diaper change table.
- Provide a staff washroom with a shower to meet end-of-trip Zoning Bylaw 8500 requirements for employees cycling to work.
- Depending upon an operator's preferred approach to meeting WorkSafe BC requirements for preventing staff injury, a ceiling lift may be required to assist with transferring older children to a diaper change table (important in centres serving children who require extra supports).

Administrative Office

- For administrative activities, as well as small meetings and conferences with parents.
- Allow for visual supervision of the primary activity area from this office.
- Provide lockers for staff in this room (although as an option, lockers can be provided in the cubby area). Double tier half-lockers are preferred.

- The office should be large enough to seat one person per program at the same time.

Staff Break Room

- A small room where staff can take breaks and have lunch.
- It should be sufficient size to accommodate a small kitchen counter with under-counter fridge, a dishwasher, a lunch table, a desk and a small couch.

Parents Room

- Consider providing a parent room near the entry and staff office, which could be used for small group meetings or interviews.
- A one-way window could be considered for observation purposes.
- This room could also be used as a library and child care reading resource room for parents.
- While desirable in a larger facility serving 69 children or more, a parents room should not take precedence over providing a staff break room in a typical facility.

Laundry

- Provide a front-loading washer, dryer and folding counter with a deep sink and overhead shelving.
- A laundry room is typically about 40 sq. ft. in size, ideally located near the washroom for the infant and toddler group, if possible.
- The laundry room needs to be lockable to prevent unsupervised access. Laundry machines need to be inaccessible to children or protected by a safety gate.
- Laundry appliances should be larger capacity machines, with heavy duty ratings (i.e. energy efficient).

Janitor’s Room

- Locked utility area with mop sink, floor drain, shelves, and wall space for hanging mops and brooms.
- A room of a minimum size of 40 sq. ft. in area.
- Provide open shelving for janitorial supplies on one wall.

Garbage and Recycling

- Provide a lockable garbage and recycling room or an exterior garbage and recycling enclosure adequately sized for the separation and storage of garbage and recyclables organics, accommodating the following:
- Garbage and recycling container sizes will be determined by the operator, however the dedicated area for storage of these containers should be built to accommodate nine 240 litres garbage containers, each with a depth of 27.5 inches, 24.5 inches in width and 43.25 inches in height.
- Ideally, the garbage and recycling room could be located right at the garbage and recycling collection point. However, both are to be located away from children’s activity areas and the facility entry.
- Provide a safe and accessible route to the garbage and recycling room or exterior enclosure and to the collection point, particularly if the room is remote from the collection area.
- The garbage and recycling room is best secured with solid core metal doors with heavy duty hardware including hold-opens, kickplates and door edge protection.
- An exterior garbage and recycling enclosure will need to be designed with an enclosed roof and must be accessible by garbage collection services (i.e. not placed on a curb).
- Provide a hose bib or mop sink and a floor drain.

Service Rooms

- Mechanical and electrical rooms and closets must be lockable and ideally kept remote from children’s areas.
- Avoid mechanical and electrical noise, and mechanical exhaust from entering children’s areas.
- Ideally, if situated in a mixed-use development, the child care facility should have its own separate mechanical heating and ventilation system, as well as irrigation system access, to avoid operational conflicts, temperature control difficulties and irrigation concerns.
- Mechanical and electrical service rooms are not to be used for storage of any items.
- A separate communications closet or Information Technology (IT) room is preferred for data and telecommunications equipment.

Appendix L:

Optimal Item Measurements in Child Care Facility (in inches)

Table L-1: Child Care Program Main Activity Room Measurements

Program Type	Floor to bottom of breakfast bar	Floor to top of adult-height art sink counter	Floor to top of child-height art sink counter	Art Sink Counter Depths	Floor to bottom of window minimum height	Floor to top of staff counter height	Floor to top of parent sign-in counter height
Group Child Care (Under 36 Months)	n/a	36″	18″ – 20″	20″	18″ – 24″	36″	36″
Group Child Care (30 Months to School-Age)	25″	36″	20″ – 22″	20″	18″ – 24″	36″	36″
Preschool	25″	36″	20″ – 22″	20″	18″ – 24″	36″	36″
School-Age	n/a	36″	28″ – 30″	20″	24″	36″	36″
Preschool/ School-Age combined	25″	36″	24″ – 26″	20″	24″	36″	36″

Table L-2: Child Care Program Children's Washrooms Child-height Sink Measurements

Program Type	Floor to top of children's sink height	Top of children's sink to bottom of faucet height	Front of children's sink counter to tap length	Edge of children's sink to front edge of counter length	Floor to paper towel holder height
Group Child Care (Under 36 Months)	18″ – 20″	6″ – 8″	16″	2.75″	36″
Group Child Care (30 Months to School-Age)	20″ – 22″	6″ – 8″	18″	2.75″	36″
Preschool	20″ – 22″	6″ – 8″	18″	2.75″	36″
School-Age	28″ – 30″	6″ – 8″	18″	2.75″	36″
Preschool/ School-Age combined	24″ – 26″	6 – 8″	18″	2.75″	36″

Table L-3: Child Care Program Children's Washrooms Toilet Measurements

Program Type	Floor to top of toilet seat height	Floor to bottom of toilet partition height	Floor to top of toilet partition height	Floor to centre of toilet roll height	Floor to centre of grab rail height in accessible stall
Group Child Care (Under 36 Months)	15″ – 16″	n/a	n/a	12"– 14"	18"– 20"
Group Child Care (30 Months to School-Age)	15″ – 16″	8.5″	48″ – 60″	14"	20"
Preschool	15″ – 17″	8.5″	48″ – 60″	14"	20"
School-Age	15″ – 17″	8.5″	60″	14"– 17"	20"– 25"
Preschool/ School-Age combined	15″ – 16″	8.5″	48″ – 60″	14"– 17"	25"

Table L-4: Child Care Program Children's Washrooms Adult-height Sink Measurements

	Floor to adult sink and change area counter height	Width of change area on counter top	Top of change area counter top to bottom of upper cabinet height
Adult-height sink/countertop	36″	36″	24 – 32"

Table L-5: Child Care Program Cubby Design Measurements (see Figure 11)

Program Type	Floor to top of cubby bench seat height	Floor to cubby hooks height	Floor to top of cubby "main box" height	Floor to top of cubby open upper shelving height	Floor to top of cubby recommended total (bench, hanging space, open shelving, closed shelving) height	Cubby bench seat depth	Cubby Depth
Group Child Care (Under 36 Months)	10″	30″	34″	60″	84″	20″	12″
Group Child Care (30 Months to School-Age)	10″	36″	40″	60″	84″	20″	12″
Preschool	10″	36″	40″	60″	84″	20″	12″
School-Age	10″	36″	40″	60″	84″	20″	12″
Preschool/ School-Age combined	10″	36″	40″	60″	84″	20″	12″

Table L-6: Shared Space Measurements

	Floor to upper cabinet height of stroller storage	Wall to upper cabinet depth at stroller storage	Floor to top of laundry sink and counter height	Floor to top of toilet seat height (staff & public washroom)	Floor to centre of toilet roll (staff & public washroom)	Floor to bottom of paper towel holder height (staff & public washroom)
Shared Space	54″	48″	36″	17–19″	19″	33" – 36"

Table L-7: Applicable to all Areas

	Floor to bottom of blind cords	Floor to top of wall protection	Backsplash height (washroom & kitchen)	Backsplash height (art sinks)
All Spaces	minimum 60″	minimum 36″	minimum 4″	minimum 24″

Please take a few moments to give feedback.
Submit your comments to **childcare@richmond.ca**
and mention "Design Guidelines" in the subject line

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