DESIGN-BUILD AGREEMENT

for the Clinical Support Building,
Kelowna General Hospital Interior Heart and Surgical Centre Project

INTERIOR HEALTH AUTHORITY

and

GRAHAM DESIGN BUILD SERVICES, a Joint Venture

Dated: December 10, 2010

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DESIGN-BUILD AGREEMENT

THIS AGREEMENT dated for reference as of December 10, 2010 (the "Effective Date") is entered into:

BETWEEN:

INTERIOR HEALTH AUTHORITY
(the "Authority")

AND:

GRAHAM DESIGN BUILD SERVICES, a joint venture, jointly and severally by GRAHAM DESIGN BUILD SERVICES LP by its general partner Graham Design Build Services Ltd. (a corporation formed under the laws of Canada) and Jardeg Construction Services Ltd. (a corporation formed under the laws of Alberta)
(the "Design-Builder")

WHEREAS:

A. The Authority has selected the Design-Builder to perform all Work for the Project referred to as the "Clinical Support Building", as further described in this Agreement; and

B. The parties wish to enter into this Agreement to set out their respective rights and obligations.

NOW THEREFORE in consideration of the premises and the mutual obligations contained in this Agreement, the parties hereby agree as follows:

PART A – DEFINITIONS AND INTERPRETATION

1. DEFINITIONS AND INTERPRETATION

1.1 In this Agreement, the following words and expressions have the following meanings:

(a) "Agreement" means this agreement, including the documents referred to in Section 1.2;

(b) "Architect" means a professional architect registered and in good standing under the *Architects Act* (British Columbia);

(c) "Authority" has the meaning set out on the first page of this Agreement;

(d) "Authority's Consultant" means Cannon Design Architecture Inc. unless replaced in accordance with Section 5.5;

(e) "Authority's Representative" has the meaning set out in Section 5.1;

(f) "Bonds" has the meaning set out in Section 58.1;

(g) "Business Day" means a day other than a Saturday, Sunday or statutory holiday in British Columbia;

(h) "CaGBC" means the Canada Green Building Council;

(i) "Category 1 Equipment" has the meaning set out in Section 1 of Schedule 4 – Equipment;

(j) "Category 2 Equipment" has the meaning set out in Section 1 of Schedule 4 – Equipment;

(k) "Category 3 Equipment" has the meaning set out in Section 1 of Schedule 4 – Equipment;

(l) "Category 4 Equipment" has the meaning set out in Section 1 of Schedule 4 – Equipment;

(m) "Category 5 Equipment" has the meaning set out in Section 1 of Schedule 4 – Equipment;

(n) "Change" means a change in the Work, including any addition, deletion, alteration, revision or substitution;

(o) "Change Directive" means a written instruction referenced as a "Change Directive" executed by the Authority and directing the Design-Builder to proceed with a Change;

(p) "Change Order" means a written document referenced as a "Change Order" executed by the Authority and the Design-Builder and setting out a Change and the value or method of valuation of a Change and any adjustments to the Contract Price and Contract Time;

(q) "Commission", "Commissioned" and "Commissioning" have the meanings set out in Section 1 of Schedule 4 – Equipment;

(r) "Commissioning Plan" has the meaning set out in Section 31.1;

(s) "Confidential Information" means information of a party that the party has designated as confidential at the time of disclosure and which is supplied, or to which access is granted, to or on behalf of the other party (whether before or after the Effective Date), either in writing, or in any other form, directly or indirectly pursuant to discussions with the other party and includes all analyses, compilations, studies and other documents whether prepared by or on behalf of a party which contain or otherwise reflect or are derived from such designated information;

(t) "Construction" means all things, other than Design, necessary to complete the Work;

(u) "Contaminants" means any materials, substances or special (hazardous) wastes, the storage, manufacture, disposal, treatment, generation, use, transport, remediation or release into the environment of which is now or hereafter prohibited, controlled or regulated under the *Environmental Management Act* (British Columbia) and the *Contaminated Sites Regulation* (British Columbia) as they may be amended, repealed or replaced from time to time;

(v) "Contract Price" means the price set out in Section 2.1;

(w) "Contract Time" means the time within which the Design-Builder will achieve Substantial Completion of the Work as set out in Section 3.1;

(x) "Deliver", "Delivered" and "Delivery" have the meanings set out in Section 1 of Schedule 4 – Equipment;

(y) "Design" means the design for the Project;

(z) "Design Covenant" means Covenant No. LB223014 registered against the Land in favour of the City of Kelowna;

(aa) "Design-Builder" has the meaning set out on the first page of this Agreement;

(bb) "Design-Builder's Consultant" means Stantec Architecture Ltd. as the principal Architect and coordinating professional and any other architectural or engineering firm or person, including any Architect or Professional Engineer, engaged by the Design-Builder to prepare the Drawings and Specifications, or to otherwise consult to the Design-Builder on the Project;

(cc) "Design-Builder's Representative" has the meaning set out in Section 5.2;

(dd) "Disclosed Data" means any information, data and documents (including in PLS-CADD or any other electronic format) made available or issued to the Design-Builder or any Subcontractor or other person on behalf of the Design-Builder or any Subcontractor in connection with the Project by or on behalf of the Authority, including any information relating to the Land or the requirements of any governmental authority, whether before or after the Effective Date;

(ee) "Dispute" means any disagreement, failure to agree or other dispute between the Authority and the Design-Builder arising out of or in connection with this Agreement, including in respect of the interpretation, breach, performance, validity or termination of this Agreement, whether in the law of contract or any other area of law;

(ff) "Drawings" means all drawings for the Project that are prepared by or for the Design-Builder and submitted to the Authority under the Review Procedure and that the Design-Builder is entitled to proceed with under the Review Procedure;

(gg) "Effective Date" has the meaning set out on the first page of this Agreement;

(hh) "End Date" means the date described in Section 4.1;

(ii) "Equipment" has the meaning set out in Section 1 of Schedule 4 – Equipment;

(jj) "Equipment Committee" has the meaning set out in Section 1 of Schedule 4 – Equipment;

(kk) "Equipment Data Sheets" has the meaning set out in Section 1 of Schedule 4 – Equipment;

(ll) "Equipment List" has the meaning set out in Section 1 of Schedule 4 – Equipment;

(mm) "Equipment Logistics Schedule" has the meaning set out in Section 1 of Schedule 4 – Equipment;

(nn) "Facility" means the buildings, related structures, utility connections, landscaping and other improvements to be constructed by the Design-Builder pursuant to this Agreement;

(oo) "Force Majeure" means labour disputes, strikes, lock-outs, fire, unusual delay by common carriers or unavoidable casualties or, without limiting any of the foregoing, by a cause beyond the Design-Builder's reasonable control, but excludes:

(i) any event that is the result of breach of this Agreement or Law;

(ii) economic hardship or lack of financing;

(iii) equipment failure;

(iv) unavailability of personnel, labour or Subcontractors;

(v) unavailability of materials;

(vi) labour disputes, strikes or lock-outs of the personnel of the Design-Builder or the Subcontractors;

(vii) delays resulting from adverse weather conditions that, based on available historical records or on a reasonable knowledge of the location of the Site, are consistent with those that ought reasonably to have been anticipated; and

(viii) unsuitable or unanticipated Site conditions, including subsurface conditions.

(pp) "FIPPA" means the *Freedom of Information and Protection of Privacy Act* (British Columbia);

(qq) "Health and Safety Plan" has the meaning set out in Section 29.5;

(rr) "HST" means the harmonized sales tax imposed pursuant to Section IX of the *Excise Tax Act* (Canada);

(ss) "Indemnified Parties" has the meaning set out in Section 56.1;

(tt) "Install", "Installed" and "Installation" have the meanings set out in Section 1 of Schedule 4 – Equipment;

(uu) "Insurance Conditions" means the terms and conditions set out in Schedule 3 – Insurance Conditions;

(vv) "Key Personnel" means the persons identified in Schedule 9 – Key Personnel;

(ww) "Land" means the lands located at 2268 Pandosy Street in the City of Kelowna, British Columbia, and legally described as Lot A, District Lot 14, ODYD, Plan KAP87113;

(xx) "Laws" means the common law and any and all laws, statutes, enactments, by-laws, regulations, rules, orders, directives, policies, permits, licences, codes and rulings of any government, and any ministries, agencies, board, commission or tribunal of any government having jurisdiction in any way over or in respect of any aspect of performance of this Agreement or the Project;

(yy) "LD Holdback" has the meaning set out in Section 41.1;

(zz) "LEED Gold Certification" means the award of a LEED Gold certification from the CaGBC under the LEED Rating System;

(aaa) "LEED Holdback" has the meaning set out in Section 41.1;

(bbb) "LEED Rating System" means CaGBC's Leadership in Energy & Environmental Design (LEED) Green Building Rating System for New Construction & Major Renovations LEED Canada – NC 1.0 (and March 2007 Addendum), but for greater certainty does not refer to the current rating system unless the rating system is changed under Section 10.1(c);

(ccc) "Lien Holdback" means the 10% holdback required under the *Builders Lien Act* (British Columbia);

(ddd) "Other Contractor" means any person employed by or having a separate contract directly or indirectly with the Authority for work related to the Project other than the Work;

(eee) "Performance Holdbacks" has the meaning set out in Section 41.1;

(fff) "Preload Contract" has the meaning set out in Section 11.1;

(ggg) "Preload Contractor" has the meaning set out in Section 11.1;

(hhh) "Professional Engineer" means a professional engineer registered and in good standing under the *Engineers and Geoscientists Act* (British Columbia);

(iii) "Project" means the design, construction, testing and commissioning of the Facility and all other works in accordance with this Agreement;

(jjj) "Project Binder" has the meaning set out in Section 43.1;

(kkk) "Project Management Plan" means the management plan that (i) sets out a high level workplan to describe the manner in which the Design-Builder will manage the Project, including to address related matters such traffic management and communications, (ii) is prepared by or for the Design-Builder and submitted to the Authority under the Review Procedure and (iii) the Design-Builder is entitled to proceed with under the Review Procedure, together with such changes to the plan that are prepared by or for the Design-Builder and submitted to the Authority under the Review Procedure and that the Design-Builder is entitled to proceed with under the Review Procedure;

(lll) "Proposal Extracts" means Schedule 11 – Proposal Extracts;

(mmm) "Quality Management Plan" means the plan for quality management including quality control and quality assurance with respect to the Work, a copy of which is attached as Schedule 10 – Quality Management Plan, together with such changes to the plan that are prepared by the Design-Builder and submitted to the Authority under the Review Procedure and that the Design-Builder is entitled to proceed with under the Review Procedure;

(nnn) "Receive", "Received" and "Receiving" have the meanings set out in Section 1 of Schedule 4 – Equipment;

(ooo) "Record Drawings" means the Drawings and Specifications that record the as-built Project;

(ppp) "Report" means the letter dated November 24, 2009 from Levelton Consultants Ltd. to Interior Health Authority regarding "Support Services Building, Kelowna General Hospital, 2268 Pandosy Street, Kelowna, B.C.";

(qqq) "Review Procedure" means Schedule 2 – Review Procedure;

(rrr) "Schedule of Values" means the schedule of values referred to in Section 38.5 that allocates the Contract Price set out in Schedule 5 – Schedule of Prices over the course of the Project and that is the basis for monthly payments by the Authority for Work properly performed pursuant to this Agreement;

(sss) "Setup" has the meaning set out in Section 1 of Schedule 4 – Equipment;

(ttt) "Site" means the place of the Work shown on the Site Plan;

(uuu) "Site Occupation Date" means the date that is the third Business Day after the Effective Date unless otherwise agreed by the Authority and the Design-Builder;

(vvv) "Site Plan" means the plan of the Site attached as Schedule 12 – Site Plan;

(www) "Specifications" means all construction and other specifications for the Project prepared by or for the Design-Builder and submitted to the Authority under the Review Procedure and that the Design-Builder is entitled to proceed with under the Review Procedure;

(xxx) "Standards" means any and all Laws, building codes, professional standards and specifications, including under Section 2.1 of the Statement of Requirements, applicable to the Work, or to work such as the Project, as they are in force from time to time in the latest current version;

(yyy) "Statement of Requirements" means Schedule 1 – Statement of Requirements;

(zzz) "Subcontract" means a subcontract with a Subcontractor;

(aaaa) "Subcontractor" means a person or entity, including the Design-Builder's Consultant, having a subcontract with the Design-Builder or with a subcontractor of any tier to perform a part or parts of the Work or to supply products or materials for the Work;

(bbbb) "Submittal" means any and all items, documents and anything else required or specified by this Agreement (including Section 17 (Design Process)), and any and all subsequent revisions, amendments and changes thereto, in respect of the Design and the Construction to be submitted to, reviewed, accepted or otherwise processed or considered by the Authority;

(cccc) "Submittal Schedule" has the meaning set out in Section 1.1 of Schedule 2 – Review Procedure;

(dddd) "Substantial Completion" has the meaning set out in Section 42.2;

(eeee) "Substantial Completion Certificate" means the certificate issued to the Design-Builder by the Authority's Consultant upon the achievement of Substantial Completion as described in this Agreement;

(ffff) "Substantial Completion Date" means the date that Substantial Completion has been achieved, as set out in the Substantial Completion Certificate;

(gggg) "Supply" and "Supplied" have the meanings set out in Section 1 of Schedule 4 – Equipment;

(hhhh) "Target Substantial Completion Date" has the meaning set out in Section 3.1;

(iiii) "Term" means the period commencing on the Effective Date and ending on the End Date;

(jjjj) "Time Schedule" means the general schedule for timing of the Work as set out in Schedule 6 – Time Schedule and as updated pursuant to Section 3;

(kkkk) "Total Completion" has the meaning set out in Section 42.6;

(llll) "Total Completion Certificate" means the certificate issued to the Design-Builder by the Authority's Consultant upon the achievement of Total Completion;

(mmmm) "Total Completion Date" means the date that Total Completion has been achieved, as set out in the Total Completion Certificate;

(nnnn) "Warranty Holdback" has the meaning set out in Section 41.1;

(oooo) "Warranty Period" has the meaning set out in Section 36.1;

(pppp) "Work" means everything to be undertaken by the Design-Builder under this Agreement; and

(qqqq) "Workers' Compensation Board" or "WorkSafe BC" means the board constituted pursuant to the *Workers Compensation Act* (British Columbia).

1.2 This Agreement includes the following schedules and all appendices, sub-schedules and attachments to those schedules:

(a) Schedule 1 – Statement of Requirements;

(b) Schedule 2 – Review Procedure;

(c) Schedule 3 – Insurance Conditions;

(d) Schedule 4 – Equipment;

(e) Schedule 5 – Schedule of Prices;

(f) Schedule 6 – Time Schedule;

(g) Schedule 7 – Submittal Schedule;

(h) Schedule 8 – Communication Roles;

(i) Schedule 9 – Key Personnel;

(j) Schedule 10 – Quality Management Plan;

(k) Schedule 11 – Proposal Extracts;

(l) Schedule 12 – Site Plan;

(m) Schedule 13 – Functional Program;

(n) Schedule 14 – Facility Space Requirements; and

(o) Schedule 15 - Swisslog Pneumatic Tube System Statement of Work – CSB.

1.3 This Agreement will be interpreted according to the following provisions, except to the extent the context or the express provisions of this Agreement otherwise require:

(a) no rule will apply that would construe this Agreement or any part of it against the party who (or whose counsel) drafted, prepared or put forward the Agreement or any part of it;

(b) the table of contents, headings and sub-headings, marginal notes and references to them in this Agreement are for convenience of reference only, do not constitute a part of this Agreement and will not be taken into consideration in the interpretation or construction of, or affect the meaning of, this Agreement;

(c) neither the organization of the Statement of Requirements, the Proposal Extracts or any other documents included in this Agreement into divisions, sections and parts, or the arrangement of drawings or specifications included in this Agreement will control the Design-Builder in dividing the Work among Subcontractors or in establishing the Work to be performed by a trade;

(d) each reference to a Section or Schedule is a reference to a Section of or Schedule to this Agreement;

(e) a Schedule includes all of the sub-schedules, appendices and other attachments attached to that Schedule;

(f) each reference to an agreement, document, standard, principle or other instrument includes (subject to all relevant approvals and any other provisions of this Agreement expressly concerning such agreement, document, standard, principle or other instrument) a reference to that agreement, document, standard, principle or instrument as amended, supplemented, substituted, novated or assigned;

(g) each reference to a statute or statutory provision (including any subordinate legislation) includes any statute or statutory provision which amends, extends, consolidates or replaces the statute or statutory provision or which has been amended, extended, consolidated or replaced by the statute or statutory provision and includes any orders, regulations, by-laws, ordinances, orders, codes of practice, instruments or other subordinate legislation made under the relevant statute;

(h) each reference to time of day is a reference to Pacific Standard time or Pacific Daylight Saving time, as the case may be;

(i) words importing the singular include the plural and vice versa;

(j) words importing a particular gender include all genders;

(k) each reference to a public organization is deemed to include a reference to any successor(s) to such public organization or any organization or entity or organizations or entities which has or have taken over the functions or responsibilities of such public organization;

(l) unless the context otherwise requires, each reference to “parties” means the parties to this Agreement and each reference to a “party” means any one of the parties to this Agreement, provided however that a reference to a third party does not mean a party to this Agreement;

(m) all monetary amounts are expressed in Canadian Dollars;

(n) whenever this Agreement obliges a party (the “Payor”) to pay any amount to the other party (the “Payee”) in respect of any costs, expenses, fees, charges, liabilities, losses, claims or other sums incurred by the Payee:

(i) such obligation will be construed as applying only to so much of such sums as have been properly incurred on an arm’s length commercial basis or, where not

incurred on an arm's length commercial basis (including when the payment is made to an affiliate of the Payee), so much of them as are proper and reasonable; and

(ii) the Payee will, when requested by the Payor, provide supporting evidence of such costs, expenses, fees, charges, liabilities, losses, claims or other sums;

(o) each requirement for a thing or action to be "in accordance with" or "in compliance with" any standard, code or specification or other requirement or stipulation means that such thing or action is to exceed or at least equal that standard, code, specification or other requirement or stipulation;

(p) the words "include", "includes" and "including" are to be construed as meaning "include without limitation", "includes without limitation" and "including without limitation", respectively;

(q) when a party has "discretion", it means that party has the sole, absolute and unfettered discretion, with no requirement to act reasonably or provide reasons unless specifically required under the provisions of this Agreement;

(r) any consent contemplated to be given under this Agreement must be in writing;

(s) general words are not given a restrictive meaning:

(i) if they are introduced by the word "other", by reason of the fact that they are preceded by words indicating a particular class of act, matter or thing; or

(ii) by reason of the fact that they are followed by particular examples intended to be embraced by those general words;

(t) words or abbreviations which have well-known technical or trade meanings are used in accordance with those meanings;

(u) the expression "all reasonable efforts" and expressions of like import, when used in connection with an obligation of the Design-Builder, means taking in good faith and with due diligence all commercially reasonable steps to achieve the objective and to perform the obligation, including doing all that can reasonably be done in the circumstances taking into account each party's obligations hereunder to mitigate delays and additional costs to the other party, and in any event taking no less steps and efforts than those that would be taken by a commercially reasonable and prudent person in comparable circumstances but where the whole of the benefit of the obligation and where all the results of taking such steps and efforts accrued solely to that person's own benefit, provided that the foregoing will not require the Authority to:

(i) take any action which is contrary to the public interest, as determined by the Authority in its discretion; or

(ii) undertake any mitigation measure that might be available arising out of its status as a public body that would not normally be available to a private commercial party;

(v) the expressions "by the Design-Builder" and "by or through the Design-Builder" and expressions of like import are synonymous and mean by the Design-Builder or by anyone employed by or through the Design-Builder, including the Design-Builder and all Subcontractors and their respective officers, agents, employees and workers;

(w) all accounting and financial terms used herein are, unless otherwise indicated, to be interpreted and applied in accordance with GAAP, consistently applied;

(x) if the time for doing an act falls or expires on a day that is not a Business Day, the time for doing such act will be extended to the next Business Day;

(y) each provision of this Agreement will be valid and enforceable to the fullest extent permitted by law. If any provision of this Agreement is held to be invalid, unenforceable or illegal to any extent, such provision may be severed and such invalidity, unenforceability or illegality will not prejudice or affect the validity, enforceability and legality of the remaining provisions of this Agreement. If any such provision of this Agreement is held to be invalid, unenforceable or illegal, the parties will promptly endeavour in good faith to negotiate new provisions to eliminate such invalidity, unenforceability or illegality and to restore this Agreement as nearly as possible to its original intent and effect; and

(z) each release, waiver of liability and indemnity in this Agreement expressed to be given in favour of a party is and will be interpreted as having been given in favour of and may be enforced by that party and, in the case of the Authority, by the Indemnified Parties.

1.4 All documents forming this Agreement are complementary, and what is required by any one will be as binding as if required by all.

1.5 If there is a conflict within the documents forming this Agreement:

(a) the order of priority of documents from highest to lowest will be:

(i) the part of this Agreement from the first page to the page with the signatures of the persons executing this Agreement;

(ii) the schedules (including appendices, sub-schedules and attachments to the schedules), except Schedule 11 – Proposal Extracts, in the order in which they are listed in Section 1.2;

(iii) Schedule 11 - Proposal Extracts;

(b) specifications will govern over drawings;

(c) drawings of a large scale will govern over those of a smaller scale of the same date;

(d) dimensions shown in drawings will govern over dimensions scaled from drawings; and

(e) later dated documents will govern over earlier dated documents of the same type.

1.6 If there is any conflict or ambiguity between the provisions of applicable Laws, or between a provision of applicable Laws, Standards and Statement of Requirements, then the provision of higher quality or higher standard will govern.

PART B – PRICE, TIME, TERM

2. CONTRACT PRICE

2.1 The Authority will pay the Contract Price of $ 28,800,735 plus applicable HST to the Design-Builder for performance of the Work.

2.2 The Contract Price is the entire compensation to the Design-Builder for performance of the Work.

2.3 The Contract Price is subject to adjustments as provided in this Agreement.

2.4 The Authority will pay the Contract Price to the Design-Builder as provided in this Agreement.

3. CONTRACT TIME

3.1 The Design-Builder will commence the Work within 7 days after the Effective Date and will thereafter diligently perform the Work in accordance with this Agreement and achieve Substantial Completion on or before April 27, 2012 (the "Target Substantial Completion Date").

3.2 The Design-Builder will perform the Work in compliance with the time schedule set out in Schedule 11 – Proposal Extracts (the "Time Schedule") as may be modified in accordance with the terms of this Agreement.

3.3 If the Design-Builder fails to achieve Substantial Completion on or before the Target Substantial Completion Date and the Authority has not extended the Time Schedule in accordance with this Agreement, the Design-Builder will pay to the Authority by way of liquidated damages and not as a penalty the sum of [redacted] per day for each and every day after the Target Substantial Completion Date that Substantial Completion is not achieved (or if the Authority has extended the Time Schedule in accordance with this Agreement, such other date established for the Target Substantial Completion Date). The maximum aggregate amount of such liquidated damages will be [redacted] of the Contract Price. If this Agreement is terminated, the reference in this Section 3.3 to the "Contract Price" will be deemed only for purposes of this Section 3.3 to be the amount to which the Design-Builder would have been entitled if the Design-Builder had properly performed and completed the Work and this Agreement had not been terminated. The liquidated damages will be the Authority's sole claim for damages against the Design-Builder for failure to achieve Substantial Completion by the Target Substantial Completion Date. The liquidated damages will not relieve the Design-Builder from its obligation to complete the Work or from any other duties, obligations or responsibilities of the Design-Builder under this Agreement, and will not limit the Authority's rights to terminate this Agreement for default of the Design-Builder under this Agreement.

3.4 The Authority and the Design-Builder agree that the amount in Section 3.3 represents a genuine pre-estimate of the damages and expenses that the Authority is likely to incur for such failure to meet the Target Substantial Completion Date for the Work and both parties expressly agree that such amount is not a penalty. The Authority may either deduct the daily sums in respect of liquidated damages from the Performance Holdbacks or any amounts payable to the Design-Builder after the Target Substantial Completion Date or may require payment thereof by the Design-Builder on demand.

4. TERM

4.1 With the exception of provisions that are expressly stated to survive the expiry of the Term, this Agreement is effective for the period commencing on the Effective Date and ending on the date (the "End Date") that all of the following conditions are fulfilled:

(a) the Design-Builder and the Authority have performed all obligations required under this Agreement;

(b) the Total Completion Certificate has been issued in accordance with Section 42.7; and

(c) the Design-Builder has fulfilled all of its obligations pursuant to Section 36 (Warranty).

5. REPRESENTATIVES, KEY PERSONNEL AND AUTHORITY'S CONSULTANT

5.1 Within 7 days after the Effective Date, the Authority will give written notice to the Design-Builder designating its representative for the purposes of this Agreement (the "Authority's Representative"). The Authority will give written notice to the Design-Builder of any change of the Authority's Representative.

5.2 The representative of the Design-Builder for the purposes of this Agreement (the "Design-Builder's Representative") will be the person designated as such in Schedule 9 – Key Personnel, unless otherwise agreed by the Authority.

5.3 With respect to each of the Key Personnel, including the Design-Builder's Representative:

(a) the Design-Builder will use all reasonable efforts to retain the Key Personnel to perform the role described in Schedule 9 – Key Personnel; and

(b) if for any reason any Key Personnel resigns or is otherwise unavailable to perform the role described in Schedule 9 – Key Personnel then the Design-Builder will use all reasonable efforts to retain a replacement with similar expertise and experience to the unavailable Key Personnel, satisfactory to the Authority acting reasonably, and the Design-Builder will not replace such Key Personnel without the Authority's consent, acting reasonably.

5.4 The Authority will engage the Authority's Consultant and the Authority's Consultant's services, duties and responsibilities will include:

(a) the determining of amounts owing to the Design-Builder based on the Authority's Consultant's observations and evaluations of the Design-Builder's applications for payment;

(b) the issuance of certificates of payment;

(c) the interpretation, in the first instance, of the requirements of this Agreement and the making of findings as to the performance hereunder by both the Authority and the Design-Builder without showing partiality to either the Authority or the Design-Builder, and in no event incurring liability for the result of such interpretations or findings rendered in good faith in such capacity;

(d) the interpretation and finding, in the first instance, of Disputes;

(e) assisting the Authority with compliance team services, including assisting with review of the Design;

(f) the rejecting of Work which does not conform to the requirements of this Agreement;

(g) the requiring of special testing and inspection of the Construction by the Authority's Consultant, whether or not such Construction has been fabricated, installed, or completed;

(h) the determining of the dates of substantial performance under the *Builders Lien Act* (British Columbia), Substantial Completion and Total Completion and the issuing of certificates for same;

(i) the verification of the Design-Builder's applications for release of the Performance Holdbacks;

(j) the reviewing of any defects of deficiencies in the Work at Substantial Completion and during the Warranty Period and the issuance of appropriate instructions for the correction of same; and

(k) such other work that may be required by the Authority from time to time and that is acceptable to the Authority's Consultant.

5.5 If the Authority's Consultant's engagement is terminated, the Authority will engage a new Authority's Consultant to provide the Authority's Consultant's services. The Authority will notify the Design-Builder in writing before appointing a new Authority's Consultant and the Authority will not appoint any person to be the new Authority's Consultant to whom the Design-Builder may reasonably object.

PART C - THE WORK

6. GENERAL

6.1 The Design-Builder will perform the Work in accordance with the requirements of this Agreement, including Schedule 1 – Statement of Requirements.

6.2 The Design-Builder will perform and provide all professional design services, construction administration and construction work and all labour, services, products, materials, tools, water, heat, light, power, transportation, equipment, machinery and other facilities and services and everything else necessary for the performance of the Work.

7. TIME SCHEDULE

7.1 The Design-Builder will submit for review by the Authority, by no later than 21 days after the Effective Date and, in any event, before the Authority is required to make the first payment, a Time Schedule consistent with the form of Time Schedule included in Schedule 6 – Time Schedule.

7.2 The Design-Builder will ensure that the Time Schedule will be consistent with and meet all applicable requirements of this Agreement.

7.3 The Design-Builder will submit for review by the Authority an updated Time Schedule at intervals of 1 month, reflecting progress to date and including a comparison to the previously submitted Time Schedule and a forecast to achieving Substantial Completion of the Work and Total Completion of the Work.

7.4 If, in the opinion of either the Authority or the Design-Builder, at any time the actual progress of the Work does not materially conform with the Time Schedule then, within 14 days of being so required by the Authority or, if earlier becoming aware of the same, the Design-Builder will:

(a) submit to the Authority a report identifying the reasons for such non-conformity or the reasons why it does not agree that there is material non-conformity; and

(b) if the Design-Builder agrees that there is material non-conformity (or following resolution of the Dispute that has established that there is material non-conformity), submit to the Authority a revised Time Schedule, which will meet all applicable requirements of this Agreement and provide for the Work to be commenced and pursued diligently to Substantial Completion and Total Completion.

8. CONTROL AND SUPERVISION OF THE WORK

8.1 The Design-Builder will effectively direct and supervise the Work using its best skill and attention. The Design-Builder will be solely liable and responsible for all design and all construction means, methods, techniques, coordination, sequences and procedures with respect to the Work.

8.2 The Design-Builder will have the sole responsibility for the design, erection, operation, maintenance and removal of temporary structures and other temporary facilities and the design and execution of construction methods required in their use. The Design-Builder will engage and pay for Professional Engineers and Architects to perform these functions where required by Law, and in all cases where such temporary facilities and their method of construction are of such a nature that the education, training and qualifications of the Architect or Professional Engineer are required to produce safe and satisfactory results.

8.3 The Design-Builder will execute the Work in a diligent manner, and perform all its obligations in conformance with this Agreement, including the Project Management Plan and the Time Schedule.

8.4 Unless otherwise stated in this Agreement, the Design-Builder will perform the Work at the times, in the order of procedure and in the manner and method that the Design-Builder considers appropriate provided such Work is in conformance with this Agreement, including the Project Management Plan and the Time Schedule.

8.5 The Design-Builder will employ a competent site manager, and necessary assistants, at the Site at all times during the progress of the Work.

8.6 The Design-Builder's site manager will represent the Design-Builder at the Site and written notices and instructions given to the Design-Builder's site manager by the Authority will be deemed to have been given to the Design-Builder.

8.7 The Design-Builder will employ or cause the Subcontractors to employ a sufficient number of sufficiently skilled workers to perform the Construction in compliance with this Agreement.

8.8 The Design-Builder will at all times maintain good order and discipline among its employees engaged on the Work.

8.9 Before commencing the Work, the Design-Builder will:

(a) purchase and deliver the Bonds as set out in Section 58 (Bonds) to the Authority; and

(b) file with the Authority certificates of all insurance policies and necessary endorsements to comply with the Insurance Conditions.

8.10 The Design-Builder will not perform any Construction on the Site prior to the Site Occupation Date and will not commence any Construction until the Design-Builder has submitted a Design for that portion of the Work to be constructed that is in conformance with this Agreement, submitted to the Authority under the Review Procedure and that the Design-Builder is entitled to proceed with under the Review Procedure. Notwithstanding the foregoing, the removal of preload materials under Section 11 may commence prior to submission of Design documentation.

8.11 If agreed to in writing by the Authority, the Design-Builder may perform necessary limited investigative and preparatory activities on the Site prior to the Site Occupation Date.

9. QUALITY MANAGEMENT

9.1 Without affecting any other Section, the Design-Builder is solely responsible for the quality of the Work and will diligently implement its Quality Management Plan.

9.2 The Design-Builder will establish, implement and provide for the review by the Authority, by no later than 30 days after the Effective Date, a Quality Management Plan consistent with the form of Quality Management Plan attached as Schedule 10 – Quality Management Plan.

9.3 The Quality Management Plan will:

(a) meet all applicable requirements of this Agreement;

(b) outline the quality control and quality assurance procedures to be implemented; and

(c) ensure that the Work will meet the requirements of the Quality Management Plan and this Agreement.

9.4 The Design-Builder will not commence any Construction until the quality control and quality assurance procedures applicable to that part of the Work have been developed and included in the Quality Management Plan and are fully implemented by the Design-Builder.

9.5 Despite the rest of this Section 9, the Authority may at any time audit the Quality Management Plan and its implementation and may, at the Authority's expense, carry out independent quality control testing at any time.

9.6 Nothing in this Section 9 and no review, audit, inspection, acceptance, comment, approval, action or inaction by the Authority, the Authority's Representative, the Authority's Consultant or any person on behalf of the Authority or by or on behalf of any governmental authority will derogate from or relieve the Design-Builder from its obligations under this Agreement including sole responsibility for the quality of the Work, the Quality Management Plan and implementation of the Quality Management Plan.

9.7 The Authority, the Authority's Representative, the Authority's Consultant and other persons designated by the Authority will have access to the Work at all times at the Site and wherever the Work is in preparation or progress and the Design-Builder will provide reasonable facilities for such access.

9.8 If any of the Work requires tests, inspections or approvals under this Agreement or by applicable Laws, or is reasonably requested by the Authority, the Design-Builder will give the Authority reasonable notice of when such Work is ready for review and inspection. The Design-Builder will arrange for and will give the Authority reasonable notice of the date and time of inspections by any governmental authorities.

9.9 The Design-Builder will furnish promptly to the Authority, on request, a copy of certificates and inspection reports relating to the Work.

9.10 If the Design-Builder covers, or permits to be covered, Work that has been designated for special tests, inspections or approvals before such special tests, inspections or approvals are made, given or completed, the Design-Builder will, if so directed, uncover such Work, have the inspections or tests satisfactorily completed, and make good the covering work at the Design-Builder's expense.

9.11 Subject to Section 9.10, the Authority may order any portion or portions of the Construction to be examined to confirm that such Construction is in accordance with the requirements of this

Agreement. If the Construction is not in accordance with the requirements of this Agreement, the Design-Builder will correct the Construction and pay the cost of examination and correction. If the Construction is in accordance with the requirements of this Agreement, the Authority will pay all costs incurred by the Design-Builder as a result of such examination and the restoration of the Construction.

9.12 If the results of any testing or other aspect of the Quality Management Plan or implementation of the Quality Management Plan disclose that any part of the Work is incomplete or defective in any way, the Design-Builder will immediately complete that part of the Work or correct the defect at its own expense.

9.13 Prior to Total Completion, the Design-Builder will deliver to the Authority all tests and results taken and generated by the implementation of the Quality Management Plan.

9.14 The Design-Builder will permit access to the Site and to the Design and the Construction to persons designated by the Authority including persons representing other authorities or agencies of government.

10. LEED GOLD CERTIFICATION

10.1 The Design-Builder will obtain LEED Gold Certification of the Facility in accordance with the following:

(a) The Design-Builder acknowledges that the Facility has been registered with CaGBC by or on behalf of the Authority.

(b) The Design-Builder will, subject to this Section 10, achieve all necessary prerequisites, credits and points under the LEED Rating System required to achieve the LEED Gold Certification and may in its discretion determine which of the credits and points to pursue, except that the Design-Builder will achieve the following LEED credits/points:

(i) Energy and Atmosphere Credit 1 – Optimize Energy Performance: 45% Reduction in Design Energy Cost Relative to MNECB (6 points);

(ii) Energy & Atmosphere Credit 3 – Best Practice Commissioning; and

(iii) Energy & Atmosphere Credit 5 – Measurement and Verification.

(c) The Design-Builder acknowledges that the Facility is registered under version 1.0 of the LEED Rating System. The Design-Builder may at its option, cost and risk register the Facility under another version of the LEED Rating System. If at any time after the Effective Date the requirements to achieve LEED Gold Certification under the applicable LEED Rating System change and the Design-Builder is required to comply with such change in order to achieve LEED Gold Certification for the Facility, then the Design-Builder will forthwith notify the Authority of such change and such change will be a Change. For greater certainty, the Design-Builder will not be entitled to a Change for a change at the option of the Design-Builder from version 1.0 of the LEED Rating System to another version of the LEED Rating System.

(d) The Design-Builder will compile and submit the required documents for certification to CaGBC promptly after the Substantial Completion Date and will promptly address any responses or requests from CaGBC. If the CaGBC delays, for reasons beyond the control of the Design-Builder, in providing certification of any of the points, the credits or LEED Gold Certification required under this Section 10.1, the Design-Builder will give notice of the circumstances of delay within 14 days after the Design-Builder is aware of

the delay and the applicable 24 month period set out in Sections 10.1(e), 10.1(f), 10.1(g) or 10.1(h) will be extended by a reasonable amount to take into account the effect of the delay.

(e) If for any reason the Design-Builder fails to achieve 6 points in Energy and Atmosphere Credit 1 as required by Section 10.1(b)(i) for the Facility within 24 months of the Substantial Completion Date then the Design-Builder will, upon written demand from the Authority, and in addition to any other payment owing under this Section 10, immediately pay to the Authority [redacted].

(f) If for any reason the Design-Builder fails to achieve the credit described in Section 10.1(b)(ii) for the Facility within 24 months of the Substantial Completion Date then the Design-Builder will, upon written demand from the Authority, and in addition to any other payment owing under this Section 10, immediately pay to the Authority [redacted].

(g) If for any reason the Design-Builder fails to achieve the credit described in Section 10.1(b)(iii) for the Facility within 24 months of the Substantial Completion Date then the Design-Builder will, upon written demand from the Authority, and in addition to any other payment owing under this Section 10, immediately pay to the Authority [redacted].

(h) If for any reason the Design-Builder fails to obtain LEED Gold Certification for the Facility within 24 months of the Substantial Completion Date then the Design-Builder will, upon written demand from the Authority, and in addition to any other payment owing under this Section 10, immediately pay to the Authority [redacted].

(i) Upon payment of amounts, if any, owing under this Section 10 the Design-Builder will have no further obligations in respect of obtaining LEED Gold Certification, except to provide the Authority with such information and administrative assistance as the Authority may reasonably require in relation to obtaining LEED Gold Certification, and for greater certainty the failure to obtain LEED Gold Certification will not be a default by the Design-Builder under this Agreement.

(j) The Authority and the Design-Builder expressly agree that the amounts payable from the Design-Builder in this Section 10.1 are liquidated damages that represent a genuine pre-estimate of the damages and expenses that the Authority is likely to incur for such failure to achieve the LEED credits/points specified in Section 10.1(b) and LEED Gold Certification and both parties expressly agree that such amounts are not a penalty.

(k) In this Agreement, the following words and expressions have the following meanings:

(i) "Authority's LEED Obligations" means:

(A) by the Substantial Completion Date the Authority having developed and implemented a low environmental impact integrated indoor pest management policy (sufficient to entitle the Design-Builder to receive the Innovation and Design Process LEED credit 1.3) and the Authority maintaining such policy at the Facility from the Substantial Completion Date;

(B) by the Substantial Completion Date the Authority having developed and implemented a low environmental impact cleaning equipment policy and the Authority ensuring that only janitorial equipment that maximize the effective reduction of building contaminants are used (sufficient to entitle the Design-Builder to receive the Innovation and Design Process LEED

credit 1.2) and the Authority maintaining such policy at the Facility from the Substantial Completion Date;

(C) by the Substantial Completion Date the Authority having developed and commissioned a medium to provide "green" education such as will enable the Authority to obtain the Innovation and Design Process LEED credit 1.1; and

(D) the Authority prohibiting smoking or otherwise enforcing a no smoking policy at the Facility so as to satisfy the CaGBC prerequisite relating to environmental tobacco control; and

(ii) "LEED Assumption" means (i) that the Authority's placement of pre-load on the Site and the Authority's design of a sediment control plan and certification of the existence thereof will meet the requirements of CaGBC and will not prejudice the Design-Builder obtaining LEED Gold Certification in relation to the Facility; and (ii) that the Authority will not carry out any works on the Site or any adjacent lands that the Authority is aware would likely result in the Design-Builder being unable to obtain a particular LEED accreditation point.

(l) The Authority acknowledges that, with the exception of the points and credits referred to in Section 10.1(b), the Design-Builder's obligation in this Section 10 to obtain LEED Gold Certification is subject to the Authority satisfying the Authority's LEED Obligations and the LEED Assumption. If the Authority fails to satisfy the Authority's LEED Obligations and the LEED Assumption, then the Design-Builder will be relieved from the Design-Builder's obligations in this Section 10 to the extent of the LEED credits that would have been obtained if the Authority satisfied the Authority's LEED Obligations and the LEED Assumption. Without limiting the foregoing, the Design-Builder will be required to demonstrate, supported by written documentation and expert reports and opinions, that the Design-Builder would have achieved LEED Gold Certification subject to the Authority's failure to satisfy the Authority's LEED Obligations and the LEED Assumption.

10.2 As a condition of Substantial Completion the Design-Builder will deliver to the Authority:

(a) a LEED project checklist, generally in accordance with CaGBC requirements, together with a written confirmation that, in the Design-Builder's judgment:

(i) the LEED credits/points specified in Section 10.1(b) will be achieved for the Facility; and

(ii) LEED Gold Certification will be achieved for the Facility as required by Section 10; and

(b) a written opinion from a LEED accredited professional supporting the confirmation described in Section 10.2(a) above.

11. PRELOAD

11.1 The Design-Builder acknowledges that prior to the Effective Date, the Authority has caused certain preload materials to be placed on a portion of the Site, and that the Authority has a contract (the "Preload Contract") with an Other Contractor (the "Preload Contractor") for the removal of the preload materials. The Design-Builder will identify the date by which the removal of the preload materials may commence.

11.2 The Design-Builder will, on behalf of the Authority, manage the Preload Contract so that the Design-Builder meets its obligations in this Agreement, including requiring such Other Contractor to comply with the Occupational Health and Safety Regulation under the *Workers Compensation Act* (British Columbia) and to comply with the Design-Builder's directions pursuant to that Act and regulation.

11.3 The Design-Builder will have no authority to initiate or approve any changes under the Preload Contract, or authorize any additional costs, including overtime, without the consent of the Authority, acting reasonably.

11.4 The Authority does not assign the Preload Contract and the Design-Builder does not assume the Preload Contract. The Authority remains responsible to the Preload Contractor for the Authority's obligations under the Preload Contract, including for payments to the Other Contractor. If the Design-Builder, acting reasonably, requires enforcement of the terms of the Preload Contract against the Preload Contractor, the Design-Builder will provide written notice to the Authority and the Authority will take reasonable steps to enforce the Preload Contract.

11.5 The Design-Builder will:

(a) prior to the start of any Construction, conduct a pre-Construction survey of existing buildings, roadways, services, infrastructure and adjacent properties, in a form and detail satisfactory to the Authority, acting reasonably, which will without limitation include field observations and photographs of existing conditions, with spot elevations by a British Columbia Land Surveyor (BCLS) registered surveyor at locations that will be accessible throughout and following Construction for ongoing settlement monitoring, and deliver a copy of the pre-Construction survey report to the Authority; and

(b) re-survey the spot elevations at regular intervals throughout Construction and at 24 months following Substantial Completion to determine ongoing long-term settlement effects, and deliver monitoring surveys to the Authority in a form and detail satisfactory to the Authority, acting reasonably.

11.6 The Design-Builder will protect the Work, the Site and property adjacent to the Site from settlement and will be responsible for all settlement from and after the earlier of:

(a) the 37th day after the Effective Date; or

(b) the date the preload is substantially removed,

until the expiry of the Warranty Period. The Design-Builder will make good all damage to the Work, the Site and property adjacent to the Site at its own expense or pay all costs incurred by the Authority or others in making good such damage. Nothing in this Section 11.6 limits the responsibility of the Design-Builder to take post-Warranty Period settlement into account in the Design and Construction.

12. DESIGN COVENANT

12.1 The Design-Builder acknowledges that the Design Covenant is registered against the Land and that the Design-Builder may not commence Construction until the development plans for the Facility have been submitted to the City of Kelowna and any other requirements of the Design Covenant have been achieved.

12.2 The Design-Builder acknowledges that a community consultation meeting will occur on or about December 9, 2010 and will provide the documentation required under the Design Covenant and

all other reasonable assistance required by the Authority or the City of Kelowna to satisfy the requirements of the Design Covenant.

12.3 Failure to satisfy the requirements of the Design Covenant by February 15, 2011 will, except to the extent caused by breach of this Agreement by the Design-Builder, be deemed to be an event of Force Majeure.

13. BRIDGE CONSTRUCTION

13.1 The Work includes Design and Construction of the bridge across Pandosy Street from the Facility to the Centennial Building currently under construction at the Kelowna General Hospital.

13.2 For purposes of construction of the bridge:

(a) the relevant Construction will be conducted in phases;

(b) access will be granted for the construction of the bridge supports between the dates of March 15, 2011 and April 30, 2011;

(c) access for placement of the bridge structure will be granted between the dates of October 31, 2011 and November 30, 2011; and

(d) actual physical connection to the Centennial Building cannot commence prior to the Centennial Building substantial completion/service commencement date which is tentatively set for February 13, 2012;

(e) for purposes of such Construction the Site will be expanded as shown in the Site Plan during the limited period of such Construction and all applicable provisions of this Agreement will apply in respect of the expanded Site, provided however that the Centennial Building contractor will continue to act as prime contractor;

(f) the Design-Builder will be required to work cooperatively with the Centennial Building contractor and to minimize and disruptions;

(g) on or before January 15, 2011, the Design-Builder will provide to the Authority for review a construction plan for the bridge construction that includes:

(i) maintaining construction access and fire access for the Centennial Building contractor;

(ii) a dust control plan that contemplates the Centennial Building contractor's duct cleaning and final cleaning during the March and April 2011;

(iii) maintaining the relevant portion of the Centennial Building site clean and free of debris or unnecessary materials;

(iv) preventing the introduction onto the Centennial Building site of any materials or chemicals on to the site which would impact Centennial Building Contractor's ability to achieve such certification;

(v) restricting vehicular and machinery traffic to only those vehicles and machinery that are essential to, and actively engaged in, performing work directly related to the bridge;

(vi) compliance with safety requirements; and

(h) the bridge link will comply with the Statement of Requirements,

and the Design-Builder will construct the bridge in accordance with such construction plan and any comments received from the Authority under Schedule 2 – Review Procedure.

The parties may make such other arrangements as may be agreed by them, acting reasonably and having regard to the other activities on the Kelowna General Hospital site, including construction of the Centennial Building.

13.3 The Design-Builder will provide all required drawings and specifications, and other information, in relation to the bridge as may be reasonably required by the Authority for purposes of the Authority obtaining approval-in-principle to obtain required rights from the City of Kelowna and to make all other necessary arrangements in respect of access to Pandosy Street and the Kelowna General Hospital site, including the Centennial Building. The Design-Builder is responsible to seek and obtain final approval for the bridge from the City of Kelowna concurrently with the issuance of the building permit. Subject to the Design-Builder's obligations in this Agreement, the Authority is responsible to obtain approval-in-principle from the City of Kelowna and make all other necessary arrangements in respect of access to Pandosy Street and the Kelowna General Hospital site, including the Centennial Building, prior to the relevant dates set out in Sections 13.2(b) and 13.2(c) for the bridge construction.

14. EQUIPMENT

14.1 The obligations and responsibilities of the parties related to Equipment are set out in Schedule 4 - Equipment. The Design-Builder will complete the Design and Construction to accommodate the Equipment in the Facility, including all required electrical and plumbing connections, structural support, seismic restraints and space for efficient access, all to the tolerances and specifications as may be specified and required by the manufacturers or vendors of the Equipment (which may be of a higher standard than specified in this Agreement).

15. REVIEW PROCEDURE

15.1 The Review Procedure will apply to all Submittals and the parties will comply with the requirements of that Schedule.

16. GENERAL DESIGN REQUIREMENTS

16.1 The Design-Builder is responsible for the means, methods, techniques, sequences and procedures necessary to properly complete the Design in conformance with this Agreement, including the Project Management Plan and the Time Schedule.

16.2 The Design-Builder:

(a) will ensure that the Work and the Design are fully compliant with all requirements of this Agreement and all Laws;

(b) will perform and complete the Design and the Work so as to provide the completed Project that is fit for the intended uses as described in the Statement of Requirements; and

(c) acknowledges and agrees that it has the non-delegable duty and obligation to the Authority to complete the Work, including the Design, in a manner that is fully compliant with all requirements of this Agreement and all Laws.

16.3 The Design-Builder will:

(a) cause all portions and aspects of the Drawings and Specifications to be prepared under the direction of, and to be sealed under the professional seal of, the Design-Builder's Consultant;

(b) cause the Design-Builder's Consultant to confirm to the Authority, under his or her professional seal (if applicable), that in the opinion of the Design-Builder's Consultant:

(i) the Drawings and Specifications implement and otherwise conform to the Statement of Requirements;

(ii) the Drawings and Specifications implement and otherwise conform to the Proposal Extracts;

(iii) the Drawings and Specifications have been prepared in accordance with, and substantially comply with, all Standards; and

(iv) the Design-Builder's Consultant has carried out the general reviews of the progress of the Construction, to the extent necessary, in order to determine to the Design-Builder's Consultant's satisfaction that the Construction is performed in general conformity with the requirements of the Agreement, the Drawings and Specifications and applicable Laws; and

(c) provide the Authority with all letters of professional assurance as required pursuant to applicable Laws.

16.4 The Design-Builder will not construct any part of the Work that is not based on the most recent Drawings and Specifications or that does not meet the Statement of Requirements and other requirements of this Agreement. To the extent that the Drawings and Specifications conflict with, modify or deviate from the Statement of Requirements and other requirements of this Agreement, the Design-Builder will revise the Drawings and Specifications and submit them to the Authority under the Review Procedure.

16.5 The Design-Builder will make, or cause the Design-Builder's Consultant to make, any revisions to the Drawings or Specifications as are necessary from time to time due to Changes and, for clarity, the Design-Builder will comply with Section 16.3 with respect to any such revisions.

16.6 Nothing in this Section 16, or otherwise in or under this Agreement, makes the Authority, the Authority's Representative, the Authority's Consultant or any other person on behalf of the Authority responsible for the Design of the Project, including compliance of the Drawings and Specifications with the Statement of Requirements and all Standards, and the Design-Builder will, notwithstanding any review or acceptance under the Review Procedure or this Section 16 or other act of the Authority, remain solely liable and responsible for compliance of the Drawings and Specifications with the Statement of Requirements and all Standards.

16.7 Without limiting any of the obligations of the Design-Builder under this Agreement, the duties and responsibilities of the Design-Builder with respect to the Design include:

(a) review of the documents, reports, drawings, Statement of Requirements and other information provided by the Authority and reporting promptly to the Authority any error, inconsistency or omission the Design-Builder may discover;

(b) preparation of a Design that meets the Statement of Requirements, all Standards and all terms of this Agreement;

(c) the coordination required to integrate all parts of the Design in the Work;

(d) preparation of all reports, documents, information, schemes and presentation materials as required by this Agreement;

(e) inspecting the progress of the Construction in order to determine that the Work is in compliance with the requirements of the Design, Specifications, all Standards and all terms of this Agreement;

(f) liaising with the Authority and local authorities having jurisdiction as required during the Design and Construction and providing copies of all correspondence with such local authorities to the Authority; and

(g) providing all required assurances to local authorities having jurisdiction respecting substantial conformance of the Design with all Standards and as may be required for the issuance of or compliance with any permits, licenses or approvals.

16.8 The Design-Builder will ensure that the Design-Builder's Consultant and all other architects, engineers and other professionals performing professional services engaged in the Design fulfill their duties and responsibilities to the standard of diligence, skill and care that such persons would customarily provide in accordance with their professional and legal obligations in similar circumstances and in the same general geographic location as the Site. Any failure by any of the Design-Builder's Consultants or such other architects, engineers or professionals performing professional services in relation to the Design will not relieve the Design-Builder of any responsibility for ensuring that the Work is carried out in conformance with this Agreement including the Statement of Requirements, the Design and all Standards.

16.9 If the Design-Builder's Consultant's engagement is terminated, the Design-Builder will engage a new Design-Builder's Consultant to provide Design. The Design-Builder will notify the Authority in writing before appointing or re-appointing the Design-Builder's Consultant, and the Design-Builder will not appoint any Design-Builder's Consultant to whom the Authority may reasonably object.

17. DESIGN PROCESS

17.1 This Section 17 contains general requirements for Submittals for Design by the Design-Builder to the Authority at designated stages for review by the Authority under the Review Procedure.

17.2 Unless otherwise agreed by the Authority, the Design-Builder will submit Drawings and Specifications and supporting information to the Authority for review under the Review Procedure for the following Design stages:

(a) schematic design;

(b) design development; and

(c) pre-tender Drawings and Specifications.

17.3 Within 30 days after the Effective Date, the Design-Builder will deliver to the Authority the schematic design Drawings and Specifications for the Project.

17.4 After review of the pre-tender Submittal by the Authority, the Design-Builder will finalize and complete "issued for construction" Drawings and Specifications. The Design-Builder will provide 5 copies of the final "issued for construction" Drawings and Specifications, and any revisions, to the Authority together with a certificate from the Design-Builder's Consultant that the "issued for construction" Drawings and Specifications conform to the requirements of this Agreement and Submittals from the pre-tender Drawings and Specifications stage (including to address comments received from the Authority). The Design-Builder will provide the Drawings and

Specifications on CD in AutoCAD DXF, AutoCAD DWG and Adobe PDF format acceptable to the Authority, acting reasonably.

17.5 Without limiting the generality of Section 17.2, the Design Submittals must be formatted in a manner and contain detail that is satisfactory to the Authority. The Design Submittals must have clearly identified sections for:

(a) architectural design;

(b) site development and landscaping;

(c) structural design;

(d) mechanical design;

(e) electrical design; and

(f) sustainable design.

17.6 Each Design Submittal must contain:

(a) 5 sets of Drawings at 50% scale and 1 set of Drawings at full scale;

(b) 5 sets of Specifications;

(c) 5 sets of supporting material (such as: code analysis, energy cost models, acoustic design reports, correspondence, etc.);

(d) relevant design calculations and material specifications;

(e) reports showing the Design decision process, criteria and assumptions used to develop the Design;

(f) for the schematic design stage, exterior perspectives;

(g) for the design development stage, interior perspectives;

(h) any other information the Design-Builder determines will assist the Authority (such as: models or three-dimensional renderings);

(i) a certificate from the Design-Builder's Consultant that the Drawings and Specifications conform to the requirements of this Agreement; and

(j) any other information that the Authority may reasonably request.

17.7 The Design-Builder will also comply with any requirements set out in the Statement of Requirements in relation to the stages and process for Design, including with respect to meetings, presentations, mock-ups and user groups.

17.8 The parties acknowledge that the Design-Builder proposes to carry out the Design on a design build, fast track process and that the phases of the Design will proceed progressively for each part of the Facility. The Design-Builder may complete some or all of the phases for some parts of the Facility in advance of completing the same phases for other parts of the Facility on the condition that the Design for the other parts of the Facility are advanced sufficiently to properly

prepare the earlier parts of the Design and to take into account Design and Construction for the other parts of the Facility.

18. OWNERSHIP OF DOCUMENTS

18.1 The Design-Builder acknowledges and agrees that this Agreement contains intellectual property that is protected by copyright and that this intellectual property is intended to be used solely for the purposes of the Project. The Design-Builder will obtain prior written permission and will require the Design-Builder's Consultant and any other Subcontractors to obtain prior written permission for any other use.

18.2 Copyright for the Design and Drawings belongs to the Design-Builder, the Design-Builder's Consultant or other consultants who prepared them.

18.3 Plans, sketches, Drawings, graphic representations and Specifications, including computer generated designs, when prepared by the Design-Builder's Consultant or other consultants are instruments of their service and will remain their property whether the construction for which they are made is executed or not.

18.4 Submission or distribution of the Design-Builder's Consultants' or other consultants' plans, sketches, Drawings, graphic representations and Specifications to meet official regulatory requirements or for other purposes in connection with the Work is not to be construed as publication in derogation of their reserved rights.

18.5 The Authority may retain copies, including reproducible copies, of all plans, sketches, Drawings, graphic representations and Specifications and other material including the Record Drawings. The Design-Builder hereby grants to the Authority an irrevocable licence to use any and all such material for any purpose related to the use and ownership of the Facility, including any renovations, additions or alterations to the Facility, and for completion of any Work in the event of termination of this Agreement. Such licence may be sublicensed or assigned, at the discretion of the Authority, to any third party who has or may acquire an interest or obligation related to the Facility, including for any facilities maintenance, life cycle repair/replacement or other services to the Authority or others in relation to the Facility. The Design-Builder at the Authority's request, and prior to any payment after such request is made, will deliver to the Authority a consent and acknowledgement signed by the Design-Builder's Consultant confirming such licence.

18.6 Models and renderings furnished by the Design-Builder are the property of the Authority.

19. ERRORS IN DESIGN

19.1 The Design-Builder is responsible for the Design, including all errors, omissions or deficiencies in the Design.

19.2 The Design-Builder will give written notice to the Authority immediately upon becoming aware of any error, omission or deficiency in the Design.

19.3 The Design-Builder will remedy at its own cost any error, omission or deficiency in the Design, including any resulting error, omission or deficiency in the Design that results in defects or deficiencies in any part of the Construction that has been commenced or completed. The Design-Builder will ensure that such remediation will conform to the requirements of this Agreement.

20. PRODUCTS

20.1 Unless otherwise expressly provided in this Agreement, the Design-Builder will provide and pay for all labour, products, materials, tools, equipment, machinery, water, heat, light, power, transportation and all other facilities, things and services (including services for Design) necessary for the performance of the Work in accordance with this Agreement.

20.2 All products and materials provided will be new unless otherwise expressly specified in this Agreement.

21. SUBCONTRACTS

21.1 The Design-Builder will preserve and protect the rights of the Authority under this Agreement with respect to any Work to be performed by a Subcontractor, so that the subcontracting does not prejudice the Authority's rights under this Agreement.

21.2 The Design-Builder will be responsible to the Authority for the performance of all Subcontractors and will require the Subcontractors to perform their work in accordance with the terms and conditions of this Agreement.

21.3 The Design-Builder will be as fully responsible to the Authority for acts and omissions of Subcontractors and of persons directly or indirectly employed by them as for the acts and omissions of persons directly employed by the Design-Builder.

21.4 Nothing contained in this Agreement will create any contractual relationship between the Authority and any Subcontractors or their officers, agents, employees or workers.

21.5 The Design-Builder will require every Subcontractor to observe the terms of this Agreement so far as they apply to that portion of the Work to be performed directly or indirectly by that Subcontractor. The Design-Builder will require that the terms of this Agreement that are applicable to the portion of the Work to be performed by a Subcontractor will form part of that Subcontract.

21.6 The Design-Builder will require that every Subcontract for designers and Subcontractors require such designers and Subcontractors, where requested by either the Authority or the Design-Builder, to attend any Dispute resolution process including discussions, negotiations, mediation or arbitration between the Design-Builder and the Authority; provide frank, candid and timely disclosure of relevant information and documentation; and, bona fide negotiations to resolve such Disputes.

22. OTHER CONTRACTORS

22.1 The Authority reserves the right to enter into separate contracts with Other Contractors in relation to other parts of the Project.

22.2 The Design-Builder will:

(a) coordinate the Work with that of Other Contractors and connect the Work with the work of Other Contractors as applicable; and

(b) ensure that performance of the Work is carried out in accordance with the Time Schedule so that Other Contractors are not delayed in their work.

22.3 The Design-Builder will promptly report to the Authority any apparent deficiencies in Other Contractors' work that could affect the Work as soon as they come to the Design-Builder's attention, and will confirm such report in writing promptly.

22.4 The Authority will require Other Contractors to coordinate and schedule their construction activities at the Site in accordance with the reasonable instructions of the Design-Builder acting as prime contractor that are applicable to health and construction safety at the Site and that are in accordance with the *Workers Compensation Act* (British Columbia).

22.5 The Design-Builder acknowledges that other persons working at the Site may be union or non-union. The Design-Builder will take reasonable precautions to avoid labour disruptions caused or contributed to by the Design-Builder, its Subcontractors or any persons performing the Work.

23. ACCESS TO AND USE OF SITE

23.1 Subject to any limitations under this Agreement, including under Section 23.2 and Section 23.3, the Authority grants to the Design-Builder a licence to enter and be upon the Site from the Site Occupation Date until Substantial Completion to perform the Work that is required to be performed on the Site. After Substantial Completion, the Authority will provide access to the Site as reasonably required for completion of the Work, taking into account the Authority's use and occupancy of the Facility.

23.2 The Design-Builder will:

(a) limit its activities to within the Site unless the Design-Builder obtains permission to occupy or use other lands; and

(b) obtain any construction easements and permits that may be required for construction of the Project.

23.3 The Design-Builder will:

(a) not remove or disturb trees or other vegetation for purposes of the Work, including for the purpose of providing a lay down area; and

(b) rehabilitate all construction lay down areas.

23.4 The Design-Builder acknowledges that no parking is available at the Site and agrees that the Design-Builder, the Subcontractors and their respective workers will not park on public streets within a 1km radius of the Site. The Design-Builder will use reasonable efforts to provide temporary parking or other alternate transportation solutions for workers.

24. SIGNAGE

24.1 The Design-Builder may erect signage at the Site during Construction to identify the Design-Builder and Subcontractors provided such signs are acceptable to the Authority, acting reasonably.

25. USE OF SITE

25.1 The Design-Builder will confine its construction machinery and equipment, tools, storage of materials and products, and the operations of workers to limits indicated in the Site Plan or by or under all Laws, and will not unreasonably encumber the Site or other activities on the Site.

25.2 The Design-Builder will enforce the Authority's policies, procedures and instructions, including regarding parking, safety, harassment, fires, smoking, signs and advertisements.

25.3 The Design-Builder will not load or permit to be loaded any part of the Construction with a weight or force that endangers the safety of the Project.

25.4 The Design-Builder will ensure that the Work does not adversely impact the ongoing operations of the Authority, or any person on behalf of the Authority, adjacent to the Site, including the operation of the Kelowna General Hospital and any construction activities on that site.

25.5 The Design-Builder will confirm the location of all utilities and ensure that all of its labour force, employees, Subcontractors and any other workers at the Site:

(a) are made aware of the location of all utilities in connection with the Project and the importance of avoiding damage to those underground utilities;

(b) observe any instructions in connection with those utilities issued by the Authority on behalf of any applicable utility owners; and

(c) protect all such utilities.

26. CONDITIONS AT SITE/DISCLOSED DATA

26.1 The Design-Builder acknowledges and agrees that:

(a) it has received a copy of the Report;

(b) it has had the opportunity to undertake examinations and investigations of the Site in order to satisfy itself as to Site conditions and the impact they could have on any or all of the Work (including Design and Construction), Contract Time and Contract Price;

(c) only objective geotechnical data provided in the Report can be relied upon for accuracy (subject to any qualifications or conditions set out in such information or this Agreement) but such data cannot be relied upon for sufficiency, relevancy or interpretation;

(d) neither the Authority, the Authority's Representative, the Authority's Consultant nor any other person on behalf of the Authority is in any way responsible or liable for the completeness, interpretation or accuracy of the Report (except accuracy of objective geotechnical data identified in Section 26.1(c)) or for any variation between Site conditions actually encountered by the Design-Builder and those set out in the Report; and

(e) the Design-Builder is not entitled to any adjustment in the Contract Time or Contract Price, or to any other remuneration, compensation or damages whatsoever, in any way connected with Site conditions, except to the extent of any inaccuracy of the objective geotechnical data identified in Section 26.1(c).

26.2 It is the Design-Builder's responsibility to have conducted its own analysis and review of the Project and, before the execution of this Agreement, to have taken all steps it considers necessary to satisfy itself as to the accuracy, completeness and applicability of any Disclosed Data upon which it places reliance and to assess all risks related to the Project. Except with respect to the accuracy of objective geotechnical data identified in Section 26.1(c), the Design-Builder will not be entitled to and will not make (and will require that no Subcontractor makes) any claim against the Authority or any Indemnified Party, whether in contract, tort or otherwise

including any claim in damages for extensions of time or for additional payments under this Agreement on the grounds:

(a) of any misunderstanding or misapprehension in respect of the Disclosed Data;

(b) that the Disclosed Data was incorrect or insufficient; or

(c) that incorrect or insufficient information relating to the Disclosed Data was given to it by any person other than the Authority,

nor will the Design-Builder be relieved from any obligation imposed on or undertaken by it under this Agreement on any such ground.

27. ARCHAEOLOGICAL ITEMS

27.1 Upon discovery at the Site of any fossils, remains, coins, articles of value or antiquity, including all heritage objects (as defined in the *Heritage Conservation Act* (British Columbia)), the Design-Builder will:

(a) immediately notify the Authority;

(b) take all steps not to disturb the item and, if necessary, stop Construction to the extent required if performing the Construction would endanger the object or prevent or impede its excavation;

(c) take all necessary steps to preserve the item in the same position and condition in which it was found; and

(d) comply with all Laws and regulations and all requirements of governmental authorities with respect to such discovery including pursuant to the *Heritage Conservation Act* (British Columbia).

27.2 If the Design-Builder is delayed in performing the Work or incurs additional costs as a result of taking steps required under Section 27.1, the Authority will extend the Time Schedule including the Substantial Completion Date by the delay in the critical path, and the Authority will reimburse the Design-Builder for all reasonable and direct costs the Design-Builder incurred as a result of the delay. If the Authority determines that the Target Substantial Completion Date can still be met and requests in writing that the Design-Builder accelerate the Work, the Design-Builder will accelerate its efforts to meet the Target Substantial Completion Date and the Authority will reimburse the Design-Builder for all reasonable and direct costs of taking such acceleration efforts in addition to the additional costs of taking those steps required under Section 27.1.

28. CONTAMINANTS AND ENVIRONMENTAL MANAGEMENT

28.1 Before the Site Occupancy Date, the Authority will provide the Design-Builder with a written list of Contaminants known to the Authority at that time to be present at the Site.

28.2 Except those Contaminants identified pursuant to Section 28.1, the Design-Builder acknowledges that the Authority has made no representation or warranty as to the absence or presence on, in or under the Site of any Contaminant. If the Design-Builder, after commencing the Work, encounters or has reason to believe in the existence of any Contaminant on, in or under the Site, the Design-Builder will at once take all reasonable steps, including suspension of the Work, as necessary to ensure that no person or property suffers injury, sickness, death, damage or destruction as a result of exposure to, or the presence of, any Contaminant, and the Design-

Builder will immediately report such Contaminant to the relevant governmental authorities and to the Authority.

28.3 If the Design-Builder is delayed in performing the Work, or incurs additional costs, due to discovery of such Contaminants, adjustment in the Contract Time or the Contract Price will be agreed upon, in the latter case as set out in Section 46 (Valuation and Certification of Changes). Where the Design-Builder claims a delay due to discovery of Contaminants, the Design-Builder will provide full information regarding any options to accelerate the Work to achieve Substantial Completion of the Work by the Target Substantial Completion Date.

29. SITE SAFETY

29.1 The Design-Builder agrees to be the "prime contractor" for the purposes of all applicable occupational health and safety Laws, including the *Workers Compensation Act* (British Columbia), and the Design-Builder is responsible for filing any documents necessary to comply with the *Workers Compensation Act* (British Columbia), including a notice of project. The Design-Builder will comply with all requirements of the *Workers Compensation Act* (British Columbia) and any other occupational health and safety Laws, applicable to the Project, the Work or to the Site.

29.2 Prior to commencing the Work and as a condition of receiving payment on Substantial Completion and on Total Completion, the Design-Builder will provide the Authority with satisfactory written evidence of compliance by the Design-Builder with all requirements under the *Workers Compensation Act* (British Columbia), including payments of assessments due under it to the Workers' Compensation Board. Without limiting the foregoing, the Authority may at any time require the Design-Builder to provide evidence of compliance with all requirements under the *Workers Compensation Act* (British Columbia), or payment of assessments due under it to the Workers' Compensation Board, or both.

29.3 When required to do so by the Authority, the Design-Builder will provide the Authority with evidence of its compliance and compliance of any or all of its Subcontractors under Section 29.2.

29.4 Following the Site Occupation Date, the Design-Builder will coordinate health and safety for the Site for all activities performed by its workers as well as those of Subcontractors, utilities, inspectors, the Authority, Other Contractors and any others performing any activities at the Site.

29.5 The Design-Builder will establish, implement and provide for the review by the Authority, by no later than 30 days after the Effective Date, a plan (the "Health and Safety Plan") that meets all applicable requirements of this Agreement with respect to health and safety at the Site and that addresses the safety of the Authority, patients and users who may be on the Site or property in the vicinity of the Site. The Design-Builder will provide safety fencing and hoarding as necessary to limit access to the Site in accordance with the Health and Safety Plan.

29.6 The Design-Builder will ensure that its Health and Safety Plan is consistent with, and accommodates any requirements of, the Authority's policies regarding safety and that it specifically addresses the safety of the Authority, patients and users who may be on the Site or property in the vicinity of the Site.

29.7 The Design-Builder will maintain and comply with the Health and Safety Plan in all material respects during execution of the Work.

29.8 Prior to any person accessing the Site pursuant to this Agreement, the Design-Builder will provide health and safety orientation and information to such person in accordance with its Health and Safety Plan.

30. DUST, NOISE, VIBRATION

30.1 The Design-Builder will carry out its Construction to minimize dust and noise and vibration.

30.2 Without limiting Section 30.1, the Design-Builder will discuss with the Authority any expected vibration from the Construction activities and will:

(a) carry out its Construction activities so that:

(i) between the hours of 7am to 7pm ground vibration from the Design-Builder's Construction activities does not exceed 12.5mm per second peak particle velocity at any time, as measured at a distance of 10m from the vibration source;

(ii) between the hours of 7pm and 7am the next day ground vibration from the Design-Builder's Construction activities does not exceed 5mm per second peak particle velocity at any time, as measured at the boundaries of the Site; and

(iii) vibration transfer does not unreasonably and adversely affect hospital operations or use of properties in the vicinity of the Site; and

(b) install vibration monitoring devices to monitor compliance with this Section 30.2 during Construction, and deliver to the Authority no later than the 5th day of each month a monitoring report for the previous month.

31. TESTING AND COMMISSIONING

31.1 The Design-Builder will prepare and deliver to the Authority, not less than 120 days before the Target Substantial Completion Date, for review under the Review Procedure, a detailed testing and commissioning plan (the "Commissioning Plan") setting out the commissioning activities the Design-Builder intends to carry out to commission the Facility, including:

(a) a description of the specific equipment and systems to be tested and commissioned and the associated commissioning requirements;

(b) a schedule, related to the Time Schedule, showing the timing of all testing and commissioning; and

(c) supporting documentation, including as appropriate:

(i) design calculations and/or assumptions; and

(ii) manufacturer's specifications.

32. DOCUMENTS AT THE SITE

32.1 The Design-Builder will keep at least 1 copy of the following documents at the Site in good order and available to the Authority:

(a) a copy of this Agreement;

(b) a copy of all building, electrical and plumbing permits and inspection reports;

(c) all Drawings and Specifications, including any shop drawings prepared or obtained in respect of the Work;

(d) a current and up-to-date set of Record Drawings;

(e) the Project Management Plan;

(f) the Time Schedule;

(g) the Quality Management Plan; and

(h) the Health and Safety Plan.

33. CLEANUP AND FINAL CLEANING OF WORK

33.1 The Design-Builder will maintain the Work in a tidy condition and free from the accumulation of waste products and debris, other than that caused by the Authority, Other Contractors or their employees.

33.2 The Design-Builder will promptly remove all surplus products, tools, construction machinery and equipment, and any waste and debris.

33.3 The Design-Builder will leave the Work and Site clean and suitable for occupancy and use by the Authority by the Substantial Completion Date.

33.4 In connection with any Work after the Substantial Completion Date, the Design-Builder will at all times leave the Work and Site clean and suitable for occupancy and use by the Authority , but is not required to remove waste caused by the Authority.

34. REMEDIAL WORK

34.1 The Design-Builder will do all remedial work that may be required to make the several parts of the Work comply with the Statement of Requirements.

34.2 The Design-Builder will coordinate the Time Schedule for the Work to ensure that the requirement under Section 34.1 is kept to a minimum.

34.3 Remedial work will be performed by specialists familiar with the materials affected and will be performed in a manner to neither damage nor endanger any Work.

35. REJECTED WORK

35.1 Defective Work, whether the result of poor design, poor workmanship, use of defective equipment or materials, or damage through carelessness, default or other acts of the Design-Builder or any Subcontractor, and whether incorporated in the Work or not, which has been rejected by the Authority as failing to conform to any of the Statement of Requirements, the Design or the Standards, will be removed promptly by the Design-Builder and replaced and re-executed promptly and properly at the Design-Builder's expense.

35.2 Other Contractor's work destroyed or damaged by such removals or replacements will be made good by the Design-Builder promptly at the Design-Builder's expense.

36. WARRANTY

36.1 The Design-Builder will promptly correct, at its own expense, any Work that is not in accordance with this Agreement and any defects or deficiencies in the Work that appear during the period of 24 months after the Substantial Completion Date (the "Warranty Period").

36.2 The Design-Builder will correct defects or deficiencies at times and in a manner which causes as little inconvenience to the occupants of the Facility and the Authority's operations on and adjacent to the Site as is reasonably possible.

36.3 The Authority may carry out, or have others carry out, rectification work at the Design-Builder's cost if:

(a) the Authority gives notice to the Design-Builder of a defect or deficiency and the Design-Builder does not correct the defect or deficiency within a reasonable time, not to exceed 14 days, unless the nature of the defect or deficiency is such that it cannot be corrected within such time and the Authority, acting reasonably, agrees to an extension of such time; or

(b) the nature of the defect is such that it creates a risk to the health or safety of any occupant or user of the Facility, or risk of damage to the Facility, the environment or any property and the Authority gives notice to the Design-Builder within a reasonable time after the commencement or completion of the rectification work.

36.4 If the Authority carries out or has others carry out the rectification work pursuant to Section 36.3 the Design-Builder remains responsible for the Work (including the rectification work).

36.5 The Design-Builder will provide to the Authority extended warranties from Subcontractors where required by the Proposal Extracts or other provisions of this Agreement and any other extended warranties provided by Subcontractors.

36.6 The Design-Builder will correct, at its own cost, or pay for any damage resulting from the defects or deficiencies and the corrections required under Section 36.1.

36.7 Issuance of the Substantial Completion Certificate and the Total Completion Certificate, and final payment to the Design-Builder, do not relieve the Design-Builder from its responsibility under this Section 36.

37. TITLE AND RISK

37.1 Title to the Work will vest only in the Authority. Without prejudice to any of the rights of the Authority under this Agreement, title to the Work or any part of the Work will vest in the Authority at the earliest of:

(a) the time that the Work or part of it is at the Site;

(b) the time that the Authority has paid for the Work or part of the Work; and

(c) the time of installation or construction of the Work or part of the Work.

37.2 The Work remains under the care, custody and control of the Design-Builder and at the risk of the Design-Builder until the Substantial Completion Date or until such earlier date determined by the Authority, and notified in writing to the Design-Builder, for occupancy and use by the Authority. The Design-Builder will exercise all reasonable care to avoid loss of, or damage to, the Work.

37.3 The Design-Builder represents and warrants that title to the Work and any part of the Work will pass to the Authority free and clear of all liens, charges and encumbrances.

PART D - PAYMENT AND COMPLETION

38. APPLICATIONS FOR PAYMENT

38.1 The Design-Builder will make applications for payment in accordance with this Section 38.

38.2 Applications for payment will be dated the last day of a month, and may be made not more than once each month as the Work progresses. The Design-Builder will submit applications for payment to the Authority's Consultant.

38.3 Applications for payment will be dated the last day of the monthly period and the amount claimed will be for the value, proportionate to the amount of the Contract Price, of Work performed and material delivered to the Site to and at that date.

38.4 Pending determination of the final result of any Change, the undisputed value of the Work performed as a result of a Change is eligible to be included with payment applications.

38.5 The Design-Builder will submit to the Authority's Consultant for review, at least 14 days before the first application for payment, a Schedule of Values of the various parts of the Work, aggregating to the total amount of the Contract Price and divided so as to facilitate evaluation of applications for payment. The Schedule of Values will be consistent with the information set out in the breakdown of the Contract Price set out in Schedule 5 – Schedule of Prices and made out in such form and supported by such evidence as to its correctness as the Authority may reasonably require. The Authority's Consultant will provide comments to the Design-Builder on the Schedule of Values, the Design-Builder will revise the Schedule of Values to address the comments, and so on, until such time as the Authority's Consultant is satisfied with the Schedule of Values. The Schedule of Values will be used as the basis for all applications for payment, unless it is found at any time to be in error, in which case it will be corrected in accordance with the Authority's directions. If the Schedule of Values is not finalized prior to an application for payment, the Authority's Consultant may consider the applications for payment on the basis of the Schedule of Values under review and the Authority's Consultant's comments on such Schedule of Values or such other basis as determined by the Authority's Consultant.

38.6 When making applications for payment, the Design-Builder will submit a statement based upon the Schedule of Values. Claims for material delivered to the Site but not yet incorporated into the Work will be supported by such evidence as the Authority may reasonably require to establish the value and their delivery.

38.7 Subject to any further information that may be required by the Authority, the application for payment will include:

(a) the amount applied for in the application;

(b) the value of Work performed and material delivered to the Site;

(c) payment amounts in respect of any Changes to which the Design-Builder is entitled under this Agreement, including under Section 38.4;

(d) any adjustments to the Contract Price under this Agreement;

(e) the balance of the Contract Price to complete the Work;

(f) the amount of Lien Holdback;

(g) the amount of Performance Holdbacks;

(h) the amount of any withholding or amount to be released under Section 38.9;

(i) certification by the Design-Builder that the Project Binder includes documentation current to within at least 30 days prior to the application, including all inspection reports;

(j) a statutory declaration of an officer or senior management employee of the Design-Builder stating that all accounts for labour, subcontracts, materials, construction machinery and equipment and other indebtedness which may have been incurred by the Design-Builder in performing the Work and for which the Authority might in any way be held responsible have been paid in full, except for amounts properly retained as a holdback or as an identified amount in dispute; and

(k) a clearance letter from the Workers' Compensation Board indicating that all current assessments due from the Design-Builder and all Subcontractors have been paid.

38.8 Applications for release of the Lien Holdback will be made under Section 40 (Lien Holdback) and applications for any payment at Substantial Completion or Total Completion will be made under Section 42 (Substantial Completion and Total Completion).

38.9 It is a condition of payment that the following, and all documentation and certification required under the following, are complete and up to date as of the date of each application for payment:

(a) Health and Safety Plan;

(b) Project Management Plan;

(c) Time Schedule;

(d) Quality Management Plan;

(e) Project Binder, updated as described in Section 43.3;

(f) issued for construction Drawings and Specifications, commencing with the first application for payment 180 days prior to the Target Substantial Completion Date; and

(g) Commissioning Plan, commencing with the first application for payment 120 days prior to the Target Substantial Completion Date.

The Design-Builder will not be required to re-submit documentation previously provided. The Design-Builder will identify any changes to previously submitted documentation and at the Authority's request submit revised documentation.

The Authority acknowledges that the requirement in Section 38.9(f) for issued for construction Drawings and Specifications does not require the Design-Builder to provide such Drawings and Specifications prior to the date such Drawings and Specifications are required to perform the Work and in accordance with the other provisions of this Agreement.

If any of the foregoing listed items, including the required certification and documentation for each listed item, is not complete and up to date, then the Authority may for each listed item that is not complete and up to date withhold from payment the amount of 3% of the total application for payment. This withholding will apply to each month for which such item or items is not complete and up to date. The applicable withholding will be released with the next monthly payment when such item is completed and up to date.

38.10 Notwithstanding the actual progress, the following will apply:

(a) payment of the cost of the Bonds and cost of insurance will be made to the Design-Builder upon presentation of all bonding and insurance documentation required by this Agreement and upon presentation of satisfactory proof of payment of related fees or premiums; and

(b) payment for mobilization identified in the Schedule of Values will be made in two parts: 25% when the Design-Builder occupies the Site, and 75% when the Design-Builder has established a fully functional site office, construction equipment is on site and construction has commenced.

38.11 The Authority's Consultant will, within 10 days of receipt of the Design-Builder's application for payment, either:

(a) accept the amount set out in the application for payment; or

(b) adjust the amount of any payment to reflect the Authority's estimate of Work satisfactorily performed as of the date of the application for payment.

If the Authority's Consultant amends the application for payment, the Authority's Consultant will promptly notify the Design-Builder in writing and give reasons for the amendment.

38.12 Provided the Design-Builder is not in material default of any provision in this Agreement, the Authority will pay the Design-Builder within 15 days of the Authority's Consultant approving or adjusting the Design-Builder's application for payment in accordance with Section 38.11 and the Schedule of Values.

38.13 Whenever any sum of money is recoverable from or payable by the Design-Builder pursuant to this Agreement or is an amount for which the Authority may be liable on account of a default by the Design-Builder, the Authority may deduct such sum from, or may reduce, any amounts then due or that may thereafter become due to the Design-Builder under this Agreement. Without limiting the generality of the foregoing, the Authority may set-off any amounts for liquidated damages set out in this Agreement.

39. TAXES AND DUTIES

39.1 The Contract Price is inclusive of all applicable customs duties and taxes, other than the HST, in effect at the Effective Date.

39.2 The Design-Builder will remit all customs duties and taxes to the applicable governmental authority as and when required by the relevant Law and will without limiting Section 56 (Indemnification), indemnify and hold the Indemnified Parties harmless from and against any customs duties and taxes that the Design-Builder fails to remit as and when due, and from and against any costs and penalties and interest that may be levied against the Indemnified Parties.

39.3 Any increase or decrease in costs to the Design-Builder due to changes in taxes or duties that are in effect at the Effective Date of this Agreement will increase or decrease the Contract Price accordingly.

39.4 Where an exemption or refund of taxes, customs duties or excise taxes is applicable to this Agreement by way of the Design-Builder filing claims for, or cooperating fully with the Authority and the proper authorities in seeking to obtain such exemption or refund, the Design-Builder will make such applications and provide such cooperation.

39.5 Refunds that are properly due to the Authority and have been recovered by the Design-Builder will be promptly refunded to the Authority.

40. LIEN HOLDBACK

40.1 The Authority will retain and release the Lien Holdback in accordance with the provisions of the *Builders Lien Act* (British Columbia).

40.2 For purposes of the *Builders Lien Act* (British Columbia), the Authority's Consultant will be the payment certifier for this Agreement.

40.3 For purposes of progressive release of portions of the Lien Holdback in respect of Subcontracts, the Design-Builder will be the payment certifier under the *Builders Lien Act* (British Columbia).

40.4 The Design-Builder will make application to the Authority's Consultant for certification under the *Builders Lien Act* (British Columbia). As a condition of making any application and as a condition of any certification, the Design-Builder will provide the Authority's Consultant with all information required by the Authority's Consultant.

40.5 Without limiting Section 56 (Indemnification), the Design-Builder will, at its sole risk and expense, do everything necessary, including through the institution, prosecution or defence of legal proceedings, to promptly discharge from title to the Site any claims of builder's lien, builder's liens or certificates of pending litigation by any Subcontractor or other person claiming under or through the Contractor or a Subcontractor. If the Authority becomes aware that such a claim of builder's lien, builder's liens or certificate of pending litigation is threatened or has been registered against title to the Site, the Authority may withhold out of the Lien Holdback or any other monies payable to the Design-Builder such amounts as the Authority reasonably considers necessary in order to secure the discharge of the claim of builder's lien, builder's liens or certificate of pending litigation. The Authority will cooperate with the Design-Builder in securing the discharge of any of the foregoing, subject to such arrangements being made as the Authority reasonably considers necessary before any such additional holdback monies are paid to any person or into court.

41. PERFORMANCE HOLDBACKS

41.1 In addition to the Lien Holdback and any amount retained under this Agreement (including for deficiencies under Section 42.4), the Authority will retain:

(a) a holdback of [redacted] of the Contract Price (the "LD Holdback"),

(b) a holdback of [redacted] (the "LEED Holdback"); and

(c) a holdback of [redacted] (the "Warranty Holdback");

(collectively, the "Performance Holdbacks")

41.2 The Performance Holdbacks will be calculated as a percentage of the Contract Price and that percentage will be withheld from all payments due by the Authority. The percentage will be adjusted from time to time if the Contract Price is adjusted.

41.3 The Authority will release the LD Holdback, less liquidated damages payable by the Design-Builder under Section 3.3, upon the achievement of Substantial Completion.

41.4 The Authority will release the LEED Holdback, less liquidated damages payable by the Design-Builder under Section 10 (LEED Gold Certification), upon the achievement of the points, credits or LEED Gold Certification, as applicable, under Section 10 (LEED Gold Certification).

41.5 The Authority will release the Warranty Holdback, less deductions for amounts owing to the Authority, upon the completion of the Warranty Period and all obligations of the Design-Builder under Section 36 (Warranty).

41.6 The Authority may apply the Performance Holdbacks against any amount owing by the Design-Builder to the Authority either prior to the Substantial Completion Date or during the Warranty Period, including under Section 10 (LEED Gold Certification). If any amount is applied against the Performance Holdbacks, the Design-Builder will at the Authority's option, acting reasonably, either pay such amount to the Authority to replenish the Performance Holdbacks then required to be withheld, or the Authority may withhold such amount from the next payment or payments due to the Design-Builder.

41.7 The Design-Builder will apply for payment of the applicable Performance Holdback and payment will be made in accordance with Section 38 (Applications for Payment).

41.8 The Performance Holdbacks are not held in trust for the Design-Builder, property of the Design-Builder, earned by the Design-Builder or due and payable by the Authority until the conditions for release of the Performance Holdbacks are satisfied.

41.9 The Design-Builder as an alternative to the retention of the Performance Holdbacks may propose to the Authority to provide a clean irrevocable standby letter of credit from a financial institution in Canada acceptable to the Authority . If the Authority accepts the proposal, the Authority will upon receipt of the letter of credit release the Performance Holdbacks to the Design-Builder.

42. SUBSTANTIAL COMPLETION AND TOTAL COMPLETION

42.1 The Design-Builder may make application to the Authority for the Substantial Completion Certificate at any time after it has achieved Substantial Completion.

42.2 "Substantial Completion" means that all of the following have been achieved:

(a) the Authority's Consultant has certified that substantial performance of the Work under the *Builders Lien Act* (British Columbia) has been achieved;

(b) the Work is ready for use by the Authority or is being used by the Authority for the purpose intended, and the following items have been submitted to the Authority or completed by the Design-Builder:

(i) all equipment (subject to the requirements for Equipment under Schedule 4 – Equipment) and mechanical and other building systems (including medical gas systems) are in place, commissioned, received required certifications, and are fully operational;

(ii) a complete Project Binder, provided that:

(A) the commissioning reports may be preliminary; and

(B) the inspections, certificates, guarantees and warranties, and certifications may exclude only the items of Work that remain to be completed;

(iii) issued for construction Drawings and Specifications;

(iv) maintenance and operating tools, replacement parts or products as specified in the Statement of Requirements;

(v) a clearance letter from the Workers' Compensation Board indicating that all current assessments due from the Design-Builder and all Subcontractors have been paid;

(vi) a statement reconciling all Change Orders and claims under this Agreement with respect to the Work to the date of the application for Substantial Completion;

(vii) all approvals necessary for the Project from local authorities having jurisdiction;

(viii) an occupancy permit as required from local authorities having jurisdiction;

(ix) a statutory declaration of an officer or senior management employee of the Design-Builder stating that all accounts for labour, subcontracts, materials, construction machinery and equipment and other indebtedness which may have been incurred by the Design-Builder in performing the Work and for which the Authority might in any way be held responsible have been paid in full, except for amounts properly retained as a holdback or as an identified amount in dispute;

(x) demonstration and training (sufficient to enable proper use and maintenance) of all mechanical and electrically operated devices to the Authority's designated operating and maintenance staff;

(xi) all training required by Schedule 4 – Equipment;

(xii) the LEED Project Checklist and written opinion as required by and in accordance with Section 10.2;

(xiii) the requirements of Section 33 (Cleanup and Final Cleaning of Work) have been fulfilled to the extent required by the Substantial Completion Date;

(xiv) any other conditions specified in this Agreement with respect to achieving Substantial Completion;

(c) a comprehensive deficiency list, including an estimated value for each item, has been submitted to the Authority's Consultant by the Design-Builder and agreed by the Authority's Consultant, acting reasonably; and

(d) a schedule for completion of all remaining Work has been submitted to the Authority by the Design-Builder.

42.3 The Authority's Consultant with input from the Design-Builder's Consultant will, not later than 14 days after the receipt of an application from the Design-Builder for the Substantial Completion Certificate, review and assess the Work to verify that the application and the Work conform to the requirements set out in Section 42.2. The Authority's Consultant will, not later than 7 days after the review, notify the Design-Builder of approval, or the reasons for disapproval, of the application. In the event of a disapproval, the Design-Builder will rectify all matters that prevent the issuance of the Substantial Completion Certificate and the Authority's Consultant will within 7 days after notice from the Design-Builder of rectification, approve or disapprove of the application, and so on, until such time as the Authority's Consultant determines that Substantial Completion has been achieved. When the Authority's Consultant determines that Substantial Completion has been achieved, the Authority's Consultant will issue the Substantial Completion Certificate. The date of Substantial Completion will be as stated in the Substantial Completion Certificate. Immediately following the issuance of the Substantial Completion Certificate, the Authority's Consultant, with input from the Design-Builder, will establish a reasonable date for work still to be

satisfactorily performed or replaced as specified in the list of deficiencies and for Total Completion.

42.4 The Authority may retain out of the amount due and owing to the Design-Builder upon Substantial Completion:

(a) any sums required by law to satisfy any liens against the Work;

(b) an amount determined by the Authority's Consultant to be equal to 2 times the estimated value of the work still to be satisfactorily performed or replaced as specified in the deficiency list; and

(c) any amount withheld pursuant to Section 40.5 .

42.5 No payment will be made to the Design-Builder from the amount withheld under 42.4(b) until the completion or correction of all the deficiencies specified in the deficiency list.

42.6 "Total Completion" means that all of the following have been achieved:

(a) the entire Work has been performed to the requirements of this Agreement, other than:

(i) Work required to be performed under Section 36 (Warranty); and

(ii) achievement of the LEED credits/points and LEED Gold Certification from CaGBC under Section 10 (LEED Gold Certification);

(b) all deficiencies specified in the deficiency list have been rectified or completed;

(c) the requirements of Section 33 (Cleanup and Final Cleaning of Work) have been fulfilled; and

(d) the following items have been submitted by the Design-Builder to the Authority:

(i) all Submittals, including certified Record Drawings in accordance with Section 43 (Project Binder and Record Drawings)

(ii) the final Project Binder, including final commissioning reports, final inspections (structural, environmental, etc.) and deficiency reports;

(iii) a statutory declaration of an officer or senior management employee of the Design-Builder stating that all accounts for labour, subcontracts, materials, construction machinery and equipment and other indebtedness which may have been incurred by the Design-Builder in performing the Work and for which the Authority might in any way be held responsible have been paid in full, except for amounts properly retained as a holdback or as an identified amount in dispute, dated at least 45 days after the date of substantial performance under the *Builders Lien Act* (British Columbia);

(iv) a written statement of the Design-Builder that all claims for payment for Work done under this Agreement as of the date of the Design-Builder's application for a Substantial Completion Certificate including claims and Change Orders have been presented to the Authority;

(v) a clearance letter from the Workers' Compensation Board indicating that all current assessments due from the Design-Builder and all Subcontractors have been paid; and

(vi) certification, acceptable to the Authority, that all taxes, employment assistance payments, Canada Pension Plan contributions, duties, royalties and all other monies required to be paid by law or statute have been paid in full.

42.7 The Authority's Consultant will, subject to the conditions contained in Section 42.6(b), not later than 14 days after the receipt of an application from the Design-Builder for the Total Completion Certificate, review and assess the Work to verify that the application and the Work conform to the requirements set out in Section 42.6. If review by the Authority's Consultant reveals that previously identified deficiencies have not been corrected in a manner satisfactory to the Authority's Consultant, making additional reviews by the Authority's Consultant necessary, the Design-Builder will be responsible for all additional costs of further reviews, such costs to be deducted from the monies due to the Design-Builder. The Authority's Consultant will, not later than 7 days after the review, notify the Design-Builder of approval, or the reasons for disapproval, of the application. In the event of a disapproval, the Design-Builder will rectify all matters that prevent the issuance of the Total Completion Certificate and the Authority's Consultant will within 7 days after notice from the Design-Builder of rectification, approve or disapprove of the application, and so on, until such time as the Authority's Consultant determines that Total Completion has been achieved. When the Authority's Consultant determines that Total Completion has been achieved, the Authority's Consultant will issue the Total Completion Certificate and certify for payment the monies due to the Design-Builder under this Agreement, less any amount still retained for the Lien Holdback or the Performance Holdbacks, amounts withheld under Section 40.5 or any amount set-off in accordance with this Agreement. The date of Total Completion will be as stated in the Total Completion Certificate.

42.8 No payment made by the Authority under this Agreement, or partial or entire use or occupancy of the Work by the Authority, will constitute an acceptance of Work not in accordance with the requirements of this Agreement.

42.9 By issuing any certificate, the Authority and the Authority's Consultant do not guarantee, or otherwise become liable or responsible in any way for, the correctness or completeness of the Work, including the Design, and no certificate makes the Authority or Authority's Consultant in any way responsible or liable for adequacy of the Design or for the Work.

42.10 As of the date of Total Completion, the Design-Builder expressly waives and releases the Authority from all claims against the Authority, including those that might arise from the negligence or breach of this Agreement by the Authority, except those made in writing prior to the Design-Builder's application for payment upon Total Completion and still unsettled and those arising in connection with the obligations of either party to be performed after Total Completion.

42.11 In the event of conflict between the provisions of this Section 42 and any other Section of this Agreement, the provisions of this Section 42 govern.

42.12 Without limiting any other withholding or set-off under this Agreement, the Authority may deduct from any payment to the Design-Builder under this Agreement the amount paid by the Authority to put the Design-Builder into compliance with the Insurance Conditions if the Design-Builder has defaulted in complying with the Insurance Conditions.

43. PROJECT BINDER AND RECORD DRAWINGS

43.1 The Design-Builder will prepare and provide to the Authority a set of documentation that is bound in one or more binders (the "Project Binder").

43.2 The Project Binder will include the following:

(a) commissioning reports satisfactory to the Authority;

(b) all inspections, certifications, guarantees and warranties;

(c) maintenance manuals and operating instructions;

(d) certification by all testing, cleaning or inspection authorities or associations;

(e) copies of all warranties and guarantees from Subcontractors; and

(f) all other documentation that is reasonably required by the Authority or by any party on behalf of the Authority to operate and maintain the Facility.

43.3 The Project Binder will be updated on a monthly basis with all documentation related to Work completed up to the date it is updated. The Design-Builder will provide and update 3 copies of the Project Binder, and will include 3 CDs in a format acceptable to the Authority, acting reasonably.

43.4 Within 60 days after issuance of the Substantial Completion Certificate, the Design-Builder will provide to the Authority the following:

(a) 2 complete sets of paper print Record Drawings, signed and sealed by the Design-Builder's Consultant, showing the as-built Work and identified in bold letters with the words "CERTIFIED AS-BUILT"; and

(b) 2 complete copies of the Record Drawings on CD in AutoCAD DXF, AutoCAD DWG and Adobe PDF format acceptable to the Authority, acting reasonably.

44. CASH ALLOWANCES

44.1 This Section 44 applies to the cash allowance of $240,000 for the Swisslog Pneumatic Tube System. A general description of the cash allowance and responsibilities is attached as Schedule 15 - Swisslog Pneumatic Tube System Statement of Work – CSB.

44.2 The Contract Price includes cash allowances stated in this Agreement. The allowances will be expended, if at all, only as the Authority authorizes. The scope of work or costs included in such cash allowances will be as described in this Agreement.

44.3 Cash allowances cover the net cost to the Design-Builder of services, materials, products, construction machinery and equipment, freight, unloading, handling, storage, installation and other expenditures authorized by the Authority that are incurred in performing the work stipulated under the cash allowances.

44.4 The Contract Price, and not the cash allowances, includes the Design-Builder's overhead and profit in connection with such cash allowances.

44.5 Where the actual costs expended by the Design-Builder for work under a cash allowance exceed the amount of the cash allowance, the Design-Builder will be compensated for any excess incurred and substantiated plus an amount for overhead and profit as set out in this Agreement. Where the actual costs expended by the Design-Builder for work under a cash allowance is less than the amount of the cash allowance, the Authority will be credited for the unexpended portion of the cash allowance, but not for the Design-Builder's overhead and profit on such amount. Multiple cash allowances will not be combined for the purpose of calculating the foregoing.

44.6 The Contract Price will be adjusted to provide for any difference between the amount of each cash allowance and the actual cost of the work under that cash allowance.

44.7 The value of the work performed under a cash allowance is eligible to be included in the monthly applications for payment.

44.8 The Design-Builder and the Authority will jointly prepare a schedule that shows when the Authority, through the Authority, must authorize the ordering of items called for under cash allowances to avoid delaying the progress of the Work.

PART E – CHANGES

45. CHANGES

45.1 The Authority, without invalidating this Agreement, may require Changes, with the Contract Price and Contract Time adjusted in accordance with Section 46 (Valuation and Certification of Changes). The Authority may issue any Change Order or Change Directive, which can include a stop Work order or resume Work order, to the Design-Builder's Representative or to any other person authorized by the Design-Builder to receive a Change Order.

45.2 No Change will be made without a Change Order or Change Directive from the Authority.

45.3 The Design-Builder will not be entitled to a Change Order or Change Directive, or to any adjustments to the Contract Price or the Contract Time, for any Change for which the Design-Builder has not, prior to commencing the performance of a Change, obtained from the Authority a Change Order or Change Directive.

45.4 The Authority may, at any time, require the Design-Builder to assess the impact of a proposed Change on the Contract Price and the Contract Time and the Design-Builder will provide the Authority with such assessment within 7 days after the Authority's request or such other time as may be agreed by the Authority, acting reasonably.

46. VALUATION AND CERTIFICATION OF CHANGES

46.1 The value of any Change will be determined by one or more of the following methods:

(a) by estimate and acceptance of a lump sum; or

(b) by unit prices or fee rates agreed upon (and which may include a maximum upset price).

46.2 The following process will be followed for Changes:

(a) Where a Change is proposed or required by the Authority, the Design-Builder will promptly, and in any case within 10 days or such other time as may be agreed by the Authority, acting reasonably, after the Change is proposed or required by the Authority, present to the Authority its claims for any adjustment to the Contract Price or the Contract Time that arise from the Change.

(b) Where the Design-Builder claims a Change in Contract Time, the Design-Builder will provide a full breakdown of labour, material and other cost information.

(c) Where the Authority and Design-Builder agree to the Change, including adjustments in the Contract Price and Contract Time, or to the method to be used to determine the adjustments, such Change will be effective when recorded in a Change Order.

(d) The value of the Work performed as the result of a Change Order will be included in payment applications.

46.3 In the case of Changes to be paid for under Section 46.2(c), the form of presentation of costs and methods of measurement will be agreed to by the Authority and the Design-Builder before proceeding with the Change. The Design-Builder will keep accurate records of quantities or costs as agreed upon and will present an account of the costs of the Change, together with vouchers where applicable, at least once each month during performance of the Change, and will present a final account upon completion of the Change.

46.4 If the methods of valuation, measurement and value of any Change or any adjustment to the Contract Time cannot be promptly agreed upon, and in any case within 7 days after the proposed Change, and the Change is required by the Authority to be proceeded with, then the Change will be performed by the Design-Builder and the value of the Change and adjustment to the Contract Time will be determined in accordance with the Dispute resolution process described in Section 61 (Dispute Resolution).

46.5 It is intended in all matters involving Changes that both the Authority and the Design-Builder will act promptly and in accordance with the times set out in this Section 46.

47. DETERMINATION OF COST

47.1 Subject to Section 47.2 whenever it is necessary for the purposes of this Agreement to determine the cost of a Change, the cost will be the amount agreed upon by the Design-Builder and the Authority from time to time within a reasonable time after the issue arises in any given instance.

47.2 If the Design-Builder and the Authority cannot agree as to the cost of the Change as contemplated in Section 47.1, the sole cost to which the Design-Builder will be entitled for the Change will be equal to the aggregate of:

(a) all reasonable and proper amounts actually expended by or legally payable by the Design-Builder in respect of the labour, equipment or material that are directly attributable to the subject matter of the Change and that are within one of the classes of expenditures described in Section 47.3; plus

(b) subject to Section 47.3(a):

(i) for a Change or a series of related Changes with an aggregate cost (prior to applying a markup) less than $1,000,000, a markup for overhead of 10% and a markup for profit of 5%; and

(ii) for a Change or a series of related Changes with an aggregate cost (prior to applying a markup) greater than $1,000,000, a markup for overhead of 5% and a markup for profit of 5%.

47.3 Classes of expenditure that are allowable for the purposes of Section 47.2 are:

(a) payments to Subcontractors but notwithstanding the markups specified in Section 47.2(b), the markups applied to such payments to the Design-Builder's Consultant and Subcontractors will for the purposes of Section 47.2(b) be 5% for overhead and 5% for profit.

(b) wages, salaries and traveling expenses of employees of the Design-Builder while they are actually and properly engaged on the Work, other than wages, salaries, bonuses, living and travelling expenses of personnel of the Design-Builder generally employed at

the head office, or at a general office, of the Design-Builder unless such personnel is engaged at the site of the Work, with the approval of the Authority;

(c) payments for materials necessary for and incorporated in the Work or necessary for and consumed in the performance of the Work;

(d) payment for equipment necessary for and incorporated in the Work;

(e) payments for tools, other than tools customarily provided by tradespersons, necessary for and used in the performance of the Work;

(f) payments for preparation, inspection, delivery, installation, commissioning and removal of equipment and materials necessary for the performance of the Work;

(g) assessments payable under any statutory scheme relating to workers compensation, unemployment insurance or holidays with pay;

(h) payments for renting equipment (but not tools) and allowances for equipment (but not tools) owned by the Design-Builder, necessary for the performance of the Work, provided that such payments or allowances are reasonable or have been agreed to by the Design-Builder and the Authority; and

(i) other payments made with the prior approval of the Authority that are necessary for the performance of the Work,

and such expenditures are not the subject matter of the markups in Section 47.2(b).

47.4 If the Design-Builder and the Authority cannot agree as to the cost of labour, equipment or material as contemplated in Section 47.1, and the Authority considers that a Change or series of related Changes may exceed $100,000, the Authority may require the Design-Builder, and the Design-Builder will, obtain a minimum of 3 competitive quotations or tenders for all or any part of such Change or Changes as directed by the Authority.

47.5 The applicable markups set out in this Section 47 will apply to the credit of the Authority for reductions in the costs relating to a Change. Where both increases and reductions in costs relate to a Change, the applicable markups will apply to the net increase or reduction in costs.

48. CHANGE DIRECTIVE

48.1 The Authority may issue a Change Directive to the Design-Builder directing the Design-Builder to proceed with a Change. The Design-Builder will proceed with the Change and the valuation and adjustments to the Contract Price and the Contract Time will be made as soon as reasonably possible after the implementation of the Change in the same manner as a Change for which a Change Order would be issued under this Agreement.

48.2 The Authority may issue Change Directives at any time, including prior to commencing the process for a Change Order or if there is a Dispute in relation to a Change or Change Order (including a Dispute as to whether there is a Change).

PART F – DELAYS

49. DELAYS

49.1 If the Design-Builder is delayed in performing the Work as a direct result of a failure of the Authority to provide access to the Site, a material breach by the Authority of the terms of this

Agreement or by an order issued by any court or public authority having jurisdiction (providing that such order was not issued as the result of any act or fault of the Design-Builder or a Subcontractor), then:

(a) the Contract Time will be extended for such reasonable time, taking into account the critical path, as agreed by the Authority and the Design-Builder, acting reasonably, and the Design-Builder will be reimbursed for any costs directly incurred by it as the result of such delay, determined in accordance with Section 47 (Determination of Cost); or

(b) if the Authority determines that the Target Substantial Completion Date can still be met and requests in writing that the Design-Builder accelerate the Work, the Design-Builder will accelerate its efforts to meet the Target Substantial Completion Date. The Design-Builder will be reimbursed for all reasonable and direct costs incurred by it as a result of undertaking such acceleration efforts.

49.2 If the Design-Builder is delayed in performing the Work by an event of Force Majeure, then:

(a) the Contract Time will be extended for such reasonable time, taking into account the critical path, as agreed by the Authority and the Design-Builder, acting reasonably; or

(b) if the Authority determines that the Target Substantial Completion Date can still be met and requests in writing that the Design-Builder accelerate the Work, the Design-Builder will accelerate its efforts to meet the Target Substantial Completion Date. The Design-Builder will be reimbursed for all reasonable and direct costs incurred by it as a result of undertaking such acceleration efforts.

Except as provided in Section 49.2(b) for acceleration of the Work required by the Authority, the Design-Builder will not be entitled to any costs incurred in relation to the Force Majeure or delays arising from the Force Majeure.

49.3 If the Design-Builder is delayed in the performance of the Work for any reason other than that for which an extension of time is permitted under this Section 49 or if the Design-Builder does not perform the Work substantially in accordance with the Time Schedule to meet the Target Substantial Completion Date, the Design-Builder will at its cost accelerate the Work to meet the Target Substantial Completion Date.

49.4 The Design-Builder is not entitled to any extension of time or any reimbursement of costs for delay under this Section 49 unless written notice is given to the Authority not later than 7 days after the date that the Design-Builder becomes aware of the event causing the delay. In the case of a continuing cause of delay only one notice is necessary.

49.5 In the case of any delay under Section 49.1 or Section 49.2 the Design-Builder will use commercially reasonable efforts to mitigate the costs and impacts of the delay including removing the cause of the delay as promptly as practicable such that the Time Schedule is maintained and that acceleration efforts, if requested by the Authority, are minimized.

PART G – SUSPENSION AND TERMINATION

50. NON-DEFAULT SUSPENSION/TERMINATION

50.1 Notwithstanding that the Design-Builder may not be in default of the terms of this Agreement, if conditions arise which in the Authority's reasonable opinion make it necessary, the Authority may suspend performance of the Work or terminate this Agreement by giving 5 days' written notice to that effect to the Design-Builder and the suspension or termination is effective in the manner specified in the notice.

50.2 Without limiting Section 50.1, the Authority may, if it determines that there is an emergency, by notice to the Design-Builder, do either or both of the following:

(a) suspend the Work whenever in its opinion such suspension may be necessary to ensure the safety or life of others or of the Work or neighbouring property; or

(b) make Changes, and order, assess and award the cost of such Changes that are extra to the Contract Price in accordance with Section 46 (Valuation and Certification of Changes) and Section 47 (Determination of Cost) as determined to be necessary.

50.3 The Authority will within 2 Business Days after a Change under Section 50.2(b) confirm in writing any Change instructions and if a Change has been performed by order of the Authority, the Design-Builder retains its right to claim the value of such Change.

50.4 The Design-Builder upon receiving notice of suspension or termination from the Authority will immediately suspend all operations except those, which, in the Design-Builder's reasonable opinion, are necessary to ensure the safety of personnel and the public or for the care and preservation of the Work and materials. Subject to any directions in the notice of suspension or termination, the Design-Builder will discontinue ordering materials, will not enter into any further Subcontracts (except such Subcontracts as are necessary for the safety of personnel or for the care and preservation of the Work) and will make every reasonable effort in the event of termination to cancel existing Subcontracts and orders on the best terms available.

50.5 During the period of suspension the Design-Builder will not remove from the Site any of the Work, or any material, without the prior written consent of the Authority.

50.6 If the period of suspension is 30 days or less, the Design-Builder, upon the expiration of the period of suspension, will resume the performance of the Work and will be paid for all costs reasonably incurred by the Design-Builder in complying with the suspension, determined in accordance with Section 47 (Determination of Cost) and for costs reasonably incurred for acceleration of the Work so that Substantial Completion of the Work is achieved by the Target Substantial Completion Date where the Authority requires such acceleration by written notice to the Design-Builder.

50.7 If the period of suspension is greater than 30 days and, before 120 days after the date of the notice of suspension, the Authority and the Design-Builder agree to continue with and complete the Work, the Design-Builder will resume operations and complete the Work in accordance with any terms and conditions agreed upon by the Authority and the Design-Builder and the Design-Builder will be paid for all costs reasonably incurred by the Design-Builder in complying with the suspension, determined in accordance with Section 47 (Determination of Cost).

50.8 If the period of suspension is greater than 30 days and the Authority and the Design-Builder do not agree to continue with and complete the Work, or they fail to agree on the terms and conditions upon which the Design-Builder is to resume operations and complete the Work, before 120 days after the date of the notice of suspension, this Agreement will be deemed to have been terminated.

50.9 If this Agreement is terminated pursuant to this Section 50, the Authority will pay the Design-Builder:

(a) in accordance with this Agreement, for all Work performed and for all of the Design-Builder's obligations under Subcontracts that it was unable to cancel, or asked by the Authority not to cancel, less any payments made by the Authority prior to termination; and

(b) all costs reasonably incurred by the Design-Builder in complying with the suspension or termination order, determined in accordance with Section 47 (Determination of Cost), less any costs already paid to the Design-Builder pursuant to Section 50.6.

50.10 The Design-Builder, by giving written notice to the Authority, may suspend performance of the Work to the extent the Work is stopped by an order of any court or public authority having jurisdiction through no act or fault of the Design-Builder or of anyone employed by it.

51. DEFAULT AND TERMINATION OF AGREEMENT

51.1 The Authority may give written notice to the Design-Builder of default under this Agreement if the Design-Builder:

(a) is adjudged bankrupt, makes a general assignment for the benefit of creditors, or a receiver is appointed on account of its insolvency;

(b) abandons the Work;

(c) breaches a material term of this Agreement

(d) makes a material misrepresentation of a representation or warranty of this Agreement;

(e) has delivered a statutory declaration in support of application for a payment under this Agreement that was false or materially inaccurate; or

(f) has made an assignment of this Agreement without the required consent of the Authority.

51.2 If a default occurs, other than a default referred to in Section 51.1(a) or 51.1(b), the Authority may specify in writing a 7 day rectification period within which the Design-Builder will remedy the default. If the nature of such default is that it cannot be corrected within such 7 day period, the Design-Builder will within such period provide the Authority with a schedule acceptable to the Authority for rectification of the default and correct the default in accordance with that schedule.

51.3 If a default referred to in Section 51.1(a) or 51.1(b) occurs or if the Design-Builder does not rectify any other default within the rectification period described in Section 51.2 or in accordance with the schedule acceptable to the Authority, the Authority may without prejudice to any other right or remedy exercise any or all of the following:

(a) suspend all or part of the Work;

(b) terminate the Design-Builder's right to continue with the Work in whole or in part;

(c) correct the default and deduct the cost thereof from any payment then or thereafter due to the Design-Builder; and

(d) terminate this Agreement.

51.4 If the Authority terminates the right to continue with all or part of the Work or terminates this Agreement, the Authority will be entitled to:

(a) take possession of the Work or any part of the Work;

(b) take possession of the Drawings and Specifications and make use of them in accordance with the rights granted under this Agreement;

(c) use construction machinery and equipment, subject to the rights of third parties;

(d) finish the Work or any part of the Work by whatever reasonable method the Authority may consider expedient;

(e) charge the Design-Builder the amount by which the full cost of finishing the Work and a reasonable allowance to cover the cost of corrections to Work performed by the Design-Builder that may be required under Section 36 (Warranty) exceeds the unpaid balance of the Contract Price; and

(f) on expiry of the Warranty Period, charge the Design-Builder the amount by which the cost of corrections to Work under Section 36 (Warranty) exceeds the allowance provided for such corrections.

51.5 The termination of the right to continue with part of the Work does not relieve or discharge the Design-Builder from any obligations under this Agreement, except the obligation to perform the part of the Work removed from the Design-Builder.

51.6 The rights, powers and remedies conferred on the Authority under this Agreement are not intended to be exclusive but are cumulative, are in addition to, do not limit and are not in substitution for any other right, power and remedy existing under this Agreement, under any other agreement, at law or in equity. The exercise by the Authority of any right, power or remedy does not preclude the simultaneous or later exercise by the Authority of any other right, power or remedy.

52. TERMINATION BY THE DESIGN-BUILDER

52.1 The Design-Builder may by giving written notice to the Authority declare the Authority in default of this Agreement for any of the following reasons:

(a) the Authority has failed to pay the Design-Builder within 30 days of the date that any payment becomes due to the Design-Builder in accordance with the terms of this Agreement, unless the Authority is bona fide disputing liability to make such payment and has provided notice to the Design-Builder of the basis for its dispute before the time provided in Section 38.11 for payment of invoices;

(b) the Authority has failed to substantially supply the Site to the Design-Builder, subject to any property availability restrictions identified in this Agreement, within 180 days following the Site Occupation Date; or

(c) substantially all of the Work is stopped by an order of any court or public authority having jurisdiction (providing that such order was not issued as the result of any act or fault of the Design-Builder or a Subcontractor) for a period of 90 days.

52.2 On the happening of a default by the Authority referred to in Section 52.1, the Design-Builder may specify in writing a 21 day rectification period within which the Authority will remedy the event of default.

52.3 If the Authority fails to remedy the default within the rectification period or any extension thereof established in accordance with Section 52.2, the Design-Builder may:

(a) waive the default;

(b) further extend the rectification period;

(c) suspend the Work; or

(d) terminate this Agreement.

52.4 If the Design-Builder terminates this Agreement in accordance with Section 52.3(d), the Design-Builder is entitled to be paid:

(a) in accordance with the terms of this Agreement for all Work satisfactorily performed to the date of termination; and

(b) expenses of the Design-Builder that are directly related to the termination and reasonable in the circumstances including the Design-Builder's obligations to other parties.

PART H – REPRESENTATIONS AND WARRANTIES

53. REPRESENTATIONS AND WARRANTIES

53.1 The Design-Builder represents and warrants to the Authority:

(a) as of the Effective Date that:

(i) all necessary proceedings have been taken to authorize the Design-Builder to enter into this Agreement and to execute and deliver this Agreement;

(ii) this Agreement has been properly executed by an authorized signatory of the Design-Builder and is enforceable against the Design-Builder in accordance with its terms;

(iii) the Design-Builder has had sufficient time, opportunity and resources to investigate and has investigated and satisfied itself of every condition and risk relating to, affecting or that may affect the Project and the Work, or either of them, including the Site conditions, and the labour, equipment, material and other resources that may be necessary for the performance of the Work in a manner that will meet or exceed all requirements of this Agreement, to the satisfaction of the Authority;

(iv) the Design-Builder's investigations and assessments described in Section 53.1(a)(iii), including of the Site conditions (such conditions including for greater certainty geotechnical conditions, subsurface conditions, bearing pressure, settlement characteristics and nature and consistency of soil), and any conclusions reached in such investigations and assessments, including any conclusions as to the effect, if any, on the Design, Construction, Substantial Completion Date and Contract Price, (or any of them), except for objective geotechnical information that can be relied upon for accuracy but not interpretation, sufficiency or relevance, are based on the Design-Builder's own experience, examination, knowledge, information, interpretation, assessment, analysis and judgment and not upon any statement, representation or information, whether oral or written, made, produced or provided by, through or on behalf of the Authority or its advisors;

(v) subject to Section 26.1 in respect of the accuracy of objective geotechnical data identified in Section 26.1(c), the Design-Builder acknowledges that the investigations made by the Authority of the conditions of the Site, including subsurface conditions, are of a preliminary nature and are made for the purpose of study and preliminary design for the sole benefit of the Authority only except

for objective geotechnical data that can be relied upon by the Design-Builder for accuracy but not interpretation, sufficiency or relevance;

(vi) the Design-Builder has no knowledge of any fact that materially adversely affects or, so far as it can foresee, might materially adversely affect either its financial condition or its ability to fulfill its obligations under this Agreement;

(vii) there is no bona fide proceeding pending or threatened against the Design-Builder, which would, if successful, materially adversely affect the ability of the Design-Builder to fulfill its obligations under this Agreement; and

(viii) the Design-Builder acknowledges that it has the responsibility for informing itself of all aspects of the Project and all information necessary to perform the Work and

(b) as of the Effective Date (to the extent applicable as of the Effective Date) and at all times throughout the Term that:

(i) the Design-Builder has filed all tax, corporate information and other returns required to be filed by all Laws, has complied with all workers' compensation legislation and other similar legislation to which it is subject, and has paid all taxes, fees and assessments due by the Design-Builder under those laws as of the Effective Date, except for Lien Holdback monies properly retained, payments deferred by agreement and accounts withheld by reason of legitimate dispute;

(ii) the Design-Builder holds all permits, licences, consents and authorities issued by any level of government, or any agency of any level of government, that are required by all Laws to perform the Work;

(iii) the Design-Builder has paid, as they became due, all accounts, expenses, wages, salaries, taxes, rates, fees and assessments required to be paid by it in respect of the Work and fulfillment of its obligations under this Agreement;

(iv) the Design-Builder is not in breach of any law, by-law or regulation that is material to performance of the Design-Builder's obligations under this Agreement;

(v) the Key Personnel or any substitute with equivalent qualifications proposed by the Design-Builder who have first been expressly accepted in writing by the Authority will be available and fully involved in the performance of the Work; and

(vi) the Design-Builder is registered for the purposes of the HST.

53.2 The Authority represents and warrants to the Design-Builder as of the Effective Date that:

(a) it has been properly constituted pursuant to applicable legislation;

(b) it has been properly authorized to fulfill the obligations of the Authority under this Agreement; and

(c) it has the power, capacity and authority to enter into this Agreement and to carry out its obligations under this Agreement.

PART I – PROTECTION AND INDEMNITY

54. PROTECTION OF WORK AND PROPERTY

54.1 The Design-Builder will protect the Work, the Site and property adjacent to the Site from damage that may arise as the result of the Design-Builder's operations under this Agreement, and will be responsible for such damage, except damage that occurs as the result of actions of the Authority, its agents, employees or Other Contractors.

54.2 Should any damage occur to the Work, the Site and property adjacent to the Site for which the Design-Builder is responsible as provided in Section 54.1, the Design-Builder will make good such damage at its own expense or pay all costs incurred by the Authority or others in making good such damage.

54.3 Should any damage occur to the Work, the Site and property adjacent to the Site for which the Design-Builder is not responsible as provided in Section 54.1, the Design-Builder will at the Authority's direction and expense make good such damage. The Contract Price and Contract Time will be adjusted in accordance with Section 46 (Valuation and Certification of Changes) and Section 47 (Determination of Cost).

55. EXCLUSIONS OF LIABILITY

55.1 Neither the Design-Builder nor the Authority will be liable to the other for any consequential or indirect damages in connection with this Agreement, whether based in contract, tort (including negligence), strict liability or otherwise and including loss of use, loss of revenues or profits and loss of opportunity. This Section 55.1 will not limit any liability the Design-Builder may have under this Agreement to pay liquidated damages.

55.2 Subject to Section 55.3 the maximum amount of the total aggregate liability of the Design-Builder to the Authority in connection with this Agreement, whether based in contract, tort (including negligence), strict liability or otherwise, is 50% of the Contract Price. If this Agreement is terminated, the reference in this Section 55.2 to the "Contract Price" will be deemed only for purposes of this Section 55.2 to be the amount to which the Design-Builder would have been entitled if the Design-Builder had properly performed and completed the Work and this Agreement had not been terminated.

55.3 Section 55.2 will not limit the Design-Builder's liability in connection with:

(a) fraud, gross negligence or wilful, fraudulent or criminal misconduct;

(b) bodily injury, including death, or damage to tangible personal or real property;

(c) liability to third parties;

(d) breach by the Design-Builder of its obligations of confidentiality under this Agreement; and

(e) penalties, fines or other liability imposed by a governmental authority, an administrative tribunal or a court of competent jurisdiction for breach of applicable Law.

55.4 Nothing in this Section 55 will be construed to limit the liability of an insurer under the insurance required to be maintained under this Agreement.

56. INDEMNIFICATION

56.1 Notwithstanding the provision of coverage and insurance by the Authority, the Design-Builder will indemnify and save harmless the Authority and its officers, employees, representatives, consultants and agents (collectively the "Indemnified Parties") from and against any and all losses, claims, damages, actions, causes of action, costs and expenses that any of the Indemnified Parties may sustain, incur, suffer or be put to at any time either before or after the expiration or termination of this Agreement, where the same or any of them are based upon, arise out of or occur, directly or indirectly, by reason of any negligent act or omission or wilful misconduct of the Design-Builder or of any representative, agent, employee, consultant of the Design-Builder or of any Subcontractor pursuant to this Agreement, excepting only liability to the extent arising out of the negligent acts or omissions of the Indemnified Parties.

56.2 The obligations of the Design-Builder under Section 56 (Indemnification) will not be affected by completion or termination of this Agreement, whether for default or otherwise, or suspension of the Work or any withdrawal of services or labour from the Project.

56.3 Neither the requirement of the Design-Builder to purchase and maintain insurance as described in the Insurance Conditions nor the acceptance of evidence of such insurance by the Authority will, in any manner, limit or qualify the right of the Authority to make a claim and recover insurance proceeds under the insurance policies described in the Insurance Conditions or the liability and obligations otherwise assumed by the Design-Builder under this Agreement.

57. DESIGN-BUILDER'S DISCHARGE OF LIABILITY

57.1 The Design-Builder will discharge all liabilities incurred by it, including for labour, equipment, materials or services used or reasonably required for use, in the performance of this Agreement, on or before the date each becomes due. In the case of bona fide disputed payments, the Design-Builder will discharge such liabilities when legally obliged to do so.

57.2 The Design-Builder will include as a condition of every Subcontract that the Subcontractor discharge all liabilities incurred by it, including for labour, equipment, materials, supplies or services used or reasonably required for use, in the performance of the Subcontract, on or before the date upon which each becomes due. In the case of bona fide disputed payments, the Subcontractor will discharge such liabilities when legally obliged to do so.

57.3 The Design-Builder will furnish the Authority with satisfactory evidence that its liabilities and those of Subcontractors have been discharged, such satisfactory evidence to be a statutory declaration sworn by a knowledgeable officer or senior management employee of the Design-Builder or Subcontractor, as the case may be, or such other evidence as the Authority may require.

57.4 The Design-Builder will not directly or indirectly create, incur, assume or allow to be created by any of its Subcontractors or workers any lien, charge or encumbrance on the Site, Project or any part thereof or interest therein. The Design-Builder will immediately notify the Authority of any lien, charge or encumbrance asserted upon the Site, Project or any part thereof.

PART J - SECURITY, RECORDS, REPORTS AND AUDIT

58. BONDS

58.1 Before commencing the Work, the Design-Builder will purchase and deliver to the Authority an executed performance bond and an executed labour and materials payment bond (the "Bonds"). The form of the Bonds will be in accordance with the latest edition (as of the Effective Date) of the CCDC approved bond form or in substantially equivalent form acceptable to the Authority.

58.2 Each Bond under Section 58.1 will be in the amount of 50% of the Contract Price and will be issued by a surety licensed to transact the business of a surety in British Columbia and acceptable to the Authority, acting reasonably.

58.3 Upon entering into a Subcontract with a Subcontractor, the Design-Builder will advise the Subcontractor that a labour and materials payment Bond is in effect and will supply a copy of that Bond to the Subcontractor on request.

58.4 The Design-Builder will pay for and maintain the Bonds in force during the Term and with respect to the performance bond the post-Warranty Period 90 day period referred to in Section 58.1.

58.5 If the surety notifies either party that the Bonds are or are going to be terminated or cancelled for any reason whatsoever, the Design-Builder will obtain and provide the Authority with valid bonds effective from the date of termination or cancellation of the original bonds that comply with the bonding requirements of this Agreement.

58.6 The Authority may require the Design-Builder to obtain the written consent of the surety to any Change.

59. INSURANCE

59.1 The Authority and the Design-Builder will obtain and maintain during the Term the insurance specified for each of them under the Insurance Conditions, and will otherwise comply with the Insurance Conditions.

59.2 Before beginning the Work, the Design-Builder will deliver to the Authority certified copies of all insurance coverage obtained by the Design-Builder in accordance with the Insurance Conditions, or such other proof of that insurance as is satisfactory to the Authority, acting reasonably.

60. RECORDS AND AUDIT

60.1 The Design-Builder will, in connection with this Agreement, retain for a minimum of 6 years after the expiry of the Warranty Period, all records, reports and other documentation required under this Agreement and the following records, reports and other documentation relating to the Project whether or not required under other provisions of this Agreement:

(a) all documents relating to permits;

(b) all notices, reports, results and certificates relating to completion of the Design and Construction and completion of all commissioning activities;

(c) all records relating to any inspections of the Facility conducted under applicable Laws or by or for any governmental authority;

(d) all orders or other requirements issued to the Design-Builder by any Governmental Authority in connection with the Work;

(e) all documents relating to applications for payment, Changes or delay or other claims by the Design-Builder.

The Design-Builder will permit the Authority and its consultants and representatives to inspect and copy any or all such records, reports and other documentation.

60.2 Without limiting the other provisions of this Agreement, the Design-Builder will provide to the Authority and its consultants and representatives all records, reports and other documentation

reasonably required by the Authority to support any applications for payment, Changes or delay or other claims by the Design-Builder.

60.3 The Authority and its consultants and representatives may audit all books and records of the Design-Builder that relate to any applications for payment, Changes or delay or other claims by the Design-Builder.

PART K - DISPUTE RESOLUTION

61. DISPUTE RESOLUTION

61.1 Either party will refer to the Authority's Consultant in writing any Dispute or the interpretation, in the first instance, of the requirements of this Agreement and the making of findings as to the performance hereunder by both the Authority and the Design-Builder. The parties will abide by the Authority's Consultant's decision, and the Design-Builder will diligently proceed with the Work and closely track all costs and impacts associated therewith. Both parties reserve their rights to claim or dispute the decision.

61.2 Any Dispute that is not resolved under 61.1 will be resolved under the other provisions of this Section 61.

61.3 The Authority and the Design-Builder will:

(a) make bona fide efforts to resolve any Dispute arising between them by amicable negotiations; and

(b) provide frank, candid and timely disclosure of all relevant facts, information and documents to facilitate the resolution of any claim or Dispute.

61.4 In order to facilitate the negotiations in Section 61.3(a), each party will provide full written particulars of the nature, entitlement and magnitude of any Dispute, including the provisions of this Agreement relied upon and any relevant facts, information and documents.

61.5 Within 7 days of a Dispute arising, the Design-Builder's Representative or the Authority's Representative, as the case may be and provided the parties have received all information requested pursuant to Section 61.3(b) and Section 61.4, will give the other party written notice of the Dispute and the Design-Builder's Representative and the Authority's Representative will use bona fide efforts as identified by Section 61.3(a) to resolve the Dispute.

61.6 If the Authority's Representative and the Design-Builder's Representative fail to resolve the Dispute within 10 days after receipt of the notice pursuant to Section 61.5, the parties will refer the Dispute and all information to the nominated senior officer of the Authority and the nominated senior officer of the Design-Builder for resolution.

61.7 If the nominated senior officer of the Authority and the nominated senior officer of the Design-Builder fail to resolve the Dispute within 10 days after the Dispute has been referred to them, the Dispute will be referred to a single arbitrator and finally resolved by binding arbitration under the rules of the British Columbia International Commercial Arbitration Centre.

61.8 The arbitrator will be chosen by mutual agreement between the Design-Builder and the Authority. If an arbitrator has not been appointed within 14 days of the date that the Dispute has been referred to an arbitrator pursuant to Section 61.7, the arbitrator will be appointed by the British Columbia International Commercial Arbitration Centre.

61.9 Any of the times specified in this Section 61 may be varied by mutual agreement between the Design-Builder's Representative and the Authority's Representative.

61.10 Pursuit of the resolution of a Dispute under any part of this Section 61 does not relieve either party of its responsibility to ensure timely performance of its obligations under this Agreement.

PART L - GENERAL PROVISIONS

62. LAWS, NOTICE, PERMITS AND FEES

62.1 The Design-Builder will comply with, and perform the Work in accordance, with all Laws and Standards.

62.2 The Design-Builder will apply for, pay for and obtain the building permit and all other permits, licences and approvals required for the performance of the Work.

62.3 All Laws in force in British Columbia, as amended from time to time, govern the Work and this Agreement will be deemed to include any such Laws in force, as amended from time to time.

62.4 If after the Effective Date changes are made to the applicable Laws and Standards, the Design-Builder will notify the Authority in writing requesting direction immediately upon becoming aware of such change. Any Change will be made as provided in Sections 45, 46 and 47.

63. INTELLECTUAL PROPERTY FEES

63.1 The Design-Builder will obtain and pay for all intellectual property rights (including of any patent, copyright, industrial design, trademark or trade secret), royalties and licence fees required for the performance of the Work and will, without limiting Section 56 (Indemnification), indemnify and hold the Authority harmless from and against all claims, demands, losses, costs, damages, actions, suits or proceedings arising out of the Design-Builder's performance of the Work under this Agreement that are attributable to infringement or an alleged infringement of any intellectual property right by the Design-Builder or its Subcontractors.

64. CONFIDENTIALITY AND COMMUNICATIONS

64.1 Subject to Section 64.2, each party will hold in confidence any Confidential Information received from the other party, except that this Section 64 will not restrict:

(a) the Design-Builder from disclosing or granting access to such information to its professional advisers and consultants, to the extent necessary, to enable it to perform (or to cause to be performed) or to enforce its rights or obligations under this Agreement and provided further that the Design-Builder may, subject to obtaining confidentiality restrictions similar to those set out in this Agreement, provide to a Subcontractor and its advisors, or provide or cause to be provided to other third parties, Confidential Information which is necessary to enable the Design-Builder to perform (or to cause to be performed) its obligations under this Agreement; and

(b) the Authority from disclosing or granting access to such information to any provincial ministry, Partnerships British Columbia Inc. and any other governmental authority which require the information in relation to the Project;

64.2 Subject to any restrictions on the Confidential Information which are imposed by a third party that may own any Confidential Information, the obligation to maintain the confidentiality of the Confidential Information does not apply to:

(a) Confidential Information which the party that disclosed the Confidential Information confirms in writing is not required to be treated as Confidential Information;

(b) Confidential Information which is or comes into the public domain otherwise than through any disclosure prohibited by this Agreement;

(c) Confidential Information to the extent any person is required to disclose such Confidential Information by Law, including a disclosure required under FIPPA;

(d) Confidential Information to the extent consistent with any Authority's policy concerning the Authority's Confidential Information, the details of which have been provided to the Design-Builder in writing prior to the disclosure; or

(e) the material referred to in Section 18.5 and any Confidential Information that the Authority is entitled to receive from the Design-Builder pursuant to this Agreement.

64.3 Without prejudice to any other rights and remedies that the other party may have, each of the parties agrees that damages may not be an adequate remedy for a breach of Section 64.1 and that the other party will, in such case, be entitled to the remedies of injunction, specific performance or other equitable relief for any threatened or actual breach of Section 64.1, subject, in the case of a claim for any such remedy against the Authority, to the provisions of the *Crown Proceeding Act* (British Columbia).

64.4 Unless required by any Law, neither party will make or permit to be made any public announcement or disclosure whether for publication in the press, radio, television or any other medium of any Confidential Information or any matters relating thereto, without the consent of the other party (which will not be unreasonably withheld or delayed).

64.5 The Design-Builder will not make any public announcement relating to the Project or this Agreement without the prior written consent of the Authority. The Design-Builder, with the prior written consent of the Authority, may include the Project in its promotional materials.

64.6 The Design-Builder acknowledges that the Authority may, in its discretion and without consultation with the Design-Builder, make any public announcement relating to the Project.

64.7 The parties will comply with Schedule 8 – Communication Roles.

65. NOTICE

65.1 Any notice or communication required or permitted to be given under this Agreement will be in writing and will be considered to have been sufficiently given if delivered by hand or transmitted by facsimile or electronic transmission to the address, facsimile number or electronic mail address of each party set out below:

(a) if to the Authority:

Interior Health Authority
B3 – 1620 Dickson Ave
Kelowna, BC V1Y 9Y2

Attention: Martin de Heer, Senior Project Manager

Facsimile: 250 763 8301

Email: Martin.Deheer@interiorhealth.ca

(b) if to the Design-Builder:

Graham Design Build Services, a Joint Venture
101 - 184 Adams Road
Kelowna, BC V1X 7R2

Attention: Dave Corcoran, Project Director

Facsimile: 250 765 6668

Email: Davec@graham.ca

or to such other address, facsimile number or electronic mail address as any party may, from time to time, designate in the manner set out above.

65.2 Any such notice or communication will be considered to have been received:

(a) if delivered by hand during business hours (and in any event, at or before 5:00 pm local time in the place of receipt) on a Business Day, upon receipt by a responsible representative of the receiver, and if not delivered during business hours, upon the commencement of business hours on the next Business Day;

(b) if sent by facsimile transmission during business hours (and in any event, at or before 5:00 pm local time in the place of receipt) on a Business Day, upon the sender receiving confirmation of the transmission, and if not transmitted during business hours, upon the commencement of business hours on the next Business Day following confirmation of the transmission; and

(c) if sent by electronic transmission during business hours (and in any event, at or before 5:00 pm local time in the place of receipt) on a Business Day, upon receipt, and if not delivered during business hours, upon the commencement of business hours on the next Business Day, provided that:

(i) the receiving party has, by electronic transmission, by hand delivery or by facsimile transmission, acknowledged to the notifying party that it has received such notice; or

(ii) within 24 hours after sending the notice, the notifying party has also sent a copy of such notice to the receiving party by hand delivery or facsimile transmission.

65.3 Delivery by mail will not be considered timely notice under this Agreement.

65.4 In the event of an emergency or urgent matter, in addition to the notice required by this Section 65, a verbal notice will be given as soon as the party giving the notice becomes aware of any material event or circumstance that gives rise to the requirement for a written notice being given.

66. LEGAL RELATIONSHIP

66.1 The Design-Builder is an independent contractor and not the servant, employee, partner or agent of the Authority.

66.2 The Design-Builder will not commit the Authority to the payment of any money to any person.

66.3 No partnership, joint venture or agency involving the Authority is created by this Agreement or under this Agreement.

66.4 All personnel engaged by the Design-Builder to design and construct the Project are at all times the employees or Subcontractors of the Design-Builder and not of the Authority. The Design-Builder is solely responsible for all matters arising out of the relationship of employer and employee.

67. ASSIGNMENT

67.1 The Design-Builder will not, without the prior written consent of the Authority, assign, either directly or indirectly, any right or obligation of the Design-Builder under this Agreement.

67.2 The Authority may, upon notice to the Design-Builder, assign any or all of its rights or obligations under this Agreement to any other health-care agency or organization that will assume responsibility for operation of the Facility. Subject to the right of assignment of the licence referred to in Section 18.5, the Authority will not, without the prior written consent of the Design-Builder, assign, either directly or indirectly, any right or obligation of the Authority under this Agreement.

68. INTEREST

68.1 If payment by either party of any amount payable under this Agreement is not made when due, interest will be payable on such amount at 2% per annum over the prime rate, calculated from the date due under this Agreement until paid, compounded monthly. The party to whom payment is owed and overdue will notify the other party at least monthly of the overdue amount and the accrued interest on that amount. The prime rate is the annual rate of interest announced by Royal Bank of Canada (or its successor), or any other Canadian chartered bank agreed to by the parties, as its "prime" rate then in effect for determining interest rates on Canadian dollar commercial loans made by it in Canada.

69. WAIVER

69.1 No waiver by either party of a right of that party or any breach by the other party in the performance of any of its obligations under this Agreement is effective unless it is in writing.

69.2 No waiver of any right or obligation is a waiver of any other right or obligation under this Agreement.

69.3 Failure or delay to complain of an act or failure of the other party or to declare the other party in default, irrespective of how long the failure or delay continues, does not constitute a waiver by the party of any of its rights against the other party.

69.4 The duties and obligations imposed by this Agreement and the rights and remedies available hereunder will be in addition to and not a limitation of any duties, obligations, rights and remedies otherwise imposed or available by law.

70. OTHER PROVISIONS

70.1 The exclusions, waivers and limitations of liability, representations and warranties and indemnities in this Agreement, the provisions of Sections 60 (Records and Audit), 61 (Dispute Resolution), 63 (Intellectual Property Fees), 64 (Confidentiality and Communications) and rights accrued prior to completion or termination of this Agreement will survive the completion or termination of this Agreement.

70.2 This Agreement constitutes the entire agreement between the parties, expressly superseding all prior agreements and communications (both oral and written) between any of the parties hereto with respect to all matters contained herein or therein, and except as stated herein or the

instruments and documents to be executed and delivered pursuant hereto, contains all the representations and warranties of the respective parties.

70.3 No waiver of any provision of this Agreement and no consent required pursuant to the terms of this Agreement is binding or effective unless it is in writing and signed by the party providing such waiver or consent.

70.4 No failure to exercise, and no delay in exercising, any right or remedy under this Agreement will be deemed to be a waiver of that right or remedy. No waiver of any breach of any provision of this Agreement will be deemed to be a waiver of any subsequent breach of that provision or of any similar provision.

70.5 This Agreement enures to the benefit of and binds the Authority, its successors and its assigns and the Design-Builder and its successors and permitted assigns.

70.6 The parties must do everything reasonably necessary to give effect to the intent of this Agreement, including execution of further instruments.

70.7 The Design-Builder and the Authority will take all reasonable and necessary steps to minimize and avoid all costs and impacts arising out of the performance of the Work and this Agreement.

70.8 Neither the Authority nor the Design-Builder will take advantage of any apparent discrepancy, ambiguity, error or omission in this Agreement and will notify the other party forthwith following the detection of anything it suspects may be an ambiguity, discrepancy, error or omission.

70.9 Each Schedule attached to this Agreement is an integral part of this Agreement as if set out at length in the body of this Agreement.

70.10 This Agreement may only be amended by an agreement of the parties in writing. No such amendments will be valid unless executed by the Authority and the Design-Builder.

70.11 This Agreement will be deemed to be made pursuant to the Laws of the Province of British Columbia and the Laws of Canada applicable therein and will be governed by and construed in accordance with such Laws.

70.12 For the purposes of any legal actions or proceedings brought by any party hereto against the other party, the parties hereby irrevocably submit to the exclusive jurisdiction of the courts of the Province of British Columbia and acknowledge their competence and the convenience and propriety of the venue and agree to be bound by any judgment thereof and not to seek, and hereby waive, review of its merits by the courts of any other jurisdiction.

70.13 Where the Design-Builder is a joint venture, partnership or consortium, each member agrees to be jointly and severally liable for the obligations of the Design-Builder.

70.14 Time is of the essence of this Agreement.

70.15 This Agreement may be executed in any number of counterparts, each of which will be deemed to be an original, and this has the same effect as if the signatures on the counterparts were on a single copy of this Agreement so that it will not be necessary in making proof of this Agreement to produce or account for more than one such counterpart.

70.16 A party may deliver an executed copy of this Agreement by facsimile or other electronic means but that party will immediately deliver to the other parties an originally executed copy of this Agreement.

IN WITNESS WHEREOF the parties have executed this Agreement as of the Effective Date.

INTERIOR HEALTH AUTHORITY

Per: _____
Authorized Signatory
Name: Donna Lemmer
Title: VP Residential Services + Chief Financial Officer

GRAHAM DESIGN BUILD SERVICES, a joint venture, jointly and severally by Graham Design Build Services LP and Jardeg Construction Services Ltd.

GRAHAM DESIGN BUILD SERVICES LP by its general partner GRAHAM DESIGN BUILD SERVICES LTD

Per: _____
Authorized Signatory
Name: Grant Beck
Title: Vice President

JARDEG CONSTRUCTION SERVICES LTD.

Per: _____
Authorized Signatory
Name: Mike Vos
Title: Vice President

SCHEDULE 1

STATEMENT OF REQUIREMENTS

SCHEDULE 1

STATEMENT OF REQUIREMENTS

KELOWNA GENERAL HOSPITAL

CLINICAL SUPPORT BUILDING

TABLE OF CONTENTS

SCHEDULE 1

STATEMENT OF REQUIREMENTS

PART 1. INTERPRETATION

1.1 Definitions

In this Schedule, in addition to the definitions set out in Schedules 1 and 2 of this Agreement:

"**ACC**" means the new Ambulatory Care Centre under construction across Pandosy St. from the Clinical Support Building. Renamed the "**Centennial Building"**;

"**Authority**" means the owner, Interior Health Authority, and its representatives;

"**Authority's Geotechnical Engineer**" means a Geotechnical Engineer hired by the Authority;

"**Authority's Quantity Surveyor**" means a Quantity Surveyor hired by the Authority;

"**BC Building Code**" means the 2006 British Columbia Building Code or the version of the BC Building Code current at the time of the issuance of a building permit for the project;

"**Building**" means the building to be constructed on the Site under this Agreement, and includes all additions and improvements thereto over the period of the agreement;

"**Cannon Design and its consulting team**" means the Authority's architectural consultant, Cannon Design Architecture Ltd. and Cannon Design's engineering consultants: Bush Bohlman and Partners, Hirschfield Williams Timmins Ltd. , HH Angus & Associate Limited, CTQ Consultants Ltd., Levelton Consultants Ltd. and Mortland Planning & Design;

"**Centennial Building**" means the Ambulatory Care Centre under construction across Pandosy St. from the Clinical Support Building;

"CSB" means the Clinical Support Building, a healthcare building to be constructed on the Site in accordance with the Output Specifications;

"**Communication Systems**" has the meaning set out in Section 7.6 of this Schedule;

"**CPTED**" means Crime Prevention Through Environmental Design;

"**Data Room**" means the website established by the Authority and containing documents related to the Project;

"**Design-Builder**" means the Proponent who will enter into the Design-Build Agreement with the Authority;

"**End-Use Equipment**" has the meaning set out in Section 7.6 of this Schedule;

"**Facility Space Requirements**" has the meaning set out in section 2.2.2 of this Schedule;

"**Functional Program**" has the meaning set out in section 2.2.2 of this Schedule;

"**Indicative Design**" has the meaning set out in Section 2.2 of this Schedule;

"**Indicative Equipment List**" means the equipment list located in the Data Room;

"**Information Technology and Telecommunications Equipment**" has the meaning set out in Section 7.6 of this Schedule;

"**KGH**" means the Kelowna General Hospital;

"**Statement of Requirements**" means the specifications set out in this Schedule;

"**Program Requirements**" has the meaning set out of this Schedule;

"**Proponent**" means one of the Design-Builders identified in Section 1.2 of the RFP;

"**RDS**" means Room Data Sheets;

"**Site Plan**" means the site plan set out in the Indicative Design; and

"**TAB**" means testing, adjusting and balancing.

1.2 Overview

The Output Specifications describe key functional requirements for the Design and Construction. They are written in the imperative form and except where otherwise expressly stated within the Output Specifications, all work described in or required by the Output Specifications will be an obligation of the Design-Builder. All things to be provided, delivered, performed or done by the Design-Builder as prescribed within the Output Specifications are deemed to be read and to be interpreted as "Design-Builder will".

1.3 Acronym List:

- AFUE - Annual Fuel Utilization Efficiency
- ANSI - American National Standards Institute
- ASHRAE - American Society of Heating, Refrigerating and Air-Conditioning Engineers
- ASME - American Society of Mechanical Engineers
- ASPE - American Society of Plumbing Engineers
- ASTM - American Society for Testing and Materials
- BCICA - British Columbia Insulation Contractors Association

- BCLNA - British Columbia Landscape & Nursery Association
- BCSLA - British Columbia Society of Landscape Architects
- BICSI - Building Industry Consulting Service International
- BMS - Building Management System
- CCTV – Closed Circuit Television
- CEC – Canadian Electrical Code
- CGA - Compressed Gas Association
- CISCA - Ceiling Interior Systems Construction Association
- CPU – Central Processing Unit
- CPTED - Crime Prevention through Environmental Design
- CRTC – Canadian Radio-television and Telecommunications Commission
- CSA - Canadian Standards Association
- DDC - Direct Digital Controls
- DISS - Diameter Index Safety System
- EHR - Electronic Health Record
- HAZMAT - Hazardous Materials
- HEPA - High Efficiency Particulate Air
- HVAC - Heating, Ventilating and Air-Conditioning
- IEEE - Institute of Electrical and Electronic Engineers
- LDRP – Labour Delivery Recovery and Post-Partum
- MPI – Master Painters Institute
- NEMA - National Electrical Standards Association
- NFPA - National Fire Protection Association
- NTSC – National Television Standards Committee

- OS&Y - Open Stem and Yoke
- PACS - Picture Archiving and Communication System
- PBX – Private Branch Exchange
- PoE – Power Over Ethernet
- STC – Sound Transmission Coefficient
- TTMAC – Terrazzo and Tile Manufacturers Association of Canada
- TVOC – Total Volatile Organic Compounds
- ULC - Underwriters' Laboratories of Canada
- UPS – Uninterruptible Power Supply
- VFD - Variable Frequency Drive
- VLAN – Virtual Local Area Network
- VOC – Volatile Organic Compounds
- VoIP – Voice Over Internet Protocol

PART 2. GENERAL

2.1 Standards

General Standard of Design and Construction

2.1.1 The Design and Construction is to be completed:

2.1.1.1 in accordance with the standards set out in this Schedule;

2.1.1.2 in accordance with the version of the BC Building Code current at the time of the issuance of a building permit for the Project;

2.1.1.3 in accordance with the requirements of all relevant CSA standards including CSA Z317.13-07, CSA Z318.0-93 and CSA Z9000 (draft);

2.1.1.4 in accordance with the requirements of the Authority, document "Section 01550 - Infection Control Measures" during construction; see Data Room;

2.1.1.5 having regard for the concerns, needs and interests of all authorities having jurisdiction and the Authority.

2.1.2 If the Design-Builder wishes to make reference to a code or standard from a jurisdiction outside of Canada, then the Design-Builder will demonstrate to the Authority's satisfaction that such code or standard meets or exceeds the requirements of this Schedule and other applicable governing bodies.

2.1.3 The Design and Construction is to be performed in compliance with all applicable standards regardless of whether they appear in the document or not, including:

2.1.3.1 AIA Guidelines for Design and Construction of Health Care Facilities, 2010.

2.1.3.2 BCICA Quality Standards Manual for Mechanical Insulation, latest edition.

2.1.3.3 ANSI / ASHRAE

2.1.3.3(1) 52.2-1999: Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size;

2.1.3.3(2) 55-2004: Thermal Environmental Conditions for Human Occupancy;

2.1.3.3(3) 62.1-2004:-Ventilation for Acceptable Air Quality;

2.1.3.3(4) 90.1-1999: Energy Efficient Design for New Buildings;

2.1.3.3(5) 111-1988:-Practices for Measurement, Testing, Adjusting & Balancing of Building HVAC Systems;

2.1.3.3(6) 129-1997:-Measuring Air Change Effectiveness;

2.1.3.3(7) 135-2004:-Data Communication Protocol for Building Automation & Control Networks; and

2.1.3.3(8) 0-2005 – The Commissioning Process.

2.1.3.4 ASHRAE:

2.1.3.4(1) Handbooks: 2003 HVAC Applications, 2004 HVAC Systems and Equipment, 2005 Fundamentals, 2006 Refrigeration;

2.1.3.4(2) Design of Smoke Control Systems;

2.1.3.4(3) ASHRAE Guideline 12-2000 - Minimizing the Risk of Legionellosis Associated with Building Water Systems; and

2.1.3.4(4) ASHRAE Guideline 1-1996 – The HVAC Commissioning process.

2.1.3.5 ANSI / ASME:

2.1.3.5(1) B31.1 Power Piping Code, for steam systems;

2.1.3.5(2) Section IX: Welding Qualifications;

2.1.3.5(3) unfired pressure vessels; and

2.1.3.5(4) AWS D1.3-98 - Structural Welding Code - Sheet Steel.

2.1.3.6 ASPE Plumbing Engineering Design Handbook, Volumes 1-4.

2.1.3.7 ASTM:

2.1.3.7(1) A185-06 - Standard Specification for Steel Welded Wire Fabric;

2.1.3.7(2) A82/A82M-05 - Standard Specification for Steel Wire, Plain, for Concrete Reinforcement;

2.1.3.7(3) ASTM C568-03 - Standard Specification for Limestone Dimension Stone;

2.1.3.7(4) ASTM C615-03 - Standard Specification for Granite Dimension Stone;

2.1.3.7(5) ASTM C503-05 - Standard Specification for Marble Dimension Stone;

2.1.3.7(6) ASTM C616-03 - Standard Specification for Quartz-Based Dimension Stone; and

2.1.3.7(7) BCSLA and BCLNA - BC Landscape Standard – Current Edition.

2.1.3.8 CGA - P-2.1: Standard for Medical / Surgical Vacuum Systems in Hospitals.

2.1.3.9 CSA

2.1.3.9(1) B52HB-05: Mechanical Refrigeration Code;

2.1.3.9(2) B149.1-00: Natural Gas and Propane Installation Code;

2.1.3.9(3) B651-95: Barrier Free Design;

2.1.3.9(4) Z7396.1-06 “Medical Gas Pipeline Systems – Part 1: Pipelines for Medical Gases and Vacuum;

2.1.3.9(5) Z7396.2-06 “Medical Gas Pipeline Systems – Part 2: Anaesthetic Gas Scavenging;

2.1.3.9(6) Z317.13-07: Infection Control During Construction, Renovation, and Maintenance of Health Care Facilities;

2.1.3.9(7) Z317.2-01: Special Requirements for Heating, Ventilation, and Air Conditioning (HVAC) Systems in Health Care Facilities;

2.1.3.9(8) Z318.0-93: Commissioning of Health Care Facilities;

2.1.3.9(9) Z318.1-95: Commissioning of HVAC Systems in Health Care Facilities;

2.1.3.9(10) A23.4-05 - Precast Concrete - Materials and Construction;

2.1.3.9(11) W186-M1990 (R2002) - Welding of Reinforcing Bars in Reinforced Concrete Construction;

2.1.3.9(12) A370-04 - Connectors for Masonry;

2.1.3.9(13) A23.1-04/A23.2-04 - Concrete Materials and Methods of Concrete Construction / Methods of Test and Standard Practices for Concrete; and

2.1.3.9(14) S832-06 – Seismic Risk Reduction of Operational and Functional Components (OFCS of buildings).

2.1.3.10 MPI

2.1.3.10(1) Master Painters Institute (MPI) Architectural Specification Standards Manual.

2.1.3.11 NFPA

2.1.3.11(1) 10-2002: Standard for Portable Fire Extinguishers;

2.1.3.11(2) 13: Standard for the Installation of Sprinkler Systems;

2.1.3.11(3) 50: Bulk Oxygen Systems;

2.1.3.11(4) 56F: Non-flammable Medical Gas System;

2.1.3.11(5) 90A - Current Edition: Standard for Installation of Air Conditioning and Ventilation Systems;

2.1.3.11(6) 92A - Current Edition: Standard for Smoke-Control Systems Utilizing Barriers and Pressure Differences; and

2.1.3.11(7) 101 - Current Edition: Life Safety Code.

2.1.3.12 Master Municipal Construction Document (MMCD) latest edition; and

2.1.3.13 BC Supplement to TAC Geometric Design Guide latest edition

2.2 Indicative Design and Design Requirements

2.2.1 Cannon Design and its consultant team developed an indicative design for a Clinical Support Building (the "**Indicative Design**") as part of the Authority's business case application to the Ministry of Health Services and the B.C. Treasury Board in support of the Construction of the Interior Heart and Surgical Centre (IHSC) Project on the Kelowna General Hospital site. Drawings describing the Indicative Design for the Clinical Support Building are available in the Data Room.

2.2.2 The Authority and its consultants prepared a functional program (the "Functional Program") for the laboratory component of the Clinical Support Building, a component of the Interior Heart and Surgical Centre Project. The Functional Program is located in the Data Room. The Functional Program describes the conditions of workload, staffing requirements and other factors which must be addressed in order that the new building successfully serve the needs of the Authority today and in the future. In addition to the Functional Program, the Authority has developed a schedule of Facility Space Requirements which summarize the types of rooms or spaces, the minimum number and size of rooms or spaces, and some contents of some rooms which the Authority has identified as being necessary so that the CSB can accommodate the program requirements.

2.2.3 The Indicative Design has been drawn to reflect program areas and significant design features as required by the Facility Space Requirements and the Functional Program. Clinical functionality has been tested with CSB Users who have confirmed the general laboratory layout, adjacencies, and both staff and specimen flows. Each office space has been drawn with a furniture layout test fit. Lean design has been applied to most of the laboratory departments and an equipment test fit has been completed.

2.2.4 An indicative rendered model showing one possible form and the potential character for the building has been shown to the neighbours which has been favourably received.

2.2.5 Structural, Mechanical and Electrical consultants have contributed a review and overlay of their requirements consistent with and forming part of the Indicative Design.

2.2.6 The Design-Builder must position the bridge link between the CSB and the Centennial Building in the exact location prepared in the Centennial Building and illustrated by reference drawings filed in the Data Room:

2.2.6.1 Bridge Location plan;

2.2.6.2 Bridge Location plan detail;

2.2.6.3 Bridge Location elevation;

2.2.6.4 Civil As-Built East Side Centennial Bldg.;

2.2.6.5 A-103b-005a: L3 Floor Plan;

2.2.6.6 A-153b-005a: L3 Reflected Ceiling Plan;

2.2.6.7 S-101: Foundation Plan showing additional raft/footing for link;

2.2.6.8 S-103d: L3 Structural;

2.2.6.9 A-301-003a: Envelope;

2.2.6.10 Detail 1 on A-450-003a;

2.2.6.11 Details 2 and 3 on A-901-003a; and

2.2.6.12 Detail 7 on A-915a-003a.

2.2.7 The bridge will be level, i.e., without any slope, and have no corners or bends. Materials at the bridge-Centennial Building connection will match or complement the Kawneer 1602 glazing and VicWest metal panels used in the adjacent Centennial Building façade..

2.2.8 Bridge and bridge pier construction on the Centennial Building side of Pandosy Street will be dependent on the Centennial Building construction schedule. Reference Schedule in the Design-Build Agreement.

2.2.9 Room Data Sheets have been created to compliment the indicative design, the Indicative Equipment list and this Schedule; all three should be read together.

2.2.10 The Design-Builder shall use the Indicative Design as both a reference and a baseline solution for its design, but the Authority makes no representation as to the accuracy or completeness of any aspect of the Indicative Design. The Design-Builder should

consider design decisions which deviate from the Indicative Design when such deviations serve to improve an aspect of the Indicative Design.

2.2.11 .The Site must be accessed from Royal Avenue. The Design-Builder is required to work with the City of Kelowna and the Authority to develop a mutually satisfactory solution for the exact location along Royal for access and egress from the Site in the context of adjacent traffic flow patterns and the needs of adjacent neighbourhoods. All meetings with the City of Kelowna must be arranged through the Authority and will be held with a representative of the Authority in attendance.

2.2.12 The Design-Builder is expected to work with the City of Kelowna's various planning and building departments regarding the design of the building and its conformance with City of Kelowna regulations and by-laws.

2.2.13 The Design-Builder is required to meet with the Authority and its Stakeholders to review the design as it is developed. The Design-Builder will provide a proposed design and construction schedule in the form of a Gantt Chart that will clearly lay out the Authority/Stakeholder review process:

2.2.13.1 Provide the proposed timing and number of meetings required with the Authority and its user groups, including review and sign-off of the design at submission milestones;

2.2.13.2 Identify all activities that are on the critical path and milestone dates, review activities and requirements for the Authority's stakeholder review and Authority signoff. Reference Authority QS Standards in the Data Room for milestone requirements; and

2.2.13.3 Identify Authority signoff at any other appropriate milestones depending on the construction procurement process.

2.2.14 The Design-Builder will be completely responsible for all aspects of the Design and Construction whether or not it uses all or any part of the Indicative Design, and the Design-Builder will be responsible to independently verify the accuracy of any information contained in or inferred from the Indicative Design or the Facility Space Requirements if the Design-Builder uses any of such information in its design.

PART 3. DESIGN PRINCIPLES

3.1 The Site

3.1.1 The Site is approximately 4,457 square metres in area and is defined as indicated on the Site plan included in the Indicative Design (the "Site Plan").

3.1.2 An Authority-supplied Geotechnical Report has been completed for the Site and is available in the Data Room.

3.1.3 The Geotechnical Report is included for information only and will not form a part of the Project Agreement. The Design-Builder shall interpret the information for its own use in evaluating the affect of sub-surface conditions on construction operations. The interpolation of conditions between said test borings is not guaranteed by the Authority. The Design-Builder shall visit the project site, and at its option and prior to the execution of the Project Agreement, may perform further sub-surface investigation at its own expense, after receiving written permission from the Authority.

3.1.4 The Site is currently preloaded based on the Geotechnical Report. The design criteria used to establish the pre-load area and height are available in the Data Room. The Design-Builder will be responsible for reviewing the geotechnical information, will determine the duration of the pre-load in the context of their building design and will assume all associated risk.

3.1.5 The preload is expected to cause some settlement in the adjacent existing structures and installations. The Authority has undertaken a survey monitoring program to evaluate the magnitude of this settlement. The Authority will:

3.1.5.1 Be responsible for all settlement related damage that occurs to existing structures and/or installations as a result of the preloading from May 14, 2010 to the earlier of the thirty-seventh day after the Effective Date or the date the preload is substantially removed.

3.1.5.2 Commission a condition survey of existing structures and/or installations to be completed at thirty days after the handover.

3.1.5.3 If the Design-Builder elects to leave the preload in place after the execution of the Project Agreement, the Authority will commission another condition survey, at the Design-Builder's expense, of existing structures and/or installations once all material has been removed. The Design-Builder will be responsible for all settlement related damage to existing structures and/or installations occurring thirty days or more after the execution of the Project Agreement.

3.1.6 The Design and Construction of the CSB shall enable connectivity of the Site with the surrounding neighbourhood, the existing KGH campus and contribute to a walkable and amenable public realm. Where possible, design of the CSB should support Kelowna's bicycle infrastructure.

3.1.7 Existing trees will be retained wherever possible.

3.1.8 Attenuate noise from roof-top mechanical equipment.

3.1.9 Visually shield rooftop mechanical and electrical equipment. The environment for M&E equipment and structures on the roof is at the discretion of the designer but, in any case, M&E equipment and structures must be screened.

3.1.10 Address the following within and on the CSB building site and the adjacent KGH Site as impacted by this project:

3.1.10.1 Physical safety and security;

3.1.10.2 Way-finding and legible connections between the CSB and the KGH Campus;

3.1.10.3 Pedestrian and vehicular access and parking; specifically the desire to direct traffic flows toward Pandosy and calm potential through-traffic on local residential streets, particularly the adjacent alley and Speer streets in conjunction with City requirements;

3.1.10.4 The need for visual access to daylight from staff work areas;

3.1.10.5 Sheltering of building walkways and building entrances;

3.1.10.6 Access to light throughout the year in outdoor spaces;

3.1.10.7 The requirements for snow dump and snow storage areas;

3.1.10.8 Security should follow modern principles of CPTED, that include the creation of welcoming environments that establish a sense of ownership among residents and building users;

3.1.10.9 Access to the Site to meet the needs of staff and visitor traffic, ambulances for emergencies and service and delivery vehicles; Design shall, where practicable, minimize any disruption to neighbouring residents;

3.1.10.10 Safe and well lit spaces for wheelchair bound individuals planned in conjunction with other outdoor areas;

3.1.10.11 Design shall support informal surveillance of the laneway from the building to help create a safer public space;

3.1.10.12 Use trees and other elements in the landscape to screen views of the CSB from neighbouring residential buildings, and screen views of neighbouring residential yards and buildings from the CSB. Treatment of edges surrounding street-level parking shall not be severe or utilitarian, obscuring where possible the distinction between parkade and other uses; and

3.1.10.13 CSB Design considerations should address neighbours' privacy from all three storeys including permitting no light spillage into neighbouring yards or windows, screening views into neighbouring yards from upper floor windows and diverting building system and vehicle noise away from the lane and residences to the east and from neighbouring residences to the south.

3.2 Architecture

3.2.1 Entrance vestibules

3.2.1.1 Will be protected from snow and rain by canopies;

3.2.1.2 Will deal effectively with mud, sand and dirt;

3.2.1.3 Will be barrier free design; and

3.2.1.4 Will accommodate the transport of large equipment, future accessibility and facilitate ease of deliveries.

3.2.2 Bariatric services

3.2.2.1 Bariatric clients will access and be treated in this building. Therefore, the design will be in accordance with the design recommendations for a bariatric friendly healthcare facility that are set out in 2010 Guidelines for Hospital and Healthcare Facilities published by the American Institute of Architects (AIA) and as suggested by the draft Canadian Healthcare design guidelines.

3.2.3 Elder Friendly

3.2.3.1 The Design will incorporate Elder Friendly design principles. in accordance with the design recommendations for an elderly friendly hospital that are set out in "Code Plus: Physical Design for an Elderly Friendly Hospital" published by the Fraser Health Authority as applicable to this healthcare facility; and

3.2.3.2 Building should address elder friendly design in all public and clinical spaces within the building.

3.3 Sustainable Design

3.3.1 The Project will be designed and certified to achieve LEED for New Construction Gold Certification.

3.3.2 Use the Green Guide for Healthcare Version 2.2 as a reference guide in the Design, and as a possible source of innovation credits toward LEED for New Construction Gold Certification.

3.3.3 The Design is to consider the safety and the well-being of both staff, visitors and clients. The Design and Construction approach to sustainability will therefore include the following characteristics:

3.3.3.1 Ease of access – both to the CSB and within the CSB for all staff, visitors, clients and delivery of materials and equipment;

3.3.3.2 Equitable and respectful - with all CSB Users valued, and client confidentiality and dignity maintained;

3.3.3.3 Restorative – with staff workspaces that are comfortable, peaceful, attractive, and that feel connected to the day and the seasons;

3.3.3.4 Efficient - reducing CSB Users' distances to travel within the functional departments;

3.3.3.5 Flexible - to accommodate continuous programmatic change and growth through the use of modular laboratory, office and exam room furniture and the provision of unassigned spaces;

3.3.3.6 Benign – the building will be energy efficient, water balanced, toxin free, with minimal and well-managed waste consistent with the spirit and intent of LEED and the Green Guide for Healthcare version 2.2; and

3.3.3.7 Secure - ensure security for staff who will occupy parts of the CSB 24 hours per day while permitting the public to access the outpatient collection area and clinical offices during working hours.

3.3.4 Design the CSB to consider the use of alternate energy sources such as passive solar water heating and alternate heating and cooling sources such as ground source heat pumps where required to meet energy targets.

3.4 Disaster Preparedness

3.4.1 Post- disaster architectural design is required.

Design the CSB so that:

3.4.1.1 The laboratory will continue to function as designed in response to disasters and emergency situations including but not limited to an epidemic, chemical spill, extended power interruption, forest fires; contamination of water supply and earthquake;

3.4.2 Post-disaster structural design

3.4.2.1 See section 3.10.4

3.4.3 Post-disaster mechanical design

3.4.3.1 Design the mechanical piping and equipment seismically to post disaster methods as outlined in the BC Building Code;

3.4.3.2 Provide a domestic water inlet connection on the exterior of the Building to allow for supply of water from a tanker truck;

3.4.3.3 Provide an emergency sanitary sewer overflow to a sanitary sewer storage system, complete with visual emergency level indicators, sufficient to accommodate flows until sewage pump trucks can be mobilized (for a minimum 24 hours of storage); and

3.4.3.4 Provide a sanitary sewer sump and pump out connection exterior to the Building for connection to a sewage pump truck.

3.4.4 Post-disaster electrical design

3.4.4.1 See section 7.8.1.2 (1)

3.5 Safety and Security

3.5.1 Incorporate the following into the Designs:

3.5.1.1 CPTED principles in Site layout, Building design, landscape development and lighting; and

3.5.1.2 Guidelines for the physical security of chemicals, drugs and needles and syringes stored in healthcare facilities, as produced by the College of Pharmacists of British Columbia.

3.5.2 Incorporate the following in the exterior Design:

3.5.2.1 Provide exterior lighting levels near Building entrances, exits, walkways, public areas, and parking areas. Lighting will not cause glare, shadow, or high contrast with surrounding areas and will not trespass on neighbouring property;

3.5.2.2 Shrubbery within 2m of walkways will not exceed 50cm in height;

3.5.2.3 Provide at least one open, highly visible and well lit emergency call box in staff and outpatient parking areas for every 30 parking spaces (3

minimum. Locate so as to ensure rapid and easy access to emergency call boxes from any point within the parking structure;

3.5.2.4 Provide video surveillance of all exterior areas including parking lot, entrances and exits, bicycle storage, loading zones, sidewalks and rear laneway. Arrange camera locations to facilitate viewing of the entire lot. Avoid dead spots and corners; and

3.5.2.5 Parking area design should exclude blind corners where possible and install convex mirrors where design does not allow eliminating blind corners.

3.5.2.6 Provide infrastructure for one *Digital Payment Technologies* "Luke" pay station located near the entrance to the building accessed from the covered parking.

3.5.3 Incorporate the following in the interior Design:

3.5.3.1 Video surveillance at all main entrances to the CSB so that surveillance equipment is visible to people entering the area. Cameras shall be positioned to provide identification surveillance of persons entering the building;

3.5.3.2 Card access control of all staff entrances, staff lounges, the clinical office and exam room suite and all laboratory entrances from the public corridors and elevators. Include card access control of select spaces within department areas as required for additional tiered security. The Card Assess System will have multiple zones to distinguish access between the many departments;

3.5.3.3 Duress Alarm system shall be provided for use by staff and visitors;

3.5.3.4 An internal, KGH campus only telephone will be located in the elevator lobbies and client waiting areas; and

3.5.3.5 A pay phone or local dialling only phone will be located in the Outpatient Collection lobby or waiting area.

3.6 Flexibility

3.6.1 Plan the CSB within the City of Kelowna zoning setbacks for the Site. The Site limits are shown on the Site Plan but must be verified with the City of Kelowna.

3.6.2 All plans for future expansion of the CSB should maintain or improve the level of daylight penetration into the CSB.

3.6.3 It is critical that the Design accommodate future changes and that such accommodation be clearly articulated and illustrated in the Design submission as follows:

3.6.3.1 Allow for additions, deletions and relocations of services to the laboratory, clinical and non-clinical areas over the life of the CSB, including consolidating risers and hubs in strategically accessible and expandable locations and planning closets, cabinets, chases and shafts for access and growth:

3.6.3.1(1) Locate permanent building elements such as stair, elevator and duct shafts to minimize constraints on configurational change;

3.6.3.1(2) Provide a non-restrictive fenestration pattern;

3.6.3.1(3) Minimize interior columns for ease of planning and re-planning of laboratory and clinic areas;

3.6.3.1(4) Avoid interior shear walls;

3.6.3.1(5) Locate global circulation corridors to allow CSB expansion without increasing the complexity of the global circulation system as a whole;

3.6.3.1(6) Provide internal departmental corridors that link the fronts and backs of adjacent departments to allow border zone spaces to ebb and flow between departments and to increase inter-departmental communication and lean work flows;

3.6.3.1(7) Provide standardized, same-handed room layouts where possible for repetitive rooms throughout the CSB; and

3.6.3.1(8) Rigorously control and record placement of in-floor reinforcing steel, radiant heating and cooling tubes, etc., to maximize the potential for and ease of future floor penetrations.

3.6.3.2 Laboratory practices and technologies evolve rapidly, often requiring changes in the physical layout of laboratory spaces and the mechanical and electrical service requirements for and within these spaces. The CSB design shall minimize the time, money, and waste associated with ‘churn’ over the CSB’s lifetime by incorporating integrated building systems in the design of the CSB that support change and minimize its impact on operations.

3.6.3.3 Facilitating future flexibility by providing the ability to reconfigure laboratory departments, offices and exam rooms is highly desired. The Design-Builder may use movable/demountable walls in administrative, laboratory and clinical office areas.

3.6.3.4 Use strategies in the Design that would minimize disruption to ongoing operations of the CSB during a potential future horizontal expansion to either the south or east of the CSB. Expansion is anticipated to be clinical laboratory and clinical office space.

3.7 Use of Wood

3.7.1 As contemplated by the *Wood First Act* (British Columbia), The Design-Builder will incorporate wood products into the design of the CSB to the extent that the use of wood products is consistent with the requirements of this Schedule.

3.7.2 Use wood as a featured material in both the interior and exterior of the CSB.

3.7.3 Wood will be used where indicated as “Appropriate” in Table 1. Wood will not be used where indicated as “Inappropriate”. Wood studs shall be used where Proponents determine that they are appropriate at the Proponent’s discretion.

3.7.4 **Table 1. Wood First - Appropriate Use**

Area of Usage	Appropriateness	Justification
Substructure		
Forming/ Shutter (temporary)	Appropriate	The use of wood in this process is a traditional method within the construction process
Structure		
Slab on grade	Inappropriate	The loads applied to the slab are in excess of wood’s capabilities and wood is subject to rot, mould and insects such as termites, impacts that are exacerbated by proximity to the ground
Beams	Inappropriate	The loads applied to the beams are in excess of wood’s capabilities and would require fire protection in this application to meet code requirements. Also vibration mitigation requirements for the laboratory and long spans on the structural grid would create an overly complicated structure
Columns	Inappropriate	The fire resistance requirements in this location are limiting and wood used in this application will not provide inherent fire proofing to meet the Building Codes. Also vibration mitigation requirements for the

Area of Usage	Appropriateness	Justification
		laboratory and long spans on the structural grid would create an overly complicated structure
Upper Flooring	Inappropriate	The performance of wood in these locations will be challenged due to load capacity requirements and fire integrity limitations. Also vibration and long spans on the structural grid would create an overly complicated structure
Roof (Penthouse)	Appropriate	Heavy timber construction could be used in this location
Exterior Cladding		
Roof Finish (Flat Roof)	Inappropriate	There is no known wood product for this application
Walls above ground level	Appropriate	Wood can be used as: Facing material and Studding
Exterior Windows	Inappropriate	Ability to clean and water/chemical resistance are paramount in this location
Curtain Walling	Inappropriate	There is no known wood product for this application
Exterior Doors and Screens	Appropriate	Wood doors and screens can be used in low traffic areas
Interior Partitions and Doors		
Partition Studding	Appropriate	Support studs used for the framing of the walls
Interior Doors	Appropriate for offices	Framing, core and facing of door can be wood for locations not requiring greater than a 90 minute fire resistance rating. Wood doors in high metal cart and material transport traffic areas like the laboratory would be inappropriate
Vertical Movement		
Stairs (Structural)	Inappropriate	The performance of wood in these locations will be challenged due to the load capacities and precluded by the BC Building Code due to fire resistance rating limitations
Stairs (treads, risers, handrail and infill)	Appropriate for non-exit stairs	Use of wood can be utilised in the aesthetic completion of the staircase
Guardrails	Appropriate for	Wood can be used in these locations where there is a

Area of Usage	Appropriateness	Justification
	non-exit stairs	low to medium risk of impact
Fittings and Equipment		
Hardwood Floor	Appropriate	Wood could be used in certain, non-laboratory locations as a floor finish; this would be limited to high end finished areas which are not subject to low acoustic or high usage requirements
Ceiling Tiles	Appropriate	Wood could be used in ceiling tiles for aesthetic requirements in certain, non-laboratory areas within the building. This would be limited to high end finished areas which are not subject to low acoustic or high usage requirements
Wall Finish	Appropriate	Wood could be used as a wall finish for aesthetic and acoustic requirements in certain, non-laboratory areas within the building. This would be limited to high end finished areas which are not impaired by acoustic and high usage
Toilet Partitions	Appropriate	The core material for the partitions can be made from wood particles
Signs	Appropriate	The base material on which the sign is mounted can be of wood
Loose Equipment (Desks, chairs, etc)	Appropriate	The core material for the desks, chairs, etc can be made from particles and complete wood substrate
Fixed Equipment (Millwork)	Appropriate	The carcass, core material and substrate for millwork can be constructed with wood
Modular Lab Benches	Appropriate	The carcass, core material and substrate for modular lab benches can be constructed with wood
Specialized Equipment	Inappropriate	Clinical equipment and associated environment cannot utilise wood as these environments need to be inert
Mechanical		
None Known		
Electrical		
None Known		
Site Development		
Landscaping (Architectural, decorative, site	Appropriate	Wood could be used in Landscaped areas for the Arts, Architectural features/site furnishings; seats, pagodas, etc.

Area of Usage	Appropriateness	Justification
furnishings, etc)		
Contractor		
Site establishment		Where appropriate the Design Builder is to endeavour to utilise materials of wood and wood derivative for their site establishment

3.7.5 Provide rough carpentry, wood backing materials, backing boards for mechanical rooms and electrical/communication rooms, roof sheathing, copings, cant strips, finish carpentry and architectural woodwork, including but not limited to exterior fascia's, cabinets, casework (excluding laboratory casework, which is included in Division 12), frames, panelling, ceiling battens, trim, installation of doors and hardware, and other wood-related products and applications as required for wood products exposed to view in finished interior and exterior installations.

3.8 Mechanical Engineering

3.8.1 General standard of design principles:

3.8.1.1 This section is accompanied and should be read with conjunction with the Laboratory Equipment List and Room Data Sheets.

3.8.1.2 The HVAC, plumbing, fire protection, speciality systems and medical gas systems will be designed to provide a healing, comfortable and productive environment for CSB Users.

3.8.1.3 It is essential that all mechanical systems, equipment, material and installation conform to the latest version of all the applicable codes, standards, regulations and guidelines. The codes, standards and regulations shall include, but not be limited to the following:

3.8.1.3(1) Codes:

3.8.1.3(1)(a) B.C. Building Code (2006);

3.8.1.3(1)(b) National Building Code (NBC);

3.8.1.3(1)(c) Model National Energy Code (MNECB);

3.8.1.3(1)(d) Canadian Electrical Safety Code (2006);

3.8.1.3(1)(e) B.C. Fire Code;

3.8.1.3(1)(f) National Fire Code (NFC);

3.8.1.3(1)(g) B.C. Plumbing Code;

3.8.1.3(1)(h) Atomic Energy;

3.8.1.3(1)(i) City of Kelowna Bylaws;

3.8.1.3(1)(j) Other Municipality Bylaws;

3.8.1.3(1)(k) Ministry of Environment – Environment Protection Act – Regulation 346 (MOE);

3.8.1.3(1)(l) Natural Gas Utilization Code; and

3.8.1.3(1)(m) Installation Code for Oil Burning Equipment.

3.8.1.3(2) Standards:

3.8.1.3(2)(a) Canadian Standards Association (CSA);

3.8.1.3(2)(b) National Fire Protection Agency (NFPA);

3.8.1.3(2)(c) American Standards for Testing and Materials (ASTM);

3.8.1.3(2)(d) American National Standards Institute (ANSI);

3.8.1.3(2)(e) American Water Works Association (AWWA);

3.8.1.3(2)(f) Underwriters Laboratories of Canada (YLC);

3.8.1.3(2)(g) Institute of Electrical and Electronic Engineers (IEEE) Inc. Standards; ASHRAE/IES 90.1 “Energy Standards for Buildings Except Low-Rise Residential Buildings”;

3.8.1.3(2)(h) Latest revision of CAN/CSA-Z317.2-01 “Special Requirements for HVAC Systems in Health Care Facilities;

3.8.1.3(2)(i) Latest revision of CAN/CSA-Z317.1 “Special Requirements for Plumbing Installations in Health Care Systems”;

3.8.1.3(2)(j) Latest revision of CAN/CSA-Z305.1 “Non-Flammable Medical Gas Piping Systems”.

3.8.1.3(2)(k) Latest revision of CAN/CSA – Z317.13-031 Infection Control During Construction or Renovation of Health Care Facilities;

3.8.1.3(2)(l) Latest revision of Z316.5 Fume Hoods and Associated Exhaust System; and

3.8.1.3(2)(m) Latest revision of Z77396 Medical Gas Pipeline Systems.

3.8.1.3(2)(n)

3.8.1.3(3) Guidelines:

3.8.1.3(3)(a) American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE) Handbooks;

3.8.1.3(3)(b) American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE) System Design Manual for Hospitals and Clinics;

3.8.1.3(3)(c) Sheet Metal and Air Conditioning Contractors National Association Inc. (SMACNA) Manuals;

3.8.1.3(3)(d) Industrials Ventilation Manual;

3.8.1.3(3)(e) Hydronics Institute Manuals;

3.8.1.3(3)(f) Factory Mutual (FM);

3.8.1.3(3)(g) Associated Air Balance Council (AABC);

3.8.1.3(3)(h) National Environmental Balancing Bureau (NEBB); and

3.8.1.3(3)(i) Institute of Electrical and Electronic Engineers (IEEE) Inc. publications;Leadership in Energy and Environmental Design (LEED) Program.

3.8.1.4 The mechanical, plumbing, fire protection, speciality systems and medical gas systems will minimize impact on the natural and physical environment, through energy efficiency, optimization of resource use, and simplification of the systems.

3.8.1.5 For Class II areas and laboratory rooms as defined by CSA, mechanical and plumbing equipment will be configured and located in such a way that maintenance and repair can be performed without entering these areas.

3.8.1.6 The mechanical, plumbing, fire protection, speciality systems and medical gas systems component selection, system design, and installation will incorporate the flexibility and adaptability for future expansion without major disruption or alteration to the facilities infrastructure.

3.8.1.7 Mechanical, plumbing, fire protection, speciality systems and medical gas systems will be planned for future expansion of the laboratory to occupy the entire second and third floors, while deferring the equipment cost until the expansion takes place. Expansion space will be shown on the developed drawings for the boiler and chiller room for future installation of one hot water boiler, one chiller and associated pumps and equipment. Adequate space will be provided to install a future cooling tower adjacent to the other cooling towers. Chilled water, heating water and condenser water headers, in the energy plant, pipe will be sized to incorporate this future capacity and valved connections will be provided for connection of future equipment. Easy access will be provided for moving the new equipment in and out of the mechanical rooms and energy plant with out disruption and major rework.

3.8.1.8 The mechanical, plumbing, fire protection, speciality systems and medical gas systems will be developed to provide reliability of continual operation. Include standby capacity and redundancy in system design.

3.8.1.9 Provide water, sanitary, storm and gas utilities as required and sized to suit the consumption and discharge needs of the CSB, including allowances for future expansion of the laboratory to occupy the entire second and third floors.

3.8.1.10 Water, glycol and other fluids used within mechanical systems will be treated to prevent corrosion, algae growth, build up of deposits, disease, bacteria and will prolong the equipment life.

3.8.1.11 All mechanical, HVAC, plumbing, fire protection, and speciality systems and medical gas systems will be vibration isolated to minimize noise and vibration through the structure or other components of the CSB.

3.8.1.12 All mechanical, HVAC, plumbing, fire protection, speciality systems and medical gas systems will comply with standard acoustic requirements as per CSA.

3.8.1.13 All pipes, ducts and fittings will be insulated to conserve energy, prevent condensation, attenuate noise and prevent accidental burns.

3.8.1.14 Speciality systems will include acid waste and vent, radioactive waste and vent, reverse osmosis water, laboratory air, laboratory vacuum, anaerobic gas, natural gas as required by the building.

3.8.1.15 All entrances to the CSB will be protected by vestibules and air curtain heaters, or vestibules, air curtains and cabinet unit heaters.

3.8.1.16 It is essential that the Link to the Centennial Building be Pressurized upon a Fire Alarm from either building and integration to the Centennial Building Smoke Venting Control System Operation should be implemented.

3.8.1.17 The following listed manufacturers are acceptable for their ability to meet the general design intent, quality and performance characteristics of the specified product. The list does not endorse the acceptability of all products available from the listed manufacturers/suppliers. It remains the responsibility of the contractor to ensure the products supplied are equal to the specified products in every respect, operate as intended, and meet the performance specifications and physical dimensions of the specified product.

3.8.2 List of Manufacturers:

• Access Doors	Maxam, Acudor, Milcor, Can.Aqua, Mifab
• Air Flow Measuring Air Monitor, Air Stations	Cambridge, Sentinel, Ebtron
• Air Handling Units	Racan, Pace, Haakon, Scott Springfield
• Air Separators, Relief Valves	Armstrong, Bell & Gossett, Taco
• Air Terminals - Grilles Registers, Diffusers	E.H. Price, Titus, Halton
• Air Valves - Mixing, Constant Volume and VAV	E.H. Price, Titus, Trane
• Air Vents	Hoffman, Maid-O-Mist, Taco
• Backdraft Dampers	Airolite, Vent-Aire, Penn, T.A. Morrison
• Backflow Preventers	Febco, Watts, Hersey, Singer, Ames
• Balancing Dampers	Maxam, Ruskin
• Boilers - Condensing	Viessmann, Cleaver Brooks

• Bypass Filter (HW)	Sumco, GESL, Pace Chemicals
• Chillers - Centrifugal	York, Trane, McQuay
• Chimney and Breeching	Metalbestos P/S, Van Packer P/S, Metal Fab PIL
• CO and Combustible Gas Detector	MSA, ACME, Armstrong, Critical Environment Technology
• Coils - Heating and Cooling	Trane, Aerofin, Colmac
• Condensing Units and Fan Coil Units	Trane, Dunham Bush, York
• Condensors - Air Cooled Refrigerant	Trane, Carrier, Engineered Air, Keeprite
• Controls Contractors	Siemens, Delta, Johnson Controls
• Convectors - Electric	Chromalox, Q-Mark
• Convectors - HW	Engineered Air, Trane, Rosemex, McQuay, Dunham Bush
• Cooling Tower Water Filter	Baltimore Air Coil, PEP
• Cooling Towers - Blow Through and Fluid Coolers	Baltimore Air Coil, Evapco, Marley/ Recold
• Cooling Towers - Induced Draft	Baltimore Air Coil, Marley
• Dampers - Control, Backdraft	Ruskin, Tamco
• Dampers - Smoke-Fire Comination	Ruskin, Controlled Air, Prefco
• Domestic Water Heaters - Electric	Jetglas, Aerco, AO Smith, Ruud-Rheem, State
• Domestic Water Heaters - Gas	Jetglas, Aerco, AO Smith, Ruud-Rheem, State
• Domestic Water Heaters - Steam	Aerco
• Drains - Floor, Roof, Cleanouts Trap Primers, Water Hammer Arrestors	Zurn, Ancon, PPP, J.R. Smith
• Drinking Fountains - Refrigerated	Western, Haws, Cordley, Elkay
• Dust Collectors	Murphy
• Expansion Compensators	Flexonics, Tube Turn, Hyspan, Hydroflex, Metraflex, United Flexible, Mason
• Expansion Joints	Flexonics, Hyspan, Hydroflex, Metraflex, United Flexible, Mason
• Eye Wash Fountains	Western, Haws
• Fan Coil Units	Trane, Engineered Air, Williams
• Fans - Axial (Belted-Adjustable Pitch)	Woods, Joy
• Fans - Axial (Belted-Fixed Pitch,	Northern, Chicago, Woods, Joy, CB&F

Direct Drive-Adjustable Pitch)	
• Fans - Axial (Variable Pitch in Motion)	Woods, Joy
• Fans - Bathroom Exhaust	ACME, Broan, Penn Zephyr, Reversomatic, Nutone, Broan
• Fans - Centrifugal	Buffalo, Twin City, Trane, Chicago, Barry Blower, Northern
• Fans - Grease Exhaust	Cook, Greenheck, ACME, Carnes, Garland
• Fans - In-Line Centrifugal	Greenheck, Jenn Air, Ammerman, ILG, Cook, Penn, Twin-City, Carnes
• Fans - In-Line Centrifugal (Tubular)	Chicago, Greenheck, Twin-City, Barry/CML, Northern Blower
• Fans - Kitchen Range Hoods	Nutone, Lau, Broan
• Fans - Propeller	Greenheck, Cook, Penn, Jenn Air, ACME, Powerline, Joy
• Fans - Roof and Wall Mounted	Greenheck, Ammerman, Powerline, ACME, Loren Cook, Penn, Jenn Fan, ILG, Carnes, Twin City
• Filters	Cambridge, AAF, Pacific, FARR
• Fire Dampers	Controlled Air, Ruskin, Canadian Advanced Air, Maxam, Nailor
• Fire Hose Cabinets, Valves and Extinguishers	NFE, Grigor, Wilson & Cousins, Flag
• Flexible Connectors - Ducting	Thermaflex, G.I. Industries Type IHP
• Flexible Connectors - Piping	Flexonics, Tube Turn, Atlantic, Hyspan, Hydroflex, Metraflex, United Flexible, Mason
• Flexible Duct	Thermaflex, Wiremold, GI Industries Type H.P.
• Flow Meter - Orifice Plate	Gerand
• Flow Meter - Pitot Tube	Presco, Annubar
• Flow Meter - Venturi	Gerand, Presco
• Furnaces - Forced Air	Lennox, Carrier
• Gauges - Air	Dwyer, Magnehelic
• Gauges - OWG Pressure	Trerice, Marsh, Ashcroft, Weiss
• Grease Interceptors	Zurn, Ancon, J.R. Smith
• Grooved Mechanical Pipe Joints	Victaulic, Mech Line (only where permitted)
• Heat Exchangers - Plate	Alpha Laval, Tranter, Armstrong, APV
• Heat Exchangers - Shell and Tube	Armstrong, Taco, Leitch, Bell & Gossett

• Heat Pumps	AAF-Enercon, McQuay, Trane, Friedrich
• Hose Bibbs	Jenkins,Dahl, Crane, Toyo, Kitz, Mifab
• Humidifiers - Electric	Armstrong, Vapac, Nortec, Dri-Steam
• Humidifiers - Steam	Armstrong, Sarco, Dri-Steam
• Immersion Heaters	Armstrong, Taco, B&G
• Insulation - Piping and Duct	Fibreglass Canada, Manson, Knauf Fibreglass, Plasti-Fab, Manville
• Kitchen Exhaust Filtration and Recirculation Unit	Garland
• Louvres	Airolite, Penn, Airstream, West Vent, Nailor, Ruskin
• Makeup Air Units - Packaged Indirect or Direct Fired	Engineered Air, I.C.E., Reznor
• Meters Positive Displacement	Neptune, Rockwell
• Pipe Restraints	Trelleborg
• Piping Hangers and Saddles	Grinnell, Myatt
• Plug Cocks	DeZurik, Newman-Milliken
• Plumbing Brass	Crane, American Standard, Cambridge Brass, Waltec, Kohler, Symmons
• Plumbing Fixtures	Crane, American Standard, Kohler
• Plumbing fixtures - Prefab FRP	Aquarius, Acrylic Tubs
• Pump - Condensate Packages	Paco, Leitch
• Pumps - Deaerators and Boiler Feed	York Shipley, Cleaver Brooks, Duro
• Pumps - Fire Booster	Aurora, Peerless, Leitch, Armstrong
• Pumps - In-Line Circulators	Armstrong, B & G, Taco, Grundfos
• Pumps - Manual	Crane
• Pumps - Positive Displacement	Viking, Fairbanks, Morse, Ebara
• Pumps - Submersible Bilge or Sewage	Monarch, Barnes, Hydromatic or Sewage, Myers, Zoeller
• Pumps - Sump	Monarch, Barnes, Hydromatic, Myers, Zoeller
• Pumps - Turbine	Aurora
• Pumps - Vertical In-Line and Base Mounted	Armstrong, B & G, Taco, Leitch, Grundfos
• Radiant Ceiling Panels	Airtex, Frenger
• Radiation - Wall Fin	Engineered Air, Trane, Slant/Fin, Rosemex, Dunham Bush

• Roof Top Heating/Cooling Units	Lennox, Carrier, Trane
• Showers - Institutional	Symmons
• Silencers - Fan and Duct	Vibro Acoustics, Vibron, Korfund, I.A.C, Koopers
• Sinks - Mop	Fiat, Crane, American Standard
• Sinks - Stainless Steel	KIL, American Standard, Elkay
• Steam Fittings - High Pressure	Grinnel
• Steam Pressure Reducing Station	Spirax/Sarco, Fisher
• Steam Relief Valves	Spirax/Sarco
• Steam Traps	Spirax/Sarco, Armstrong, Erwal
• Strainers	Armstrong, Sarco, Mueller, Toyo, Anderson, Metraflex, Yarway
• Tank - Diaphragm Type Expansion	Amtrol, Hamlet and Garneau Inc.
• Tanks - Boiler Feed and Blowdown	York Shipley, Cleaver Brooks
• Tanks - Domestic Hot Water Storage	Clemmer, PVI, Everdur, Westeel-Rosco, Ruud/Rheem, State
• Tanks - Expansion	Bell & Gossett, AS Leitch, Sanford, Westeel-Rosco Steelweld, Clemmer, Wheatley
• Tanks - Fibreglass Fuel Oil Storage	CAE, ZCL Manufacturing, Owens, Corning
• Tanks - Steel Fuel Oil Storage	Clemmer, Westeel-Rosco, Tidy, Regal
• Thermometers	Trerice, Marsh, Ashcroft, Winters
• Unit Heaters - Cabinet	Trane, Engineered Air, Rosemex, McQuay
• Unit Heaters - Electric	Chromalox, Q-Mark
• Unit Heaters - Gas Fired	Lennox, Modine, Reznor
• Unit Heaters - HW	Engineered Air, Trane, Rosemex, McQuay, Dunham Bush
• Valves - Butterfly	Jenkins, Keystone, DeZurik, Centreline, Monotight, Dresser, Lunkenheimer, Crane, Bray, Toyo, Grinnell
• Valves - Circuit Balancing	Armstrong, B & G, Wheatley, Tour & Anderson
• Valves - Drain, Radiator	Jenkins,Dahl, Crane, Toyo, Kitz
• Valves - Eccentric Plug	DeZurik, Homestead
• Valves - Gate, Globe, Swing, Check, Ball	Jenkins, Toyo, Crane, Kitz, Milwaukee
• Valves - Plumbing Flush	Crane, Sloan, Teck

• Valves - Pressure Balanced Mixing	Symmons
• Valves - Pressure Reducing	Armstrong, Bell & Gossett, Taco
• Valves - Relief	Armstrong, Bell & Gossett, Taco, Wheatley
• Valves - Shower	Symmons, Powers
• Valves - Silent Check	Val-matic, APCO, StreamFlo
• Valves - Suction Diffusers Combination Check and Balance	Armstrong, B&G, Taco
• Valves - Thermostatic Mixing	Symmons, Powers, Lawler
• Valves - Water Pressure Reducing	Watts, Clayton, Singer, Zurn. Wilkins, BCA, Cash Acme, Braukman
• Vent Caps	Jenn-Air, Penn Ventilator
• Vent Sets	Greenheck, Trane, Sheldons, Buffalo, New York, Brundage, Loren Cook, Lau
• Vibration Isolation	Mason, Vibro Acoustic
• Wash Fountains	Bradley
• Wash Fountains	Bradley
• Water Closet Seats	Moldex, Beneke, Bemis
• Water Softening	Duro, Petwa, Gladwell, Water Conditioning Canada
• Water Filter	Judo, Amiad

3.9 Electrical Engineering

General standard of design principles:

3.9.1 Provide lighting that is energy efficient and environmentally friendly.

3.9.2 Provide electrical systems which promote energy efficiency and adhere to LEED for New Construction principles.

3.9.3 Integrate communications systems where this integration provides an efficiency advantage, operational advantage, and cost advantage.

3.9.4 Ensure a safe environment for staff, visitors and clients by proper utilization of access control, video monitoring, and lighting.

3.9.5 All systems shall integrate and be compatible with existing KGH Campus systems.

3.10 Structural Engineering

3.10.1 Structural Design Principles

3.10.1.1 The Structural Engineer of Record will be a professional engineer registered in the Province of B.C. experienced in the design of institutional and commercial building of similar size and shall have designated structural engineer 'StructEng' standing with APEGBC.

3.10.1.2 The structural design shall meet the minimum requirements of the 2006 B.C. Building Code (BCBC) and all other applicable codes, material standards, and local by-laws and the loading and performance requirements detailed in this section.

3.10.1.3 Prior to construction, the Engineer of Record will have a qualified independent professional engineer carry out a concept review in accordance with the requirements of APEGBC quality management by-law.

3.10.1.4 The structural engineer of record will perform field review of the construction at sufficient frequency and review shop drawings and reports of inspection and testing agencies to verify that the building structure has been built in substantial conformance with the approved issued for construction drawings and specifications.

3.10.1.5 The use of B.C. wood and wood products shall be considered in the design of the building.

3.10.1.6 A geotechnical consultant will be part of the project team to provide recommendations for the design of foundations, slabs on grade, and superstructure, including seismic design parameters. A supplementary geotechnical investigation may be required.

3.10.2 Structural Systems

3.10.2.1 The preferred structural system for the suspended floors and main roof consists of cast-in-place concrete flat slab construction. Any other proposed system will provide similar performance for flexibility for change, vibration resistance, fire rating, acoustic separation, ceiling space available for services, and overall building height.

3.10.2.2 Reinforced cast-in–place concrete construction will be used for the lower storey of the structure.

3.10.2.3 Concrete slab on grade construction will be used for the parkade area surfaces below the building. Reinforce slabs on grade with 10M at 350 centres each way as a minimum.

3.10.2.4 Building lateral seismic and wind loads will be resisted by reinforced concrete shear walls or structural steel bracing located at stair and elevator cores and at exterior walls. Shear walls and bracing should be avoided within interior spaces, with the exception of the penthouse, in order to leave flexibility for future changes.

3.10.2.5 Post tensioned or precast concrete structural systems shall not be used.

3.10.2.6 Mechanical room floors will be concrete slab or concrete topping on steel deck construction. Concrete topping on steel deck will be a minimum 130 mm thick reinforced with a minimum 15m at 300mm centres each way.

3.10.2.7 Roofs may be concrete slab, structural steel or heavy timber construction. Structural steel open web joists shall not be used for the design of roofs or floors.

3.10.2.8 The elevated link to the existing KGH ACC building will clerespan Pandosy Street. The east end of the link will be supported by the CSB. The west end of the link will be supported with a new pier constructed adjacent to the existing ACC building. Location, foundations and details will be coordinated with IHA to suit the ACC building. There will be a seismic expansion joint where the link abuts the ACC building. A walkthrough steel truss with architectural quality appearance is an acceptable link structure.

3.10.2.9 If the building foundation design uses a raft slab, the raft slab will be recessed a minimum 450mm below the floor slab to allow space for current and future underslab service runs above the raft slab.

3.10.3 Design loads

3.10.3.1 Performance criteria:

3.10.3.1(1) unless required by the specific use and occupancy, and equipment loads, the following minimum floor design live loads will apply:

3.10.3.1(1)(a) basement and main (ground) floor: 4.8 kPa (100 psf);

3.10.3.1(1)(b) upper floors: 4.8 kPa (100 psf); and

3.10.3.1(1)(c) mechanical/electrical service rooms and penthouse: 6.0 kPa (125 psf);

3.10.3.1(2) upper floors will be designed to accommodate concentrated loads from equipment, fixtures, and machinery, whether floor, wall, or ceiling-mounted;

3.10.3.1(3) floors will be designed for a minimum superimposed dead load allowance of 1.5 kPa to allow for partitions, ceilings and suspended mechanical equipment;

3.10.3.1(4) roofs will be designed for a minimum net uplift wind load of 1.5 kPa and for the minimum snow and rain loads required by the BC Building Code and the local building by-laws. Notwithstanding other requirements, the minimum live load for design of roofs will be 2.4 kPa (50 psf) and roofs will be designed to accommodate concentrated loads from equipment, machinery and features, whether roof or ceiling-mounted;

3.10.3.1(5) roofs will be designed for the superimposed dead load of roofing materials, green roofs, ceilings, mechanical equipment, but not be less than 1.5 kPa (30 psf) to allow for future re-roofing alternatives;

3.10.3.1(6) floors and roofs above mechanical and electrical service rooms and penthouses will be designed for a

superimposed suspended equipment dead load of 2.0 kPa (40 psf) in addition to the minimum dead load allowances specified above; and

3.10.3.1(7) floors for rooms designated for records storage or compact mobile shelving will be designed for a minimum 12.0 kPa (250 psf) live load;

3.10.3.1(8) floors of storage rooms 167C, 167E, 172, 217a and 217b will be designed for a minimum live load of 12.0 kPa (250 psf).

3.10.4 Post – disaster

3.10.4.1 The Building's structures, structural components, and non-structural components and equipment restraint will be designed as post-disaster in accordance with the BC Building Code.

3.10.5 Flexibility for future change

3.10.5.1 The CSB will be designed to readily accommodate renovations for changes in tenancy use and occupancy and changing technology, equipment, medical and laboratory techniques, and building services.

3.10.5.2 Performance criteria:

3.10.5.2(1) concrete floor structures shall be able to accommodate one 130mm diameter cored hole per structural bay at almost any location in the floor plate and the design for the concrete floors should assume at least one reinforcing bar in each direction at each core location is cut. The floor structure will be designed with a minimum of one 150mm diameter knock-out opening on two sides of each column for future use and the knock-out openings will be in addition to any openings required for current services. The design shall also allow for six 150mm diameter future cores to be cut in any structural bay, clear of beams, bands, and drop panels, provided they are positioned to clear slab reinforcement;

3.10.5.2(2) the selection of a structural system that will readily accommodate future changes for similar design load parameters without the addition of structural

members, welding, noise, dust, or demolition should be a primary structural design criteria; and

3.10.5.2(3) electrical and communication conduits will not be embedded into concrete slabs and toppings.

3.10.6 Deflection limitations

3.10.6.1 The structure will be designed to minimize the effects of deflection and long-term creep.

3.10.6.2 The design of the structure is to meet the deflection limits of the BC Building Code, and applicable CSA standards as a minimum and as required for the non-structural components of the Building. Notwithstanding the above, the deflection limit will not exceed the levels specified in this section.

3.10.6.3 Performance criteria:

3.10.6.3(1) for concrete floor or roof construction, the maximum deflection occurring after the installation of non-structural elements due to all sustained loads, including long-term creep deflection, plus immediate deflection due to additional live load, will not exceed span/480;

3.10.6.3(2) for timber roof construction, the maximum live load deflection will not exceed span/480 with the total load deflection not exceeding span/360;

3.10.6.3(3) for steel roof construction, the maximum live load deflection will not exceed span/480 and the total load deflection will not exceed span/360;

3.10.6.3(4) for roofs over penthouses, the maximum allowable deflection limits will be L/360 for Live Load and L/240 for Total Load;

3.10.6.3(5) for steel floor construction, the maximum live load deflection will not exceed span/480 and the total load deflection will not exceed span/360. The total load deflection will include effects of shrinkage of concrete topping slabs; and

3.10.6.3(6) the floor and roof perimeter edge will be designed to limit short and long term deflection occurring after the

installation of exterior wall components, including effects of creep, to a maximum of 15mm.

3.10.7 Vibration limitations

3.10.7.1 The Proponent acknowledges that there are numerous pieces of Equipment used in the project which may be sensitive to even low levels of vibration including microscopes and spectrometers.

3.10.7.2 An acoustic and vibration consultant will be retained by the Preferred Proponent. The consultant will be a professional engineer licensed to practice in the Province of British Columbia with demonstrated experience in providing recommendations and analysis for acoustic and vibration performance for buildings similar in function, size and complexity to the project..

3.10.7.3 Ensure that the design of the structural, mechanical and electrical systems of the project complies with the more stringent requirements of Table 3.10.7 Serviceability Criteria for Deflections and Vibrations. The requirements of equipment manufacturers and the principles detailed in this Section to result in control of the vibration of structure of the facility and such that performance of the Equipment is not adversely affected.

3.10.7.4 Undertake space planning to maximize the separation between vibration sensitive Equipment and sources of vibration, particularly mechanical or electrical rooms.

3.10.7.5 Table 3.10.7 lists the requirements for various typical areas of the Building and the maximum vibration velocity allowed – note that the corresponding floor stiffness applies only to footfalls within the floor space in consideration.

3.10.7.6 Demonstrate using numerical analysis carried out by the structural engineer and vibration consultant that the vibration responses of the proposed building structure at the location of the space or Equipment in question will not exceed the values specified in Table 3.10.7.

3.10.7.7 Select the damping ratio, based on generally accepted practice, to reflect appropriately the structural system, the influence of non-structural elements and the effect of building occupants.

3.10.7.8 Undertake field testing of the vibration response of the structure at the location of critical Equipment or spaces to demonstrate that the as-constructed condition will satisfy the required maximum vibration response noted in table 3.10.7.

Table 3.10.7: Acceptable Vibration Levels for Various Typical Facility Spaces

Occupancy or Equipment Requirements	Vibrational Velocity (1)		Floor Stiffness KF_n (2)
	µin/s	µm/s	kips/in-sec
Mechanical rooms on an unoccupied floor above of below an occupied floor	4000	1000	Not Applicable
Office areas, waiting rooms and cooridors	1600	400	250-1500
Mechanical Rooms on the same floor as an occupied area	1200	300	Not Applicable
Computer areas; patient areas (daytime) - threshold of human perception	8000	200	500-3000
Laboratories and critical work areas; bench microscopes up to 100 x magnification	4000	100	1000-6000
Bench microscopes up to 400 x magnification; optical and other precision	2000	50	2000-12000

3.10.7.9 Where space utilization dictates otherwise, place such vibration sensitive Equipment on a massive, stiff structure such as a thick reinforced concrete slab.

3.10.7.10 Avoid locating vibration sensitive Equipment or spaces on spans greater than 9m unless significant structures can be accommodated.

3.10.7.11 Avoid placing vibration sensitive Equipment on light-weight, or long-span floor structures.

3.10.7.12 Whenever possible, isolate the major sources of vibration at the source as opposed to isolation of the vibration sensitive Equipment itself. Machinery that could be a source of vibration will be mounted using vibration isolation techniques.

3.10.7.13 Be aware that additional mass may be required to provide an inertial base for adequate isolation of building services or Equipment and the structure must account for this additional dead load.

3.10.8 Durability

3.10.8.1 The building structure and structural components will be designed for a minimum 100-year life span.

3.10.8.2 Design of the Building structure will be in accordance with the BC Building Code and the applicable material and CSA standards including CSA S478 Guideline on Durability of Buildings.

3.10.8.3 Design of the building structure and structural components will minimize effects of corrosion and deterioration due to environment and use in accordance with the following:

3.10.8.3(1)(a) adequate concrete crack control joints and expansion/contraction joints. Caulk exposed joints;

3.10.8.3(1)(b) high strength concrete mixes proportioned to CSA durability requirements for exposure class;

3.10.8.3(1)(c) reinforce concrete for crack control and repair exposed cracks;

3.10.8.3(1)(d) chamfer corners of exposed concrete where possible;

3.10.8.3(1)(e) hot-dip galvanize exterior exposed steel;.

3.10.8.3(1)(f) reinforcement and required curing for concrete toppings;

3.10.8.3(1)(g) corrosion protection measures for concrete exposed to moisture in the parking area in accordance with CSA S413, including application of sealers to vertical concrete surfaces in splash zones and slopes for drainage; and

3.10.8.3(1)(h) Wood structural elements will not be directly exposed to the weather. Provide protective cap flashings and drips, sealers, raised concrete pedestals at grade supports, and roof overhangs. Protection shall account for wind driven rain exposure. Exposure to direct sunlight should also be avoided.

3.10.9 Equipment supports

3.10.9.1 Design will provide for support/anchorage of equipment. Equipment will be supported, anchored, and braced to resist gravity, operational, and seismic loads in a manner required for the functional and service requirements for the specific equipment.

3.10.9.2 The Design for medical and laboratory equipment supports, anchorage, and bracing will be carried out by a qualified professional engineer registered in the Province of British Columbia. Installations will be field reviewed by the design engineer.

3.10.9.3 Performance criteria:

3.10.9.3(1) floor and roof assemblies will be designed to support the gravity and seismic loads for floor, wall, or ceiling-mounted equipment;

3.10.9.3(2) the structure will be designed for the vibration limitations specified by the manufacturer of the specified equipment. Carry out in-situ vibration

testing when specified by the equipment manufacturer;

3.10.9.3(3) drilled insert-type anchors for equipment supports and anchorage will be rated by the insert manufacturer for seismic and cyclic loading applications and drop-in sleeve anchors will not be used; and

3.10.9.3(4) mechanical equipment mounted onto timber roofs will incorporate a concrete housekeeping pad appropriately anchored to the roof structure.

PART 4. SITE DEVELOPMENT REQUIREMENTS

4.1 Exterior Spaces

4.1.1 Provide exterior public spaces including areas that:

4.1.1.1 Welcome and engage visitors, clients, and staff;

4.1.1.2 Minimize exposure to sun, wind, rain and polluted air produced by roadways and parking areas;

4.1.1.3 Have visual appeal throughout the year;

4.1.1.4 Are low maintenance;

4.1.1.5 Provide physical separation between site and residential neighbours;

4.1.1.6 Provide visual privacy for residential neighbours both in their houses and their outdoor spaces;

4.1.1.7 Ensure minimal intrusion of CSB activities on neighbours, especially along the east laneway facing residential development. Particular attention should be given to the routes of late night and early morning staff around the site.

4.1.1.8 Are safe, with visible areas with adequate lighting and seating for visitors waiting for transportation;

4.1.1.9 Locate trees or shrubbery, lighting and other elements to support way-finding with particular emphasis on building entrances; and

4.1.1.10 Incorporate principles of Crime Prevention through Environmental Design (CPTED).

4.1.2 Staff Facilities

Provide CSB staff with sheltered outdoor spaces that:

4.1.2.1 Provide shelter from sun, rain and wind;

4.1.2.2 Offer views of trees and plants that reflect seasonal change; and

4.1.2.3 Are located to minimize noise which could disturb neighbours.

4.2 Circulation and Adjacencies (Pedestrian and Vehicular)

4.2.1 General

Circulation will co-ordinate the movements of vehicles, bicycles, pedestrian and wheelchairs. The design will emphasize safety, while providing opportunities for interaction and social contact.

4.2.2 Pedestrian Walkways

4.2.2.1 Integrate pedestrian circulation throughout the Site that minimizes conflict with vehicles and bicycle zones between the following areas:

4.2.2.1(1) the surrounding roads and major entrances;

4.2.2.1(2) the KGH campus; and

4.2.2.1(3) the CSB;

4.2.2.2 Design pathways to provide universal access to all entrances and exits;

4.2.2.3 Pathways and sidewalks will be configured to provide maximum amount of natural visual surveillance; and

4.2.2.4 Client access to Outpatient Collection and the passenger elevator shall be level, i.e., not ramped.

4.2.3 Vehicular access & parking

4.2.3.1 Integrate vehicular circulation with layout of pedestrian and bicycle zones to provide visible connections, to promote safe travel, and to minimize conflict between vehicles and other modes of travel. The driveway will provide a connection between Royal Avenue and the CSB parking area;

4.2.3.2 Provide a minimum of 48 vehicle parking stalls and 7 motorcycle stalls;

4.2.3.3 Design for maximum access to the CSB and provide drop-off areas; and

4.2.3.4 Provide courier delivery vehicle loading area adjacent to the service elevator. This area can also act as the access area for emergency vehicles. The courier loading area shall allow delivery vehicles to pass through without backing-up.

4.2.4 Bicycle access & storage

4.2.4.1 Provide well-lit secure bicycle locking/parking facilities under cover for a minimum of twenty-eight (28) bicycles;

4.2.4.2 Bicycle locking/parking facilities must conform with City of Kelowna requirements;

4.2.4.3 Provide safe, well-lit routes for cyclists and offer clear sight-lines between vehicles and cyclists in parking facilities; and

4.2.4.4 Provide surveillance cameras and card readers to protect and monitor this area.

4.2.5 Signage

4.2.5.1 Signage will be designed and located to satisfy the Authorities requirements for Site identification and tie in to Centennial Building signage. There will be two (2) large signs identifying the CSB located at the main entrances. Signage will be designed and constructed to withstand typical weather conditions experienced in Kelowna. Signage will be provided with lighting after dark so that major signs are legible at all times. Ensure that views to important signs, site and building entrance are not obstructed by trees or shrubs. Wayfinding design must assist staff, visitors and clients to:

4.2.5.1(1) Know the building name;

4.2.5.1(2) Know where to park;

4.2.5.1(3) Know how to find the correct entrance;

4.2.5.1(4) Know how to find the correct destination; and

4.2.5.1(5) Know where adjacent streets are relative to each exit.

4.3 Site Infrastructure

4.3.1 All municipal services shall conform to the City of Kelowna Subdivision and Development Servicing Bylaw and service the land use with reliable infrastructure.

Work of this section will be carried out in accordance with the Master Municipal Construction Document (MMCD) Latest Edition.

4.3.2 On-Site Services Infrastructure

4.3.2.1 All on-site servicing shall meet the quality requirements for the corresponding municipal off-site services. On-site services shall be designed and constructed to meet proposed development requirements.

4.3.3 Off-Site Services Infrastructure

4.3.3.1 All off-site servicing shall meet the quality requirements as per the City of Kelowna February 22, 2010 Memorandum (posted in the Data Room). Road and utility construction design, construction supervision, and quality control supervision of all off-site and site services including on-site ground recharge drainage collection and disposal systems, must be performed by an approved consulting civil engineer. Off Site designs must be submitted by the Design-Builder to the City Engineering Department for review and marked “issued for construction” by the City Engineer before any off-site construction may begin.

4.3.3.2 Royal Avenue: The Design Builder will be require to complete the urbanisation of Royal Avenue, and will require the upgrade of the existing catch basins, as well as the driveway letdown removal and construction of a concrete sidewalk with boulevard landscaping complete with underground irrigation.

4.3.3.3 Public Lane: It will be necessary to widen and reconstruct the lane to the City of Kelowna commercial paved standard for the full frontage of the CSB. The Design-Builder will be responsible to determine if any upgrades removals, re-location or adjustment of existing utility appurtenances are require to accommodate the CSB.

4.3.3.4 The Design-Builder will be required to extend the watermain within Royal Avenue, from Speers Street, to the main within Pandosy Street. The CSB will be required to be serviced from this new main within Royal Avenue.

4.3.4 Sanitary Sewers

4.3.4.1 The Design-Builder’s mechanical engineer will determine the development requirements of this proposed development and establish the service needs;

4.3.4.2 The preferred service location of the new larger service will be from the main within the rear lane; and

4.3.4.3 The sanitary sewers shall be of a diameter, grade and depth to safely convey all effluent from the site. The sanitary sewer system includes the pipes, manholes, and all other required appurtenances to comply with applicable municipal and provincial standards.

4.3.5 Storm Sewers and Drainage

4.3.5.1 The storm sewers and drainage network shall be of a size, grade and depth to safely convey all storm water;

4.3.5.2 Site storm water storage and attenuation shall be provided as required to insure no net increase in downstream flows for the 10 year return period;

4.3.5.3 The Design-Builder must engage a consulting civil engineer to provide a storm water management plan for the site, which meets the requirements of the City Storm Water Management Policy and Design Manual. The storm water management plan must also include provision of lot grading plan, minimum basement elevation (MBE), if applicable, and provision of a storm drainage service for the development and /or recommendations for onsite drainage containment and disposal systems; and

4.3.5.4 There are piped storm drainage facilities within Pandosy Street, Royal Avenue and the rear lane. The on-site drainage system may be connected to the main within Royal Avenue or the rear lane with an overflow service.

4.3.6 Watermain and Appurtenances

4.3.6.1 The watermain system (watermain and appurtenances) shall be capable of providing domestic and fire fighting capacity for the CSB;

4.3.6.2 The watermain system shall provide redundancy;

4.3.6.3 The watermain system shall include backflow preventers, as per City of Kelowna Bylaw requirements, to protect the municipal system and on site facilities from contaminants;

4.3.6.4 The watermain system shall include a flow meter as per the City of Kelowna Bylaw requirements; and

4.3.6.5 The Design-Builder's mechanical engineer will determine the domestic and fire protection requirements of this proposed development and establish hydrant requirements and service needs.

4.3.7 Electrical, Telecommunications, Gas Services

4.3.7.1 Electrical, telecommunications, and gas services to support the CSB shall be provided; and

4.3.7.2 The electrical and telecommunication services to this building must be installed as illustrated in revised Drawing E403 dated October 4, 2010. It is the Design-Builder's responsibility to make a servicing application with the respective electric power, telephone and cable transmission companies to arrange for these services, which would be at the Design-Builder's cost.

PART 5. ARCHITECTURAL

5.1 Location and Siting

5.1.1 Site the CSB as illustrated by the Indicative Design. Design will satisfy all City of Kelowna zoning requirements, section 5.1.2 notwithstanding. Where required, and in consultation with the Authority, the building footprint may be modified in order to mitigate any conflicts with the Electrical Easement.

5.1.2 The Site plan shows that the current property line includes provision for a bus lay-by along Pandosy Street. The Authority is in negotiations with the City of Kelowna to either remove the lay-by from the property or to permit a variance to existing zoning set back requirements. Design-Builders should proceed with their design on the basis that one of these interventions will be applicable. Any other variations from requirements made by applicable Authorities Having Jurisdiction will be the responsibility of the Design-Builder.

5.2 Building Configuration and Global Circulation

5.2.1 Provide a level floor interior connection between the CSB and the Centennial Building at Level 3.

5.2.2 Separate back of house / service circulation from public circulation, including elevators.

5.3 Quality of Space/Interior Design

5.3.1 Incorporate the principles of evidence-based design.

5.3.2 Maximize opportunities for access to natural light and views.

5.3.3 Employ materials and detail surfaces to absorb and minimize sound transmission throughout clinical and staff work areas.

5.3.4 Conceal and make discreet from view of visitors and clients the clinical infrastructure wherever possible in clinical areas.

5.3.5 Maximize opportunities for staff empowerment through control of lighting, sound, décor (personalization) and daylight as defined in section 8.6.13.

5.3.6 Create visual interest within public areas by varying colours, textures, lighting and by employing wood finishes wherever reasonable.

5.3.7 Avoid 'blank' hallways with solid-coloured end walls wherever possible: provide views and/or direct or borrowed natural light at ends of hallways.

5.3.8 Design building access and interior circulation systems which support the confidentiality of client information and the security needs of staff at all hours of the day.

5.3.9 Design workplaces so that they are flexible and adaptable to change in program or personnel and promote staff and client safety.

5.3.10 Design of workspaces will be ergonomic and conducive to workflow and processes.

5.3.11 Include and indentify suitable spaces in public areas of the CSB for the display of two- and three-dimensional art complete with wall backing for mounting and donor recognition systems complete with required lighting, power, and data connectivity.

5.3.12 Design the clinical areas of the CSB to be elder-friendly.

5.3.13 Design the CSB with respect for the economy and culture of the Province by using wood panelling, exposed wood structure and wood feature strips where consistent with the overall project objectives.

5.4 Wayfinding and Signage

5.4.1 Overriding Principles

5.4.1.1 Provide simple circulation systems and functions so that way finding is inherently easy;

5.4.1.2 Locate major destinations, such as department entrances, along primary circulation paths for easy access. Make waiting areas as open as possible to build confidence in way finding. Design waiting areas to be distinct from circulation;

5.4.1.3 Design public elevator and stair lobbies and public circulation routes to be distinct from service and from other non-public routes;

5.4.1.4 Provide all signage required for building operations;

5.4.1.5 Design signage such that the materials, colours, letter fonts, sizes and other aesthetic and functional considerations, such as Braille, conform to a conceptually coherent overall way finding design system;

5.4.1.6 Provide signage that is resistant to graffiti and physical damage;

5.4.1.7 Provide signage that is easy to replace when necessary;

5.4.1.8 Use international symbols where required;

5.4.1.9 Orient all building plan directories to reflect the direction from which they are viewed;

5.4.1.10 Provide signage that directs visitors to departments and rooms within;

5.4.1.11 Provide signage that is clearly visible day or night; and

5.4.1.12 Avoid multi-layered naming hierarchies and complex numbering systems.

5.4.2 Design Requirements

5.4.2.1 Design the internal directional signs to include:

5.4.2.1(1) a main directory, installed at the main public entrances to the CSB, that indicates the CSB in relation to the overall KGH Campus Site and the location of every area and department within the CSB that are accessible to the public;

5.4.2.1(2) a continuous ‘trail’ of signage from the entrances to each of the reception/information points listed on the directories;

5.4.2.1(3) installation of signage at each point at which a directional decision is required;

5.4.2.1(4) consistent terminology;

5.4.2.1(5) door signage to indicate restrictions on entry and warn of hazards;

5.4.2.1(6) door signage will not be obscured by emergency systems or other functional elements of the building;

5.4.2.1(7) door signage that will identify every space (e.g. rooms, alcoves, corridors and stairwells) in the CSB;

5.4.2.1(8) door signage that will be located in a consistent location for every room in the CSB;

5.4.2.1(9) door signage that is consistent with the following room numbering protocol:

5.4.2.1(9)(a) each room has a unique identifier number;

5.4.2.1(9)(b) rooms are numbered in a manner that reflects normal movement through the facilities;

5.4.2.1(9)(c) labelling anticipates a person attempting to follow numbering along corridors in sequence;

5.4.2.1(9)(d) blocks of numbers are periodically skipped to allow for future expansion of the numbering system if rooms are added through renovations;

5.4.2.1(9)(e) the Design-Builder will review with, and obtain approval from, the Authority for the door/room/parking stall numbering system;

5.4.2.1(10) corridors require unique numbers which are two digits;

5.4.2.1(11) stair wells utilize a single digit; and

5.4.2.1(12) each room requires a number for service reasons and since many rooms will not have formal wall numbering panels, each door frame will be equipped with a lamacoid number plate approximately 25 mm high by 50 mm long, attached to the head of the door frame on the hinge side; and as this numbering system is used for deliveries, repairs, fire alarm notifications, etc., it is important that room numbers be determined early in design and maintained following occupancy. Follow the same numbering system on design and construction documentation for all disciplines (architectural, mechanical, electrical, etc.).

5.4.2.2 External directional signage will:

5.4.2.2(1) clearly indicate access for the public;

5.4.2.2(2) clearly indicate restrictions to 'after-hours' access and closest accessible entrance; and

5.4.2.2(3) be well illuminated, backlit, reflective or high contrast and easily visible at night; and

5.4.2.2(4) ensure that illuminated external CSB signage:

5.4.2.2(4)(a) clearly identifies the CSB;

5.4.2.2(4)(b) minimizes light spillage; and

5.4.2.2(4)(c) indicates the accesses, parking and restrictions for various vehicle types, as required.

5.5 Building Envelope

5.5.1 Complete all Design and Construction so as to prevent the accumulation and stagnation of rain, snow, ice and dirt on the horizontal and vertical surfaces of the envelope for the climate the building is situated in.

5.5.2 Design exterior walls in accordance with rain-screen principles. Include a continuous air space of minimum 25 mm clear width located within the exterior wall assembly.

5.5.3 Ensure that materials and systems employed in wall and roof assemblies contribute to reducing heat gain and loss with minimal decline in performance over their expected 50 year lifespan.

5.5.4 Ensure continuation of the air barrier, vapour barrier, thermal barrier and rain barrier across the entire envelope including foundations, walls and roofs.

5.5.5 Design Building Envelope details to avoid thermal bridging.

5.5.6 Utilize a building envelope consultant through design and construction.

5.6 Exterior Building Component - Form and Character

5.6.1 The Clinical Support Building (CSB) is located in an urban district undergoing substantial change. The rapidly growing Kelowna General Hospital (KGH) campus – of which the CSB is a part – is surrounded by low-density residential uses, resulting in awkward and sometimes conflicting adjacencies. Vehicle volume in the neighbourhood has increased both as a result of hospital demand and commuter through-traffic, further impacting local residents. The design of the CSB must be conscious of this challenging context and capture the diverse demands placed on the building's character.

5.6.2 **Pandosy Street.** People who approach the site from the north or south (along Pandosy Street) should feel a sense of arrival at the hospital block. In addition to the pedestrian link reaching across the road, other elements on the building façade and in the public realm should unite the CSB with the hospital block to the west, creating a sense of gateway and contributing to a district identity for the KGH campus. While a sense of connection between the buildings is desirable, there is no requirement to 'match' the material palette of the new ambulatory care centre (ACC). Pedestrians will be crossing Pandosy regularly at the north and south ends of the block (Rose and Royal Avenues). Many of these people will be patients sent to the main floor CSB phlebotomy clinic to give specimens for analysis. A legible and visually permeable public entrance to the clinic should offer an intuitive destination that is supported by, rather than reliant on, clear signage. The Pandosy edge of the parkade area in the CSB should create spaces that are safe and comfortable for pedestrians. Severe and utilitarian responses to this edge should be avoided.

5.6.3 **Royal Avenue.** The primary challenge on the Royal Avenue edge of the CSB is the organization of traffic flows into and out of the parkade and laneway. This corner of the building should clearly indicate the location of the vehicle entrance, minimizing the amount of traffic searching for access from adjacent residential streets. The design of the building exterior on this edge must also deal with the constraint of three above-ground electrical boxes located near the intersection. Gestures that help reduce the visual impact of this infrastructure are encouraged, particularly considering the desire for a 'front-of-house' reading for drivers.

5.6.4 **The Laneway.** The laneway located behind the CSB must achieve several key functions. Driving around the side of the building from Royal, the division between local alley traffic and CSB parking should be clear. Looking down the laneway, one should not feel as though the CSB has turned its back on the neighbourhood. Instead, one should encounter a functional and pleasant space that provides privacy and peace for the residents backing onto the lane. This is particularly important for the small group of houses that front westward onto the laneway. Cladding along this edge should de-emphasize the institutional qualities of the building, instead drawing from a more residential composition and materials. Exterior elements here should break down the building mass and where possible shield neighbours from light and sound spilling from the building and its mechanical equipment. As the lab functions on both the second and third floors will operate at reduced capacity throughout the night, it is particularly important that there is no disruption to adjoining houses. Use of vegetation to achieve these goals is highly encouraged.

5.7 Interior Building Components

Design and build the CSB's interior building components in accordance with the following:

5.7.1 Interior Walls and Partitions

5.7.1.1 The interior walls and partition systems will:

5.7.1.1(1) provide acoustic separations as required for the specific functions to be carried out in the spaces affected. Refer to Appendix 1D; and

5.7.1.1(2) provide all separations required for fire safety and protection.

5.7.1.2 Seismic resistance capabilities will conform to the requirements of CSA S832-06 Guidelines for Seismic Risk Reduction of Operational and Functional Components of Buildings.

5.7.1.3 Design and select interior walls and partitions, partition systems and interior finishes to comply and optimize the following criteria as may be relevant for the particular or specific functions enclosed:

5.7.1.3(1) easily cleanable and maintained systems and finishes which contribute to infection control;

5.7.1.3(2) permanence and durability including impact resistance;

5.7.1.3(3) flexibility and adaptability of services;

5.7.1.3(4) low VOC emissions so as to minimize adverse impact on indoor air quality and indoor environmental quality; and

5.7.1.3(5) aesthetic and design qualities to provide a positive environment for staff and visitors.

5.7.2 Ceilings

5.7.2.1 The ceiling system will be part of the definition of interior spaces and may be accessible or inaccessible in total or in part.

5.7.2.2 Accessible ceiling systems may provide access to the ceiling spaces throughout the system or at specific and particular locations.

5.7.2.3 Ceiling systems will comprise a major component of the acoustic or sound attenuation function as required in the spaces in which they are installed and will conform to the Sound Transmission ratings specified in Appendix 1D. As an alternative, where full height walls are provided, ceiling systems will not be required to conform to the Sound Transmission ratings specified in Appendix 1D. Design-Builder acknowledges that; any mechanical equipment, located adjacent to rooms listed in Appendix 1D, will be positioned in order to minimize noise transmission into the room.

Where it is not possible to re-position equipment, acoustic insulation will be provided in the ceiling system.

5.7.2.4 Ceiling systems can form a component of fire resistance rated separations for areas requiring such separation.

5.7.2.5 Ceiling height will not be less than 2.7 metres above the finished floor in all areas except for the following:

5.7.2.5(1) ceiling heights in corridors, storage rooms and toilet rooms will be not less than 2.4 metres except that ceiling heights in small, normally unoccupied spaces such as storage closets may be reduced to a minimum of 2.1 metres; and

5.7.2.5(2) ceiling heights in laboratory areas and other rooms requiring ceiling-installed equipment will be no less than 3.0 metres.

5.7.2.5(3) Infrastructure above ceiling heights less than 3.0 metres shall be installed so that the ceiling may be raised to 3.0 metres in the future.

5.7.2.6 Design and select ceiling systems and ceiling finishes to comply with and optimize the following criteria as may be relevant to the particular or specific functions of the space:

5.7.2.6(1) easily cleanable and maintained systems and finishes which contribute to infection control;

5.7.2.6(2) flexibility and access to the spaces above;

5.7.2.6(3) compatibility with mechanical, plumbing, electrical, communications services and fixtures;

5.7.2.6(4) low VOC emissions so as to minimize adverse impact on indoor air quality and indoor environmental quality; and

5.7.2.6(5) Aesthetic and design qualities to provide a positive environment for staff and visitors.

5.7.3 Floor Finishes

5.7.3.1 The floor and floor systems will be a component of the definition of interior space and will be finished to be complementary and integral to the functional and aesthetic requirements of the interior space.

5.7.3.2 Floor finishes will be selected to suit types and concentration of pedestrian and/or vehicular/wheel traffic to be anticipated.

5.7.3.3 Flooring designs and patterns may comprise a component of the "way-finding" system of the CSB. Refer to Part 5.4.

5.7.3.4 The following criteria will govern and be integral to the selection of floor finishes:

5.7.3.4(1) easily cleanable and maintained finishes which contribute to infection control;

5.7.3.4(2) the frequency and quality of joints and ease of replacement if and when required;

5.7.3.4(3) imperviousness to concentrations of moisture anticipated to be existing on the floors and duration of that moisture;

5.7.3.4(4) permanence and durability and resistance to concentrated service traffic both pedestrian and vehicular;

5.7.3.4(5) aesthetic and design qualities to provide a positive environment for staff and visitors;

low VOC emissions so as to minimize adverse impact on indoor air quality and indoor environmental quality; and

5.7.3.4(6) patterns and textures compatible with the requirements for pedestrian safety and elder friendly design. Refer to Part 3.2 and Part 3.5. Non-skid flooring will be used in wet areas, wash and change rooms.

5.7.4 Infection Control

5.7.4.1 Design the CSB to mitigate and prevent where possible, the spread of infection including via contaminated surfaces and airborne pathogens.

5.7.4.2 Select materials and use simple detailing leading to quality workmanship and ease of accessibility for routine cleaning and maintenance.

5.7.4.3 Design the CSB to consider ease of infection control in future alterations, modifications and additions.

PART 6. FACILITIES CONSTRUCTION SUBGROUP SPECIFICATIONS

6.1 Procurement and Contracting Requirements (Division 1) – NOT USED

6.2 Existing Conditions (Division 02)

6.2.1 Basic requirements

6.2.1.1 Refer to 3.1.2 for available survey information.

6.2.1.2 Further Site specific geotechnical investigations including subsurface drilling and sampling, material testing, exploratory excavations, and pre-construction monitoring may be performed prior to construction at the Design-Builder's expense.

6.3 Concrete (Division 03)

6.3.1 Basic Requirements

6.3.1.1 See Section 2.1.3 Technical References. The list of technical references is not intended to be a complete list of applicable standards. Design and construction will comply with applicable standards and practices whether listed in this section or not.

6.3.1.2 There is no mention of concrete sealers or of curing methods. Concrete left exposed, with no finish materials, should be sealed, especially at parking areas. Two primary options include:

6.3.1.2(1) Curing: Wet cure concrete for 3 days. Prevent drying for additional 4 days. Protect for 28 days total or longer if required until compressive strength tests show compliance with structural design requirements.

6.3.1.2(2) Silicate-based sealers: At roof deck, parking deck, and areas of exposed concrete, provide sodium or potassium silicate products that react chemically with the calcium in the concrete to densify, seal, and dustproof the concrete at the end of the 3 day wet cure period. This is a permanent reaction. Some silicate manufacturers claim that their products may be used for curing as well as sealing. Though this is not in compliance with any recognized standards, this method will be considered acceptable pending review of manufacturers written certification that product has been successfully tested for concrete curing. Method may be used at the end of the 3 day wet cure period as specified above. Manufacturer shall certify compatibility with finishes, roofing

system, or other products to be applied over the concrete substrate. Installer shall certify compliance with manufacturer's printed installation instructions for use as curing agent or as concrete sealer, as applicable.

6.3.2 Overriding Principles

6.3.2.1 Design and construct cast in place or precast concrete of required properties for the intended use in accordance with the requirements of all applicable codes and specifications.

6.3.3 Quality Requirements

6.3.3.1 Inspection and testing of cast in place concrete and concrete materials will be carried out by a testing laboratory in accordance with CAN/CSA A23.1-04. Non-destructive Methods for Testing Concrete will comply with CAN/CSA A23.2-04.

6.3.3.2 Inspection and testing of precast concrete materials and workmanship will be carried out by the precast concrete contractor as part of its quality control program in accordance with CAN/CSA-A23.2-04. Maintain plant records and a quality control program as required by CSA A251.

6.3.3.3 Performance Criteria:

6.3.3.3(1) concrete floors will be finished with a smooth, dense, steel trowel finish with a Class A Flatness Classification in accordance with CSA A23.1. Overlay toppings to level floors will not be used;

6.3.3.3(2) cracks in concrete floors and walls will be repaired to suit the floor finish and long-term serviceability requirements of the floor;

6.3.3.3(3) foundation walls for below-grade occupied spaces will be water-proofed to prevent groundwater ingress. Construction joints will have purpose-made water stops. A perimeter draining system will be installed around the exterior of the earth-retained building foundation in areas where the foundation is immediately adjacent to below grade occupied spaces; and

6.3.3.3(4) exposed Architectural concrete will comply with CAN/CSA A23.1-04 Section 8.3.

6.4 Masonry (Division 04)

6.4.1 Basic Requirements

6.4.1.1 Masonry design and construction that meets or exceeds current Canadian standards and practices as set out in this section, may be considered for building elements and systems.

6.4.1.2 Masonry construction may be considered for exterior walls and walls systems where permanence of finishes, both visually and functionally, and ease of maintenance are primary considerations in the exterior fabric of the CSB.

6.4.1.3 Masonry construction may be considered for interior walls and wall systems when priorities include, permanence and maintenance, sound transmission control, fire resistance and separation requirements and security.

6.4.1.4 See Section 2.1.3 Technical References. The list of technical references is not intended to be a complete list of applicable standards. Design and construction will comply with applicable standards and practices whether listed in this section or not.

6.4.2 Concrete Masonry Units

6.4.2.1 Overriding Principles:

6.4.2.1(1) Concrete unit masonry may be considered for both independent exterior walls and in exterior wall systems as a structural backing to other finish materials or systems; and

6.4.2.1(2) Concrete unit masonry for interior applications may be considered as an integrally finished material, as a base for applied finish and as a structural backing to other finish systems:

6.4.2.1(2)(a) painted or unpainted concrete unit masonry will not generally be considered an acceptable exposed finish with the exception of the Parkade level where walls facing the parking area shall have a painted concrete unit masonry finish and utility and service

rooms which may have an unpainted concrete unit masonry finish. Wherever concrete unit masonry is normally visible to the public, it shall be painted. Unless referenced above, concrete unit masonry shall be finished with gypsum wallboard and painted.

6.4.2.2 Quality Requirements:

6.4.2.2(1) Masonry design and construction will comply with all applicable codes and standards including, but not limited to, CSA S304.1-04, the BC Building Code, and the standards listed in Section 2.1.3 for Technical References; and

6.4.2.2(2) Concrete unit masonry practices and work standards will comply with Canadian Masonry Contractors Association (CMCA) Masonry Practices Manual, CSA-S304.1-04, and CSA-A371-04.

6.4.3 Brick Masonry

6.4.3.1 Overriding Principles:

6.4.3.1(1) Exterior wall systems comprising brick masonry as a finish veneer to concrete, concrete masonry or metal framing will be a rain screen or cavity wall system;

6.4.3.1(2) No brick masonry below grade for exterior applications; and

6.4.3.1(3) Brick masonry in interior applications will have integral finish and construction compatible to the maintenance and infection control requirements of the authority.

6.4.4 Stone Masonry

6.4.4.1 Overriding Principles:

6.4.4.1(1) Stone masonry may be considered as a finish veneer to concrete walls or concrete masonry walls. Exterior wall systems in such applications will be a rain screen or cavity wall system.

6.4.4.2 Quality Requirements:

6.4.4.2(1) Stone will be sound, hard and durable, well-seasoned and of uniform strength, colour and texture, and free of quarry sap, flaws, seams, sand holes, iron pyrites or other mineral or organic defects.

6.5 Metals (Division 05)

6.5.1 Basic Requirements

6.5.1.1 Structural steel, steel deck, and cold-formed steel stud design and construction that meets or exceeds current Canadian standards and practices as set out in this section, may be considered for building elements and systems.

6.5.1.2 See Section 2.1.3 Technical References. Additional below list of technical references is not intended to be a complete list of applicable standards. Design and construction will comply with applicable standards and practices whether listed in this section or not.

6.5.2 Performance Criteria:

6.5.2.1 Structural steel, steel deck, and cold-formed steel stud systems will be designed to comply with the deflection and vibration criteria outlined in Structural Sections 3.10.6 and 3.10.7.

6.5.2.2 Erection tolerances for steel construction will be in accordance with CSA S16-01 Clause 29.7 except the maximum out-of-plumbness of exterior columns will be +/- 20mm over the full height of the building.

6.5.2.3 For steel floor and roof construction, the deflection of steel beams, joists, and girders due to the wet weight of concrete topping slabs will be considered. Topping slab thickness may have to vary to maintain floor levelness tolerances. The additional concrete ponding weight will be considered in the design of the structure.

6.5.2.4 Concrete topping slabs will be finished with a smooth, dense, steel trowel finish with a Class A Flatness Classification in accordance with CSA A23.1. Thin overlay toppings to level floors will not be used.

6.5.2.5 Special attention will be paid to crack control of concrete topping slabs on steel deck. As a minimum, the following details and procedures will be implemented:

6.5.2.5(1) minimize wet weight deflections of steel decking and supporting structure;

6.5.2.5(2) where practical, place concrete in alternate bays. Avoid placing large areas at one time;

6.5.2.5(3) use concrete topping with a low design slump. Add superplasticizer to increase slump for placing and finishing;

6.5.2.5(4) use 14mm or larger aggregate topping mix;

6.5.2.5(5) avoid placing topping slabs on hot or windy days;

6.5.2.5(6) reinforce topping slabs with a minimum 10M at 300mm centers each way chaired a minimum 20mm above steel deck;

6.5.2.5(7) Provide extra topping slab reinforcement around openings, columns, and at corners; and

6.5.2.5(8) wet cure topping slabs for a minimum of three days using soaked burlap covered with polyethylene or similar methods.

6.5.2.6 Cracks in concrete topping slabs will be repaired to suit the floor finish and long-term serviceability requirements of the floor.

6.5.2.7 Steel floor/roof decking will be wide rib profile for ease of attachment of current and future services, equipment, and fixtures using drilled insert expansion anchors into the bottom of the deck ribs.

6.5.2.8 Steel floor/roof decking plus the concrete topping slab thickness will satisfy the requirements of a ULC-rated assembly meeting the BCBC fire rating requirements. Spray on or applied fireproofing material will not be used to achieve required floor deck fire rating.

6.5.2.9 Structural steel floor/roof framing and supporting members will be fire-proofed to meet the BCBC fire rating requirement.

6.5.2.10 Preference will be given to spray-on fire proof applications to floor/roof beams, joists, and girders for ease of attachment of future services, equipment, and fixtures. Spray on fireproofing will have an applied sealer creating a dense non-friable surface.

6.5.3 Structural Steel

6.5.3.1 Quality Requirements:

6.5.3.1(1) quality of workmanship will be inspected by an approved testing laboratory. Testing procedures as specified in CSA S16-01 to verify soundness of representative shop and field welds will be used. All full strength welds shall be tested;

6.5.3.1(2) material quality including sourcing and welding quality to be monitored by independent testing agency; and

6.5.3.1(3) preparation and painting of Structural Steel Components will conform to the Master Painters' Institute (MPI) Standards.

6.5.4 Load Bearing Steel Studs

6.5.4.1 Overriding Principle:

6.5.4.1(1) load bearing steel studs may be considered as a component of the exterior wall systems to support exterior wall finishes and form an integral part of the building envelope; and

6.5.4.1(2) load bearing steel studs may be part of the building structure or may be independent of the principle building structural system.

6.5.4.2 Quality Requirements

6.5.4.2(1) load bearing steel stud design will be carried out by a Professional Engineer registered in the Province of British Columbia and construction will comply with CSA-S136-01;

6.5.4.2(2) manufacturer will be certified in accordance with CSSBI Standard 30M-06 and CSA-A660-04;

6.5.4.2(3) fabricator and erector will be experienced in the type of work undertaken. Erection will be reviewed by the design engineer; and

6.5.4.2(4) conform to the Association of Wall and Ceiling Contractor's Specification Standards Manual (AWCC).

6.5.4.3 Performance Requirements:

6.5.4.3(1) limit maximum deflection under specified wind loads to L/360, unless a smaller maximum deflection is specifically required due to wall finishes. For brick masonry used as an exterior finish over steel stud back-up, provide steel stud deflection of L/600 maximum;

6.5.4.3(2) design components to accommodate erection tolerances of the structure;

6.5.4.3(3) design wind bearing stud end connections to accommodate floor/roof deflections and to ensure that studs are not loaded axially; and

6.5.4.3(4) design steel studs to take into account the anchorage of other materials being supported including but not limited to: sub-girts supporting metal cladding and composite panels, soffit finishes and the provision of lateral support at window heads.

6.5.5 Miscellaneous Metals

6.5.5.1 Quality Requirements:

6.5.5.1(1) Primers and paints of miscellaneous metals will conform to Master Painters Institute (MPI) Architectural Specification Standards Manual.

6.6 Wood Plastics and Composites (Division 06)

6.6.1 Basic requirements

6.6.1.1 Wood and plastic products and procedures required in the construction process and as integral components of the building fabric, including but not limited to fabrication, assemblies, surfaces, and finishes, will conform to requirements outlined in Output Specifications Section 2.1. Standards and to those set out in this division.

6.6.1.2 Added Urea formaldehyde will not be permitted.

6.6.1.3 Timber is acceptable product for building structure provided requirements of Section 3.10 are satisfied.

6.6.1.4 Finish carpentry and architectural woodwork, including but not limited to cabinets, casework (excluding laboratory casework, which is included in Division 12), frames, panelling, trim, installation of doors and hardware, and other wood-related products and applications will be provided as required for wood products exposed to view in finished interior and exterior installations.

6.6.1.5 Plastic laminate surfacing and/or solid polymer fabricated surfacing will be provided as required to create surfaces that require antiseptic or clean characteristics, special or regular maintenance, and resistance to caustic action of chemicals or agents used by the Authority.

6.6.1.6 Acrylic plastic products will be provided as required for wall cladding, wall protection, corner protection, casework finishing, trims, ornamental elements, and other applications to achieve a quality of interior finish suitable for use by clients and staff.

6.6.1.7 Timber structural elements will be glued-laminated structural units meeting the requirements of CAN/CSA-0122 and CAN/CSA-0177. Timber connector hardware will be hot dipped galvanized where exterior exposure. All nuts, washers and bolts will be galvanized.

6.6.2 Performance Criteria

6.6.2.1 Finish carpentry and architectural woodwork:

6.6.2.1(1) design, fabrication, materials, installation, and workmanship of finish carpentry and architectural woodwork will conform to quality standards outlined in 6.6.1.1., the Architectural Woodwork Manufacturer's Association of Canada (AWMAC) Architectural Woodwork Standards (AQS) (First Edition) for minimum "Custom Grade," and Door and Hardware Institute (DHI) standards;

6.6.2.1(2) VOC emission levels will be in accordance with CaGBC (Canada Green Building Council) to minimize adverse impact on indoor environmental and air quality;

6.6.2.1(3) adhesives will be non-toxic, non-solvent glue to comply with AWMAC Architectural Woodwork Standards, Canadian 'Eco-Logo' program, and CaGBC (Canada Green Building Council); and

6.6.2.1(4) marine-grade plywood substrate will be used for countertops at wood bases at cabinets.

6.7 Thermal and Moisture Protection (Division 07)

6.7.1 Basic requirements

6.7.1.1 Construction assemblies will be designed according to the building envelope principles outlined in Section 5.4 Building Envelope and the CMHC technical guidelines.

6.7.1.2 Construction assemblies will prevent the ingress of moisture or water vapour from the exterior into the building and the passage of air through the building envelope from the interior spaces to the exterior and vice versa.

6.7.1.3 Construction assemblies will prevent the ingress of moisture through foundation walls below grade, both subject and not subject to hydrostatic pressure.

6.7.1.4 Comfortable, liveable interior environments will be created by providing protection such as insulation to resist the transfer of heat through exterior walls and roofs.

6.7.1.5 Resistance to the propagation and spread of fire will be provided for exterior walls and interior walls designated as fire-resistance rated separations.

6.7.2 Performance criteria

6.7.2.1 Damp proofing

6.7.2.1(1) foundation wall surfaces will have sufficient damp proofing coverage that is sufficient to repel and prevent moisture ingress in accordance with BCBC 5.8.2.

6.7.2.2 Waterproofing

6.7.2.2(1) waterproofing will be provided to prevent water ingress to occupied spaces below grade at below-grade vertical concrete walls where hydrostatic head is indicated on geotechnical report;

6.7.2.2(2) sheet or fluid-applied membrane waterproofing will be used to prevent water ingress over suspended

slabs and decks and associated walls over habitable spaces where water collection is anticipated; and

6.7.2.2(3) waterproof membranes in the form of air barriers will be provided in exterior walls as part of the building envelope and integral with rain screen or cavity wall assemblies.

6.7.2.3 Vapour Barriers

6.7.2.3(1) a continuous vapour barrier membrane will be provided to prevent water vapour transmission and condensation in wall assemblies, roofing assemblies, and under concrete slabs-on-grade within the building perimeter.

6.7.2.4 Air barriers

6.7.2.4(1) air barrier assemblies will be designed to limit air ex-filtration and infiltration through materials of the assembly, joints in the assembly, joints in components of the wall assembly, and junctions with other building elements including the roof; and

6.7.2.4(2) air barrier assemblies will prevent air leakage caused by air pressure across the wall and roof assembly, including interruptions to the integrity of wall and roof systems such as junctions with dissimilar constructions to the standards as listed above. Provide air barriers to prevent water intrusion in accordance with Paragraph 6.7.2.2 (3) above. Air barriers may be sheet or fluid-applied.

6.7.2.5 Thermal protection

6.7.2.5(1) thermal insulation will be provided as part of the building envelope to prevent the transfer of heat both from the interior to the exterior and vice versa, dependent on seasonal conditions, and to resist the absorption of water;

6.7.2.5(2) thermal protection materials will be of a type and quality that will provide consistent environmental quality to enclosed spaces;

6.7.2.5(3) Foamed plastic insulation will be CFC and HCFC free and in compliance with the Province of British Columbia Ozone Depleting Substances Regulations.

6.7.2.5(4) Minimum insulation values will be R20 (U-Value 0.05) for exterior walls and R30 (U-Value 0.033) for roof areas.

6.7.2.6 Roofing

6.7.2.6(1) Materials and workmanship for roofing will conform to the Roofing Contractors Association of British Columbia Guarantee Corp (RGC) latest Standards and ten (10) year Guarantee, as published in the RGC Roofing Practices Manual.

6.7.2.6(2) Roof materials will comply with RGC Roofing Practices Manual “Acceptable Materials List,” including:

6.7.2.6(2)(a) Flexible membrane – SBS modified (two-ply system)

6.7.2.6(2)(b) Flexible membrane – Elastomeric or Thermoplastic (single-ply system)

6.7.2.6(3) Roof assembly design including deck, vapour barrier, insulation, board stock, and membranes shall comply with British Columbia Building Code for fire classifications and with RGC requirements with wind uplift requirements, as well as requirements of Paragraph 3.10.1.1 for live loads, dead loads, snow loads, and wind uplift. Comply with ULC Class 60 wind uplift classification.

6.7.2.6(4) Quality of roofing will undergo inspections as required by the RCABC.

6.7.2.6(5) Foamed plastic insulation will be CFC- and HCFC-free and in compliance with the Province of British Columbia Ozone Depleting Substances Regulations.

6.7.2.6(6) A complete horizontal barrier to weather and climate will be provided, using one of the following

construction systems as applicable to the installation required:

6.7.2.6(6)(a) Built-up bituminous or non-bituminous exposed or protected roofing systems, or

6.7.2.6(6)(b) Other roofing systems including but not limited to sheet metal, shingles, and roof tiles.

6.7.2.6(7) Roofing systems will include:

6.7.2.6(7)(a) Flashings and sheet metal;

6.7.2.6(7)(b) Thermal insulation;

6.7.2.6(7)(c) Roofing specialties and accessories required for completion;

6.7.2.6(7)(d) Interior access systems to roof areas;

6.7.2.6(7)(e) Protection from pedestrian traffic and solar radiation in accordance with 6.7.2.6(1);

6.7.2.6(7)(f) Roof drainage, including overflow scuppers.

6.7.2.6(8) Sheet metal flashings will be designed to divert water away from membrane flashing termination and protect the membrane from deterioration due to the elements and mechanical damage. The roofing membrane will be continuous under the metal. Ensure that sheet metal components comply with wind uplift requirements established for roofing system

6.7.2.6(9) Metal roofing systems, if used, will provide clear internal paths of drainage to allow any trapped moisture to drain to the exterior and avoid the staining of architectural finishes, forming of puddles, forming of icicles, and dripping on pedestrians. Building design and roof systems will ensure that entrance ways are protected from sliding snow and ice and will ensure that there are no accumulations of snow and ice in roof valleys.

6.7.2.7 Fire and Smoke Protection

6.7.2.7(1) Spray-applied cementitious fire proofing will conform to standards of Warnock-Hersey (WH) Certification Listings. Typically, cementitious fireproofing will be nominal 240 kg/m^3 (15 pound) density unless otherwise required by BCBC. Provide Portland cement based, wet mix, exterior exposed fireproofing for underside of floor deck above parking. Paint white for added reflectivity per Division 09.

6.7.2.7(2) Barriers will be integrated into vertical and horizontal space separations to protect against the spread of fire and smoke, and protection will be applied to exposed building elements (structural and non-structural) susceptible to fire and subsequent damage.

6.7.2.7(3) Penetrations of vertical and horizontal fire-resistance rated separations will be protected.

6.7.2.7(4) Fire-stopping and smoke seal systems will consist of asbestos-free materials and systems, capable of maintaining an effective barrier against flame, smoke, and gases.

6.7.2.7(5) Fire-stopping materials will:

6.7.2.7(5)(a) Be compatible with substrates;

6.7.2.7(5)(b) Allow for movement caused by thermal cycles;

6.7.2.7(5)(c) Prevent the transmission of vibrations from pipe, conduit or duct to structure and structure to pipe, conduit or duct.

6.7.2.7(6) When more than one product is required for an assembly, all products will be compatible and from the same manufacturer and shall comply with requirements established by ULC tested assemblies. Note that damming materials, such as mineral fibre insulation, is usually not manufactured by the firestopping product manufacturer.

6.7.2.7(7) Fire stopping sealants and coatings will be silicone-based or urethane-based and guaranteed not to re-

emulsify if subject to wetting or standing water; acrylic-based coatings and sealants are not acceptable.

6.7.2.8 Sealants

6.7.2.8(1) Sealant materials will be applied to achieve:

6.7.2.8(1)(a) Seals to the building envelope systems or around openings in the building envelope systems as required to prevent water ingress;

6.7.2.8(1)(b) Seals around and over cavities in or behind surface elements to allow effective infection control;

6.7.2.8(1)(c) Sealed joints between dissimilar or similar materials to allow a smooth or even transitions;

6.7.2.8(1)(d) Sealed expansion or controls joints in the building envelope systems or structural systems to allow movement.

6.7.2.8(1)(e) No cracks will be allowed in clinical areas.

6.7.2.8(2) Exterior sealants will completely and continuously fill joints between dissimilar and/or similar materials.

6.7.2.8(3) Interior sealant (at frames such as those at doors, windows and skylights) will completely fill joints between dissimilar materials and will be one component, acrylic emulsion type.

6.7.2.8(4) Silicone caulking to washroom plumbing fixtures will be mildew-resistant and impervious to water.

6.7.2.8(5) Sealants applied to expansion and control joints in concrete floors requiring self-levelling properties will be two-component, traffic-grade urethane sealants for horizontal surfaces.

6.7.2.8(6) Sealants for exterior vertical expansion and control joints in masonry or wall cladding will be non-sag sealant.

6.7.2.8(7) Sealants will allow for minimum 25% movement in joint width.

6.7.2.8(7)(a) In corridors and other traffic areas used by laundry carts, supply carts, material handling equipment etc., sealant will be traffic bearing type and suitable to support imposed load without deformation or failure.

6.8 Openings (Division 08)

6.8.1 Basic requirements

6.8.1.1 Except where wire glass is required in accordance with the BC Building Code, interior windows and sidelights will be constructed of tempered glass. Exterior glazing at doors and sidelights will be laminated. Where required by Code, label as safety glass.

6.8.1.2 Installation methods and locations for doors, frames, and hardware will conform to Door and Hardware Institute (DHI) standards.

6.8.1.3 Doors

6.8.1.3(1) Doors will be sized, fabricated, and installed to suit the intended function of spaces or rooms requiring acoustic or visual privacy, security, special HVAC requirements, fire-resistance rated separations or other closures.

6.8.1.3(2) Size Requirements for Doors

6.8.1.3(2)(a) Door openings will be of adequate width to suit the intended purpose of rooms on either side of the doors and allow the movement of people and equipment associated with those rooms.

6.8.1.3(2)(b) Double doors will be provided into rooms where large pieces of equipment will be moved in or out during the lifetime of the CSB and where such equipment cannot pass through 1200 mm single door openings.

6.8.1.3(2)(c) Door openings must accommodate movement of equipment.

6.8.1.3(2)(d) Double doors will be provided into corridors and major laboratory areas.

6.8.1.3(2)(e) Unless required otherwise, doors to outpatient areas, including doors to water closets and change room cubicles, will have a minimum width of 950 mm.

6.8.1.3(2)(f) No single door will be less than 750 mm wide.

6.8.1.3(2)(g) No door or door leaf will be less than 2150 mm high, unless specifically required for access to services or other purposes where height is restricted.

6.8.1.3(3) Acoustic Requirements for doors:

6.8.1.3(3)(a) Doors in STC rated assemblies shall be of solid wood core construction with sound gaskets and bottom seals.

6.8.1.3(4) Doors into or between major departments or activity areas through which cart, stretcher, or bed traffic is anticipated on a routine basis will be automatically activated by an electronic device or manual push button, located to allow emergency access without the necessity to stop movement. All other doors through which cart, equipment or frequent staff traffic is anticipated on a routine basis will have hardware or automatic activation that allows the doors to stay in an open position.

6.8.1.3(5) Door sizes and designs will be applied consistently to rooms of similar use, location, and configuration.

6.8.1.3(6) Doors will not swing into corridors in a manner that may obstruct traffic flow or reduce the corridor width, except doors to spaces that are used infrequently and not subject to occupancy such as small closets.

6.8.1.3(7) Doors may swing into washrooms, provided they allow for ease of use. Such doors will be equipped with required hardware to allow the door to be opened out into the room in an emergency situation.

6.8.1.3(8) Doors will have required hinges, edge protection, and face protection to minimize damage and resultant disruptive maintenance.

6.8.1.3(9) Doors and frames will have a suitable finish that prevents dirt and fingerprint accumulation, and can be easily cleaned and disinfected.

6.8.1.3(10) Where possible, the preference is to provide glazing in an adjacent sidelight rather than within the door itself.

6.8.1.3(11) Blinds or window coverings suitable for the level of functional and operational requirements will be provided. Blinds may be integral with the window air space.

6.8.1.3(12) Doors and door frames will have the capability to withstand the varying and high levels of humidity and impact that occur typically within a laboratory and maintain their inherent aesthetic and functional capacities. Frames and anchors for doors, sidelights, and interior and exterior windows for special areas will be designed to withstand the heavy degree of impact anticipated and maintain their aesthetic and functional capacities.

6.8.1.3(13) In areas where security is considered paramount such as secure entrances, safety and security will be achieved with the required location, configuration, materials, construction, and detailing of doors and hardware in accordance with British Columbia Ministry of Health Standards.

6.8.1.4 Windows

6.8.1.4(1) Windows will be sized, configured, and adequately constructed to suit rooms that require daylight, views and/or natural ventilation.

6.8.1.4(2) Consideration will be given to providing ‘borrowed light’ through interior windows to occupied rooms that do not have exterior windows. The intent is to borrow light from areas that have windows and consequently

create a more comfortable and less closed-in atmosphere.

6.8.1.4(3) Glazing heights will be coordinated with adjacent wall protection, handrails, door hardware, and other accessories to achieve functional and aesthetic cohesiveness.

6.8.2 Performance Criteria

6.8.2.1 Hollow Metal Doors and Frames

6.8.2.1(1) Materials and manufacture of metal doors and frames will conform to the requirements of the Canadian Steel Door and Frame Manufacturer's Association (CSDFMA).

6.8.2.1(2) Interior metal doors will have flush faced construction. Provide continuously welded, seamless edge construction using steel sheet; 16 gauge (1.6 mm) typically

6.8.2.1(3) Exterior Metal Doors will have

6.8.2.1(3)(a) Flush faced construction Provide steel sheet; minimum 16 gauge (1.6 mm).

6.8.2.1(3)(b) Edge seams to correspond with door function and minimize maintenance needed. Provide with continuously welded, seamless edge construction.

6.8.2.1(3)(c) Prepared surfaces to receive finishes that resist corrosion from exposure to weather. Provide with ZF180 coating.

6.8.2.1(4) Pressed Metal Frames will have

6.8.2.1(4)(a) Fully welded construction Provide same gauge at frames as at doors to improve performance of assembly, including hardware.

6.8.2.1(4)(b) Thermally-broken door frames at exterior, non-fire-rated openings.

6.8.2.1(4)(c) Anchors to each jamb to suit wall type and receive the frame.

6.8.2.1(5) Door Glazing

6.8.2.1(5)(a) Exterior glazing will be sealed units in thermally-broken frames to prevent heat loss.

6.8.2.2 Wood Doors

6.8.2.2(1) Wood doors will conform to the Architectural Woodwork Standards (First Edition) published by the Architectural Woodwork Manufacturer's Association of Canada (AWMAC).

6.8.2.2(2) Wood doors will be sized, constructed and hardware, and be provided with hardware and finishes to suit the intended function and aesthetics of the CSB and its program.

6.8.2.2(3) Construction, finish, and installation will attempt to minimize the requirement for maintenance and resulting disruption to hospital operations.

6.8.2.2(4) Wood doors will be flush Custom Grade quality, solid particleboard core.

6.8.2.2(5) Fire-resistance rated doors will be constructed with a homogeneous incombustible mineral core and AWMAC Quality Standards Option 5 blocking.

6.8.2.2(6) Finish hardware will be installed securely to resist loosening over time and fastened to solid wood backing, except where hardware is designed to be through-bolted.

6.8.2.2(7) Stiles, rails and faces will be glued to the core with Type II water-resistant adhesive to minimize de-lamination or disassembly as a result of moisture ingress.

6.8.2.2(8) Face veneer will be A-Grade hardwood veneer with AWMAC No. 3 edge and finished to suit the intended use. Clear urethane factory finish.

6.8.2.3 Aluminum Entrances and Storefronts

6.8.2.3(1) Aluminum entrances and storefront framing and doors may form part of the exterior envelope of the building(s) or provide glazed interior partitions as required to comply with functional program requirements.

6.8.2.3(2) Aluminum doors will be used within aluminum entrances and storefront. Provide with offset pivots or with heavy duty butt hinges to accommodate expected traffic.

6.8.2.3(3) Frames will be thermally-broken, flush glazed, aluminum sections, to accept insulating glass units at exterior openings.

6.8.2.3(4) Frames will incorporate drained and vented system (rain screen) with a complete air and vapour seal, allowing any moisture entering the frame to drain to the exterior and allowing air into the pressuring chamber.

6.8.2.3(5) Aluminum swing entrance doors will be heavy-duty commercial or institutional grade and may be automatically operated, motion-detector controlled, with longer opening times for the elderly.

6.8.2.3(6) Aluminum finish for exposed aluminum surfaces will be applied in the manufacturing process and be permanent and resistant to corrosion caused by weather exposure and climate.

6.8.2.4 Specialty Doors

6.8.2.4(1) Overhead Rolling Service Doors

6.8.2.4(1)(a) Lateral movement of door curtain slats will be restrained. Windlocks will be provided as required by door size or wind load requirements.

6.8.2.4(1)(b) Curtain slats will be interlocking flat slats, complete with bottom bar and contact type bottom astragal.

6.8.2.4(1)(c) Manual operation will be provided with inside lift handle and locking bar or chain hoist. Motor operation will be provided on doors requiring constant usage. Chain operation will be by means of reduction gears and galvanized hand chain.

6.8.2.4(1)(d) For fire doors, automatic closing device will be operated by fire door release device connected to fire alarm system.

6.8.2.4(2) Overhead Rolling Grilles

6.8.2.4(2)(a) Overhead rolling grilles will be fabricated with metal components, and assembled to allow visual access to secure areas.

6.8.2.4(2)(b) Grille guides will be complete with aluminum or steel guides, fabricated to withstand vertical and lateral loads, counterbalanced by helical torsion springs, and sound-deadened.

6.8.2.4(2)(c) Manual operation will be provided with inside lift handle and locking bar or chain hoist. Motor operation may be provided on grilles requiring constant usage. Chain operation will be by means of reduction gears and galvanized hand chain.

6.8.2.4(3) Overhead Rolling Counter Shutters

6.8.2.4(3)(a) Shutter curtains will be fabricated with extruded aluminum, galvanized steel, or stainless steel interlocking flat slats, complete with guides of similar materials.

6.8.2.4(3)(b) Shutters will have manual operation and locking capability.

6.8.2.4(4) Sliding Doors and Panels

6.8.2.4(4)(a) Door and track materials and assembly will operate smoothly and resist door derailment.

6.8.2.4(4)(b) Systems with a swing-type door(s) will attach to the slide door carrier(s) by means of top

pivot bar and bottom pin guide, and contain a breakaway release latch for holding the door in the closed position during normal operation. Swing-out sidelights will allow the active sliding door to swing at 90° from any position in the sliding mode.

6.8.2.4(4)(c) Glass will be of safety type, capable of withstanding the impact of manually-wheeled vehicles in emergency situations.

6.8.2.4(5) Interior Aluminum Sliding Doors and Sidelights

6.8.2.4(5)(a) Interior sliding doors and sidelights will have recessed mounted track with sliding and fixed panel(s), and suitable for single glazing with 6 mm clear fully tempered float glass.

6.8.2.4(6) Automatic Sliding Doors

6.8.2.4(6)(a) Automatic sliding doors will be installed at main and emergency entrances.

6.8.2.4(6)(b) Doors equipment will accommodate medium to heavy pedestrian traffic and up to the following weights for active leaf doors: 100 kg for locations as designated bi-part, 200 kg for single slide.

6.8.2.4(6)(c) Door operator, including the motion and presence detection system, will be capable of operating within the temperature ranges existing at the CSB and be unaffected by ambient light or ultrasonic interference.

6.8.2.4(6)(d) Energy-saving devices will be provided to reduce conditioned air loss.

6.8.2.4(6)(e) Doors will be on motion sensors and securable after hours.

6.8.2.4(7) Automatic Swing Doors

6.8.2.4(7)(a) Automatic swing doors will be used for interior and exterior locations as designated.

6.8.2.4(7)(b) Door equipment will accommodate medium to heavy pedestrian traffic and up to 98 kg weight of doors.

6.8.2.4(7)(c) Directional motion sensor control device, if used, will be unaffected by ambient light or ultrasonic frequencies.

6.8.2.4(7)(d) All in-swing doors that are required exits will be equipped with an emergency breakaway switch that internally cuts power to the operator. No external power switch will be allowed

6.8.2.4(7)(e) Longer hold-open times will be implemented to accommodate the elderly and frail.

6.8.2.4(7)(f) Use of delayed panic hardware to meet exit route requirements is discouraged.

6.8.2.4(8) Aluminum Curtain Walls

6.8.2.4(8)(a) Aluminum curtain walls will conform to the Aluminum Association Standards (AAS), and the American Architectural Manufacturers Association (AAMA) field testing specifications.

6.8.2.4(8)(b) Curtain wall framing will incorporate a drained and vented system with a complete air and vapour seal, allowing any water entering the framing/system and the glazing detail cavities to drain to the exterior and also allow air into the pressuring chamber.

6.8.2.4(8)(c) The design of the curtain wall framing will incorporate a thermal-break system.

6.8.2.4(8)(d) Aluminum finish for exposed aluminum surfaces will be permanent and resistant to corrosion resulting from weather exposure and climate.

6.8.2.4(8)(e) The assembly will be designed to resist local seismic conditions (post-disaster building).

6.8.2.4(8)(f) The assembly will resist 1-in-100 year climatic events (with a safety factor).

6.8.2.5 Aluminum Windows

6.8.2.5(1) Aluminum windows will conform to the Aluminum Association Standards (AAS), and the American Architectural Manufacturers Association (AAMA) field testing specifications.

6.8.2.5(2) Windows will incorporate a drained and vented system with a complete air and vapour seal, allowing any water entering the framing/system and the glazing detail cavities to drain to the exterior and also allow air into the pressuring chamber.

6.8.2.5(3) The design of the curtain wall framing will incorporate a thermal-break system.

6.8.2.5(4) Aluminum finish for exposed aluminum surfaces will be permanent and resistant to corrosion resulting from weather exposure and climate.

6.8.2.5(5) The assembly will be designed to resist local seismic conditions (post-disaster building).

6.8.2.5(6) The assembly will resist 1-in-100 year climatic events (with a safety factor).

6.8.2.6 Skylights

6.8.2.6(1) Skylights will conform to the Aluminum Association Standards (AAS), and the American Architectural Manufacturers Association (AAMA) field testing specifications.

6.8.2.6(2) Roof or skylight glazing may be provided where natural light is required in interior spaces to augment or complement interior ambient lighting.

6.8.2.6(3) Aluminum finish for exposed aluminum surfaces will be permanent and resistant to corrosion resulting from weather exposure and climate.

6.8.2.7 Glass and Glazing

6.8.2.7(1) Glass and glazing materials and workmanship will conform to the Insulating Glass Manufacturers Association of Canada (IGMAC) Guidelines, and the Glazing Contractors Association of B.C. (GCA) Glazing Systems Specifications Manual.

6.8.2.7(2) Exterior and/or interior glass and glazing may be provided as integral components of the exterior building envelope, interior partitions and screens, exterior and interior doors, handrail balustrades, skylights and decorative and ornamental glazing.

6.8.2.7(3) The assembly will be designed to resist local seismic conditions as a post-disaster building.

6.8.2.7(4) The assembly will resist 1-in-100 year climatic events (with a safety factor).

6.8.2.7(5) Laminated safety glass will be used in single-glazed skylights, entry doors and sidelights, or as the inboard light of a double-glazed skylight.

6.8.2.7(6) Mirrors

6.8.2.7(6)(a) Full wall unframed mirrors will be 6 mm thick minimum float glass backed with electrolytically-applied copper plating. All edges will be ground smooth and polished.

6.8.2.7(6)(b) Wall mounted posture mirrors will be framed type; one piece, stainless steel channel frame with a No. 1 quality, 6 mm thick float glass mirror backed with electrolytically applied copper plating. Back will be galvanized steel.

6.8.2.7(6)(c)

6.8.2.8 Finish Hardware

6.8.2.8(1) Finish hardware materials and workmanship will conform to quality standards of the Door and Hardware Institute (DHI).

6.8.2.8(2) Finish hardware supplier will be an established contract builders hardware firm who will have in its

employ one or more AHC (Architectural Hardware Consultant) who are members in good standing of the Door and Hardware Institute (DHI) and who will be responsible for the complete hardware contract.

6.8.2.8(3) Finishes will be selected to provide maximum longevity and preservation of the finish.

6.8.2.8(4) Hardware, where applicable, will be ULC-listed for fire rating for all functions up to 2-hour doors.

6.8.2.8(5) Hardware will be heavy-duty commercial quality. Locksets and latchsets will be fully mortised type and lever handles will be solid material.

6.8.2.8(6) Hardware in special areas such as Mental Health will suit the purposes unique to those areas as per BC Ministry Guidelines.

6.8.2.8(7) Keying

6.8.2.8(7)(a) Primus EF Level 2 Cylinders will be supplied.

6.8.2.8(7)(b) 4-level system will be implemented.

6.8.2.8(7)(c) Keying groups will be assigned by the Authority.

6.8.2.8(7)(d) New key fittings will be given to and controlled by the Authority.

6.8.2.8(7)(e) Keys from factory will be given to the Authority.

6.8.2.8(7)(f) Four (4) keys will be supplied for each lock cylinder.

6.9 Finishes (Division 09)

6.9.1 Basic Requirements

6.9.1.1 In areas where finishes and systems of installation will occur and water is anticipated to be present as part of cleaning or other procedures, water will be allowed to collect and exist without causing damage to the finishes or substrate.

6.9.1.2 For areas in which wear is a concern, such as areas with anticipated pedestrian or wheeled traffic, finish materials will be durable to withstand damage and easily replaceable in sections if damage does occur.

6.9.1.3 Infection prevention and control will be a priority in the selection of finishes for all client care areas.

6.9.1.4 Acoustic characteristics of finish materials will be a priority consideration.

6.9.1.5 The appearance of finishes and colours will create and promote a natural healing environment, prevent glare, and minimize artificial lighting requirements.

6.9.1.6 Selection of materials will promote sustainability by, for instance, having low-emissivity or comprising of renewable resources.

6.9.2 Performance Criteria

6.9.2.1 Interior Wall Framing

6.9.2.1(1) Materials and workmanship for interior walls, including steel studs and furring and gypsum board ceiling suspension systems, will conform to the Canadian Sheet Steel Building Institute Standards (CSSB1), and the Association of Wall and Ceiling Contractors of B.C. (AWCC) Wall & Ceiling Specification Standards Manual (latest edition).

6.9.2.1(2) System design and components will meet seismic restraint requirements for a post-disaster building.

6.9.2.1(3) Prefabricated steel studs for interior partitions and furring will be non-load bearing, with no axial load other than its own weight, the weight of attached finishes, and lateral loads of interior pressure differences and seismic loads.

6.9.2.1(4) Steel stud framing construction will accommodate electrical, plumbing and other services in the partition cavity, and support fixtures, wall cabinets and other such wall-mounted items with reinforcement and backing.

6.9.2.1(5) Design will consider the differences in air pressure that may result on opposite sides of the wall or partition due to factors such as wind and other lateral

pressures, stack effects, or mechanically-induced air pressurization.

6.9.2.2 Gypsum Board

6.9.2.2(1) Materials and workmanship for gypsum board and accessories will conform to the Association of Wall and Ceiling Contractors of B.C. (AWCC) Wall & Ceiling Specification Standards Manual (latest edition). Note that the British Columbia Wall and Ceiling Association - http://bcwca.org/ also provides a link to the AWCC website, but the Standard is by AWCC. The Association of Wall and Ceiling Contractors (AWCC) of BC - http://awccbc.org/ issues the Standards Manual. There is also a Northwest Walls & Ceilings Bureau (NWCB) - http://www.nwcb.org/, that spans the US and Canadian Northwest and who publishes a standard "Recommended Levels for Finishing of Gypsum Board". Typically, finish exposed gypsum board surfaces to Level 3 finish. Provide Level 3 finish at long walls, walls with wall washers (downlights or sconces), walls with wall coverings or gloss paint, and walls with a light source at the end.

6.9.2.2(2) Thickness of gypsum board will be no less than 5/8" (16 mm).

6.9.2.2(3) Except for 6.9.2.2(4), glass mat water-resistant gypsum backing panels (tile backer board) will be used behind ceramic wall tile in showers, behind sinks, or other wet areas.

6.9.2.2(4) Reinforced cementitious board or cementitious backer unit (CBU) may be used as an alternative to glass mat water-resistant gypsum backing panels in 6.9.2.2(3).

6.9.2.2(5) Abuse-resistant gypsum board will be provided where required in Room Data Sheets for increased resistance to abrasion, indentation, and penetration of interior walls and ceilings.

6.9.2.2(6) Glass mat surfaced gypsum sheathing board will be used wherever exterior gypsum sheathing is required at exterior walls.

6.9.2.2(7) Airborne sound insulation will be provided for gypsum board/steel stud assembly to close off air leaks and flanking paths by which noise can go around the assembly. Assemblies will be airtight. Recessed wall fixtures such as cabinets or electrical, telephone and television outlets and medical gas outlets, which perforate the gypsum board surface, will not be located back-to-back. In addition, any opening for fixtures will be carefully cut to the proper size and piping penetrations will be sealed. Conduit/duct/piping penetrations will be sealed with tape and filled at the plenum barrier. The entire perimeter of a sound insulating assembly will be made airtight to prevent sound flanking. An acoustic caulking compound or acoustical sealant as recommended by the acoustic consultant will be used to seal between the assembly and all dissimilar surfaces (including at window mullions) in accordance with the recommendations of the acoustic consultant.

6.9.2.3 Ceramic Tilework

6.9.2.3(1) Materials and workmanship for ceramic tilework will conform to the Terrazzo Tile and Marble Association of Canada (TTMAC) Tile Guide Specification Section 09 30 00 Tile (latest edition).

6.9.2.3(2) In order to reduce opportunities for the spread of infection, use of ceramic tile will be minimized in interior applications.

6.9.2.3(3) Floor tile installed on wet and exterior surfaces will have the following static coefficients of friction as per the American Society for Testing and Materials International (ASTM):

6.9.2.3(3)(a) Level Surfaces: Not less than 0.50 for wet and dry conditions.

6.9.2.3(3)(b) Stair Treads: Not less than 0.60 for wet and dry conditions.

6.9.2.3(3)(c) Ramp Surfaces: Not less than 0.60 for wet and dry conditions.

6.9.2.3(4) Exterior tiles will be frost-resistant and have a moisture absorption rating of 3.0% or less.

6.9.2.3(5) Control joints and expansion joints will be provided in conformance with the recommendations of the TTMAC Tile Installation Manual.

6.9.2.3(6) A waterproof membrane will be provided under ceramic floor tile in showers and other wet areas. The membrane may be trowel-applied, built-up, liquid-applied or sheet-applied.

6.9.2.3(7) Crack isolation membranes will be provided to resist crack transmission from the substrate due to lateral movement and designed for use in thin-set applications of tile over a cracked substrate. Materials used will be elastomeric sheets or trowel-applied materials suitable for subsequent bonding of ceramic tile.

6.9.2.3(8) Ceramic tile will be set and grouted with epoxy setting and grouting materials.

6.9.2.4 Acoustic Ceilings

6.9.2.4(1) Interior sound levels will be controlled to facilitate a safe working environment for CSB staff.

6.9.2.4(2) Acoustic ceiling tiles in a suspension system will be installed to provide the levels of sound attenuation identified in the Room Data Sheets to suit the intended function of the room.

6.9.2.4(3) Ceiling tiles in a suspension system will provide accessibility to the ceiling spaces where access is required to mechanical, electrical or other service systems.

6.9.2.4(4) Special surface-treated ceiling tiles, such as wood, mylar or metal-faced tiles, may be installed where

maintenance and ease of cleaning are priorities as well as the accessibility and acoustic requirements.

6.9.2.4(5) System design and components will meet seismic restraint requirements for a post-disaster building.

6.9.2.4(6) Standard acoustical panels and tiles will be designed for installation within the normal occupancy condition range of 15°C - 29°C and maximum 70% relative humidity. When the service use temperature and RH are expected to exceed these ranges, use of acoustical units specifically designed for such applications will be considered.

6.9.2.4(7) In any area where lay-in ceiling panels frequently need to be removed for plenum access, tiles will be provided with scratch-resistant surfaces and sealed edges.

6.9.2.5 Flooring

6.9.2.5(1) .

Flooring Types

All rooms except wet rooms

- The accepted product for the Authority will be Tarkett Granitt or approved equal.
- All joins will be hot welded seam.
- All installs will have a 150 mm Tarkett coved base or approved equal.
- Cove will not be capped, but will be straight cut, finished with clear silicone caulking.
- Flooring adhesive to be water soluble, low odour product.
- New installs will be hot welded to existing floor product.
- Where there is no existing product to butt against, edging will be finished with vinyl finishing strip as per manufacturers specifications.
- Flooring will not be finished with sealer and/or wax, but must be finished with high speed buffing as per manufacturers specification.

Wet Rooms

- The accepted product for the Authority will be Tarkett Eminent Safe T or approved equal.
- All joins will be hot welded seam.
- All installs will have a 150 mm Tarkett eminent coved base or approved equal.
- Cove will not be capped, but will be straight cut, finished with clear silicone Caulking
- Flooring adhesive to be solvent based, low odour product.
- New installs will be hot welded to existing floor product.
- Where there is no existing product to butt against, edging will be finished with vinyl finishing strip.

Stair Covering, Where Applicable

- Stair treads will be one piece solid vinyl Johnsonsite VIRTR (visually impaired roundel tread riser) with carborundum strip.
- Adhesive to be water soluble, low odour product.

Other Flooring

There may be floor surfaces that require specialized application such as Stonehard, poured epoxy, painted concrete or special vinyl. These applications will be reviewed on a per application basis.

In areas where floor patching has to take place, vendor must ensure replacement is to match as close as possible to existing flooring.

6.9.2.5(2) Materials and workmanship for flooring will conform to the National Floor Covering Association (NFCA) (http://www.nfcaonline.ca/) Specification Standards Manual. US Federal Specification RR-T-650e. http://www.wbdg.org/ccb/FEDMIL/rrt650e.pdf

6.9.2.5(3) The selection process for flooring materials will include considerations of cleaning and maintenance, pedestrian and rolling traffic, acoustics, infection control, and aesthetics.

6.9.2.5(4) Epoxy flooring in all wet areas will be water and slip-resistant and prevent water or moisture transmission to the substrate. Flooring will terminate at the walls

in the form of 150mm high flash coves in these areas.

6.9.2.5(5) Flooring on which wheeled or service vehicle traffic is anticipated and wear and damage may result will comprise of suitably heavy-duty materials.

6.9.2.5(6) Flooring in areas where cart or stretcher traffic is expected or where cleaning on a regular or emergency basis is necessary will be of a quality suitable for those purposes.

6.9.2.5(7) Flooring in washrooms will be impervious to water and have a slip-resistant finish.

6.9.2.5(8) Resilient tile products will be considered for flooring in service corridors and service areas.

6.9.2.5(9) Resilient Flooring

6.9.2.5(9)(a) Slip-resistant sheet vinyl will have a static coefficient of friction of 0.6 on level surfaces and 0.8 on ramps.

6.9.2.5(9)(b) Exposed surface will provide anti-bacterial activity against gram-positive and gram-negative micro-organisms. All seams will be welded. Areas surfaced in sheet flooring will have integral cove bases.

6.9.2.5(9)(c) Linoleum sheet flooring will be a homogenous sheet linoleum of primarily natural materials, consisting of linseed oil, wood flour, and resin binders mixed and calendared onto a natural jute backing. All seams will be welded. Areas surfaced in sheet flooring will have integral cove bases.

6.9.2.5(9)(d) Rubber flooring tile will be formulated with 100% virgin elastomers, reinforcing agents, soil-resisting agents, and migrating waxes compounded to create durability, excellent cleaning characteristics, and exceptional slip resistance. Stud designs will have chamfered edges with a sharply-defined

edge at the top for higher slip resistance, easier cleaning, superior maintenance and low vibration design to minimize vibration and noise. Areas surfaced with resilient tile flooring will have rubber bases.

6.9.2.5(9)(e) Tactile warning strips and stair nosings will be provided to assist the visually impaired.

6.9.2.5(9)(f) Adhesive for resilient flooring will meet or exceed EPA Standards for acceptable VOC concentration and emission rates.

6.9.2.5(10) Seamless Quartz Epoxy Flooring

6.9.2.5(10)(a) Seamless epoxy flooring will be a 100% solids, zero VOC, solvent-free system comprised of a two-component epoxy primer, a two-component epoxy resin and curing agent, coloured quartz aggregate broadcast into both primer and undercoat, and a high performance, UV-resistant two-component, clear epoxy sealer. Bases will be integral cove bases.

6.9.2.6 Acoustic Treatment

6.9.2.6(1) Acoustic treatment will be provided where sound attenuation, soundproofing or other sound control measures are necessary to create a safe and comfortable environment for staff and where confidentiality is paramount.

6.9.2.6(2) For STC ratings, refer to Appendix 1D.

6.9.2.6(3) Sound control will include:

6.9.2.6(3)(a) Attenuation of sound throughout the building;

6.9.2.6(3)(b) Sound isolation between the exterior and interior spaces;

6.9.2.6(3)(c) Sound isolation between interior spaces within the CSB at both horizontal and vertical separations;

6.9.2.6(3)(d) Sound and vibration isolation of building service noises and sound isolation of building service rooms.

6.9.2.6(4) When a partition is used for sound isolation, as specified in Appendix 1D, the sound control construction will extend from slab to slab. Where full height walls are provided, ceiling systems will not be required to conform to the Sound Transmission ratings specified in Appendix 1D. Design-Builder acknowledges that; any mechanical equipment, located adjacent to rooms listed in Appendix 1D, will be positioned in order to minimize noise transmission into the room. Where it is not possible to re-position equipment, acoustic insulation will be provided in the ceiling system.

6.9.2.6(5) Optimum sound isolation requires that the integrity of gypsum board partitions and ceilings (mass) never be violated by vent or grille cut-outs or by recessed cabinets, light fixtures, etc.

6.9.2.6(6) Where penetrations are necessary, placing them back-to-back and next to each other will be minimized. Electrical boxes and medical gas outlets will be staggered, preferably by at least one stud space. Mineral fibre insulation will be used to seal joints around all cut-outs such as electrical, TV and telephone outlets, plumbing escutcheons, recessed cabinets, and bathtubs.

6.9.2.6(7) Constructions such as ducts, rigid conduits, or corridors that act as speaking tubes to transmit sound from one area to another will be minimized. Common supply and return ducts will have sound attenuation liners at the diffuser and/or grill to maintain assemblies' STC. Conduit will be sealed.

6.9.2.6(8) To isolate structure-borne vibrations and sound, vibrating equipment will have resilient mountings to minimize sound transfer to structural materials. Ducts, pipes, and conduits will have resilient, non-rigid boots or flexible couplings where they leave vibrating equipment; and they will be isolated from

the structure with resilient gaskets and sealant where they pass through walls, floors, or other building surfaces.

6.9.2.6(9) Acoustic screens, vibration isolators, and carefully selected exterior equipment will be used to prevent exterior noise that neighbours may find offensive.

6.9.2.7 Painting and Protective Coatings

6.9.2.7(1) .

Paints

Walls, doors and shelving

- The accepted product for the Authority will be eggshell or semi gloss.
- Application: brush, roller or spray
- Clean up: warm water
- Thinner if needed: water
- Colour selection / patterning will be at the discretion of the Authority

Door frames and metal doors

- The accepted product for the Authority will be semi gloss
- Application: brush, roller or spray
- Clean up: warm water
- Thinner: water
- Colour selection / patterning will be at the discretion of the Authority

Wood finish doors

- The accepted product for the Authority will be Clear Coat Interior Varnish
- Application: brush, roller or spray
- Clean up: mineral spirits
- Thinner: mineral spirits

Paint Grade Doors

- The accepted product for the Authority will be semi gloss
- Application: brush, roller or spray
- Clean up: warm water

- Thinner if needed: water
- Colour selection / patterning will be at the discretion of the Authority

Ceilings

- The accepted product for the Authority will be flat
- Application: brush, roller or spray
- Clean up: warm water
- Thinner: water
- White will be the preferred colour for all painted ceilings

New wall / product finish

- The accepted product for the Authority will be latex sealer
- Application: brush, roller or spray
- Clean up: warm water
- White will be the preferred colour

Exterior walls

- The accepted product for the Authority will be exterior semi gloss latex
- Application: brush, roller or spray
- Clean up: warm water
- Thinner: up to 10% water for spraying applications
- Colour selection will be at the discretion of the Authority

Floors, concrete

- The accepted product for the Authority will be 2 part finish equal to Cloverdale Paints ClovaCoat 300, base component A, curing agent B
- Primer if needed will be equal to Preptech 83020, base component A, curing agent B
- Application: brush, roller, spray (preferred)
- Thinner: C70 or C25
- Colour selection will be at the discretion of the Authority

6.9.2.7(2) Materials and workmanship will conform to Master Painters Institute (MPI) Architectural Painting Specification Manual (latest edition).

6.9.2.7(3) Exterior paints and painting will be of a quality to protect the substrate materials from weather and climate conditions.

6.9.2.7(4) A visually harmonious and aesthetically coordinated appearance will be achieved across all areas of the CSB.

6.9.2.7(5) Exterior and interior finish materials will have surface finishes either as manufactured and integral to the finish material or as applied to the surface of the finish material by paint or special coating.

6.9.2.7(6) Exterior and interior materials subject to corrosion from exposure to moisture or other corrosive agents and where painting is deemed to be insufficient protection will receive a special protective coating. Such materials include exterior and interior structural, galvanized, and miscellaneous steel.

6.9.2.7(7) In interior areas, indoor air quality will be a priority, and paints and paint materials will have a minimal volatile organic compound level.

6.9.2.7(8) Interior paint materials will be of a quality to withstand regular or repeated cleaning as the function of the area dictates.

6.9.2.7(9) Handrails, doors, and frames will be painted a contrasting colour from walls in consideration of the visually impaired.

6.9.2.7(10) Parking area, stair wells walls and ceilings shall be painted white.

6.9.2.7(11) Materials used will be lead and mercury-free.

6.9.2.7(12) Seamless epoxy wall coatings will be a two-component, high solids, Zero or low VOC, solvent-free, epoxy glaze wall coating, and will be seamless and abrasion, chemical, and UV-resistant.

6.9.2.7(13) Paint materials will be rated under Environmental Notation System (ENS) with acceptable VOC ranges

as listed in the MPI Approved Product List under “E” ranges.

6.9.2.7(14) Only materials having a minimum MPI “Environmentally Friendly” E2 rating based on VOC (EPA Method 24) content levels will be used.

6.9.2.8 Special Wall Coverings

6.9.2.8(1) Materials and workmanship will conform to the Master Painters Institute (MPI) Architectural Painting Specification Manual (latest edition).

6.9.2.8(2) Wall coverings may be required on interior walls to satisfy aesthetic considerations beyond the application of paint and create a comfortable working environment in staff work areas, and a safe and inviting environment in public areas.

6.9.2.8(3) Wall coverings will not be used in areas that may have excessive moisture present or require high and frequent maintenance.

6.9.2.8(4) Sealers and adhesives will be non-toxic, water-based type and meet requirements of Canadian “Eco Logo” program or equivalent. TVOC emissive content will not be more than 20 grams per litre.

6.10 Specialties (Division 10)

6.10.1 Basic Requirements

6.10.1.1 Specialty products will be manufactured for the specific purposes intended, installed in strict accordance with the manufacturer’s directions.

6.10.2 Performance Criteria

6.10.2.1 Tackboards and Whiteboards

6.10.2.1(1) Tackboard surfaces will be of a type and quality to allow pin penetration of the surface materials and have reasonable resistance to deterioration.

6.10.2.1(2) Whiteboard surfaces will be of a type to allow use of felt-type writing instruments and allow erasing and cleaning with minimal effort.

6.10.2.1(3) Tackboards and whiteboards will be complete with manufactured frames and accessory trays.

6.10.2.1(4) Whiteboard writing surfaces will be porcelain ceramic on steel surface, magnetic, scratch and abrasion-resistant and have maximum contrast, glare control, and reflectivity, and be scratch and abrasion-resistant.

6.10.2.1(5) Lamination adhesive used for tackboards and whiteboards will be non-toxic, water-based adhesive.

6.10.2.2 Compartments and Cubicles

6.10.2.2(1) Compartments and cubicles will include toilet partitions, change cubicles, shower partitions, and other compartments and cubicles requiring privacy and security.

6.10.2.2(2) Exposed surfaces will be permanent, water-resistant, corrosion-proof, and readily cleaned and maintained.

6.10.2.2(3) Partitions and standards will be secured to the floor or ceiling structure, and resistant to lateral loading and impact.

6.10.2.2(4) Compartment/cubicle doors will be of material matching the partitions and include permanent, purpose-made hardware. Doors and hardware will provide privacy and security and be handicap accessible where required.

6.10.2.2(5) Change compartments will be complete with a mirror.

6.10.2.2(6) Toilet Partitions

6.10.2.2(6)(a) Sheet metal will be galvannealed steel conforming to ASTM A653 with minimum ZF001 (A01) zinc coating. Finish for steel surfaces will be polyester, baked enamel.

6.10.2.2(6)(b) Stainless steel will be Type 304 conforming to ASTM A240 with No. 4 finish.

6.10.2.2(6)(c) Fibre-reinforced plastic (fibreglass) will be moisture resistant.

6.10.2.2(7) Change Cubicle Partitions

6.10.2.2(7)(a) Where not adjacent to showers, partitions will conform to quality assurance requirements specified for toilet partitions.

6.10.2.2(8) Shower Partitions

6.10.2.2(8)(a) Partitions will be solid phenolic laminated thick stock, factory-laminated with decorative finish both faces of core and conforming to CAN3-A172 or NEMA LD3.

6.10.2.3 Wall Guards and Corner Guards, Handrails, Wall Protection, Door Edge and Door Frame Protection

6.10.2.3(1) Wall and corner guards

6.10.2.3(1)(a) Protection of walls and exposed wall corners at service areas and other areas will be provided, as required by the Authority, to prevent damage due to impact from traffic such as equipment and service carts.

6.10.2.3(1)(b) Materials selected will be determined by the amount and degree of impact anticipated. Corner guards shall be stainless steel or better.

6.10.2.3(1)(c) Wall and corner guards will be secured to reinforcing and backing in the walls, which will be sufficient to withstand expected impact loads.

6.10.2.3(2) Handrails

6.10.2.3(2)(a) Handrails will be provided in clinical office corridors and other ambulatory client areas.

6.10.2.3(3) Wall protection

6.10.2.3(3)(a) Sheet wall protection will be applied to wall areas identified in the Room Data Sheets and where the impact damage anticipated is of a larger area of wall than would be protected by bumper guards.

6.10.2.3(3)(b) Sheet wall protection to faces of doors will be applied where identified in the Room Data Sheets and where impact damage is anticipated and may complement the installation of door edge and frame protection.

6.10.2.3(3)(c) Wall and corner guards will be secured to reinforcing and backing in the walls, which will be sufficient to withstand expected impact loads. Wall protection will be high impact stain-resistant conforming to ASTM D4226 with anti-microbial additives.

6.10.2.3(3)(d) Wall protection handrails and corner guard products will be stain-resistant to pen marks, paint, and graffiti, and will withstand commercial cleaners without fading or staining. These products will also contain anti-microbial additives to retard mildew and bacterial growth.

6.10.2.3(4) Door Edge and Door Frame Protection

6.10.2.3(4)(a) Door edges and door frames in client areas will be protected from damage such as impact caused by the regular movement of carts and other wheeled vehicles.

6.10.2.3(4)(b) Door edges and door frames in clinical and service areas will be protected from damage such as impact caused by regular and non-regular service vehicles.

6.10.2.3(4)(c) Bumper guards, crash rails, handrails, and corner guards will be high impact-resistant extrusion conforming to ASTM D4226 and with anti-microbial additive.

6.10.2.4 Elevated Access Flooring

6.10.2.4(1) Materials, workmanship, and test methods will conform to quality standards outlined in 6.10.1.1 and the “Recommended Test Procedures for Access

Floors" as published by the Ceilings and Interiors Systems Construction Association (CISCA).

6.10.2.4(2) The electrical resistance of the access floor system will be tested in accordance with NFPA 99.

6.10.2.4(3) Elevated access flooring may be considered where electronic and data cabling, outlets, junctions, etc., in the floor are in heavy concentration and must be regularly serviced, added to or altered.

6.10.2.4(4) Elevated access flooring may be considered where flexibility of access points over a floor area, or part thereof, is required rather than a focused or distributed single access point.

6.10.2.4(5) Panel-to-understructure (metal-to-metal) connections will provide less than 10 ohms resistance without grounding clips.

6.10.2.4(6) The access floor system assembly will consist of modular floor panels laid out on a grid system, supported by and secured to the understructure. Panels will be supported by an adjustable pedestal base that positively locates, engages, and secures panels, and that accommodates horizontal grid members only as required.

6.10.2.4(7) All components of the access floor system will be of steel construction with manufacturer's standard corrosive-resistant finishes, except for panel-cementitious core.

6.10.2.4(8) Panels will be easily removable by one person with standard tools and a lifting device and will be interchangeable, except for cut-outs for special conditions. Cable cut-out panels will be interchangeable with solid panels.

6.10.2.4(9) The completed surface of floor system will provide a continuous smooth floor surface and under-floor space to accommodate electrical, communication, computer service lines and mechanical ducting, and may serve various areas as air supply or return

plenums. The area below the raised access floor system may be a pressurized area.

6.10.2.4(10) Panels will be square, of welded steel components with an enclosed galvanized steel bottom pan formed in a flat or uniform pattern of square or round pockets. The unitized panels will be internally filled with lightweight concrete to improve sound characteristics and provide performance value.

6.10.2.4(11) Panels may be surfaced with resilient floor tiles.

6.10.2.4(12) Pedestals, when secured to subfloor, will be capable of supporting a minimum axial load without deformation.

6.10.2.4(13) Panels will support a minimum concentrated load of 566 kg on a 25 mm square point anywhere on the panel, with a deflection not to exceed 2.5 mm.

6.10.2.4(14) Panels will support a rolling load of 453 kg on a 75 mm x 20.6 mm wheel at 10 passes, and 800 lbs on a 150 mm x 38 mm wheel at 10,000 passes.

6.10.2.4(15) Ultimate load will be 1721 kg.

6.10.2.5 Building Signage

6.10.2.5(1) Building signage will be highly visible, clear, concise, and well-differentiated from surrounding information, notices, advertising, etc.

6.10.2.5(2) Materials, colours, letter fonts, sizes, and other aesthetic and functional considerations will conform to the overall ‘way finding’ design of the Centennial Building.

6.10.2.5(3) International symbols will be used where and as applicable.

6.10.2.6 Metal Lockers

6.10.2.6(1) Individual and shared storage facilities will be provided in designated staff areas for CSB staff and in accessible secure areas suitable for staff to secure personal effects.

6.10.2.6(2) Such storage facilities may be metal lockers and metal locker systems of sizes, numbers, and groupings as identified in the Room Data Sheets and drawings.

6.10.2.6(3) Sheet metal will be galvannealed steel conforming to ASTM A653 with ZF001 (A01) zinc coating.

6.10.2.6(4) Finish for steel surfaces will be polyester baked enamel.

6.10.2.6(5) Single, double, or multiple-tier metal lockers for staff use will be complete with provision for locking with padlock, number plates, and hanging hooks.

6.10.2.7 Storage Shelving Systems

6.10.2.7(1) Storage systems for materials will be provided in designated storage areas.

6.10.2.7(2) Adjustable shelving systems may be specifically manufactured for storage purposes, such as plywood or steel-slotted angle industrial shelving for bulk materials of plastic laminate-faced plywood for clean storage.

6.10.2.7(3) Mobile storage systems for files will be a high-density system designed to make maximum use of available space by eliminating need for access aisle for each run of shelving. System must be installed and braced to resist seismic loads.

6.10.2.8 Washroom, Shower and Hand Wash Sink Accessories

6.10.2.8(1) Accessories in washrooms, showers and at hand wash sinks will be supplied and installed by the Design-Builder unless otherwise noted. Type, size, and number of accessories will be determined by the numbers and categories of users.

6.10.2.8(2) Washroom accessories will include but are not limited to the following:

6.10.2.8(2)(a) Soap dispensers (Authority provided, Design-Builder installed)

6.10.2.8(2)(b) Toilet paper dispensers (Authority provided, Design-Builder installed)

6.10.2.8(2)(c) Paper towel dispensers (Authority provided, Design-Builder installed)

6.10.2.8(2)(d) Paper towel waste bin

6.10.2.8(2)(e) Mirrors

6.10.2.8(2)(f) Angled mirrors as required

6.10.2.8(2)(g) Handicap grab bars (with integral tactile grip finish)

6.10.2.8(2)(h) Coat hooks

6.10.2.8(2)(i) Sanitary napkin dispensers

6.10.2.8(2)(j) Sanitary napkin disposals

6.10.2.8(2)(k) Baby change tables

6.10.2.8(2)(l) 'In-Use' indicators

6.10.2.8(3) Shower rooms or showers in washrooms will include but are not limited to the following accessories:

6.10.2.8(3)(a) Shower curtain track or rod

6.10.2.8(3)(b) Handicap grab bars

6.10.2.8(3)(c) Coat hooks

6.10.2.8(4) Hand wash sink accessories will include but are not limited to the following:

6.10.2.8(4)(a) Soap dispensers (Authority provided, Design-Builder installed)

6.10.2.8(4)(b) Paper towel dispensers (Authority provided, Design-Builder installed)

6.10.2.8(4)(c) Paper towel disposals

6.10.2.8(5) Accessories with safety features will be selected for areas where there is increased risk of client injury,

and be in accordance with British Columbia Ministry of Health Standards.

6.10.2.8(6) Recessed dispensers (such as those for paper towels, soap, and waste receptacles) will not be used.

6.10.2.8(7) Accessories will be commercial grade and free from imperfections in manufacture and finish.

6.10.2.8(8) Washroom accessory and installation will allow cleaning and maintenance of the accessory and surrounding wall area.

6.10.2.8(9) Fittings will have concealed fastening for security and discouragement of tampering.

6.11 Equipment (Division 11) – Not Used

6.12 Furnishings (Division 12)

6.12.1 Basic Requirements

6.12.1.1 Window coverings will allow control of exterior light entering the room during daylight hours and provide privacy during daylight and non-daylight hours.

6.12.1.2 Window coverings will be designed to minimize light spillage into residential areas.

6.12.1.3 Should window coverings be required to provide black-out functions, materials, tracks, seals, and operation will be suited to the purpose.

6.12.1.4 Window coverings will be designed and manufactured using materials and mechanisms that would minimize cleaning and maintenance operations and maximize infection control.

6.12.1.5 Provide window coverings as follows:

6.12.1.5(1) to all exterior windows, preferably vertical blinds but other products will be considered providing they provide privacy, sun and heat control consistent with the energy management plan, are easy to clean and do not support or provide a surface that encourages spread of infectious disease (i.e. do not become electrostatically charged);

6.12.1.5(2) to all interior windows where privacy may be a concern; and

6.12.1.5(3) all window coverings must be easy to remove and clean.

6.12.2 Performance Criteria

6.12.2.1 Window Shade Systems

6.12.2.1(1) Will be PVC or vinyl-coated polyester or fibreglass yarn.

6.12.2.1(2) Will be waterproof, washable, rot-proof, flame-resistant, fungal and bacteria-resistant, colourfast to light, glare-reducing, and able to control heat gain and provide external visibility.

6.12.2.1(3) Will pass Small Scale Vertical Burn requirements in accordance with CAN/ULC-S109 or NFPA-701.

6.12.2.1(4) Will be tested in accordance with ASHRAE Standard 74073 for shading coefficient, fungal resistance in accordance with ASTM G21, and bacterial resistance.

6.12.2.1(5) Will meet infection control requirements for window shade systems.

6.12.3 Laboratory Casework and Countertops

6.12.3.1 Laboratory Grade Plastic Laminate Casework and Countertops: Chemical-resistant plastic laminate, NEMA LD-3, with backing sheet over 45 pound density MDF or particleboard core; Core shall have no added urea formaldehyde. Provide with 3 mm PVC edge band at countertops and casework edges; color to match plastic laminate. Minimum thickness at countertops: 25 mm (1 inch). Minimum core thickness at typical casework: 19 mm (0.75 inch) except provide 6 mm (0.25 inch) thick hardboard at fully-concealed unit backs. Core at toe space shall be marine grade plywood.

6.12.3.2 Epoxy Countertops and Sinks: At sinks in typical casework, provide epoxy sinks with epoxy countertop surround minimum 600 mm (24 inches) wide on both sides of sink by full depth of countertop. Epoxy thickness: 25 mm (1 inch). Color: Green, light grey, dark grey, or blue as selected by the Authority; ensure match with available laboratory grade plastic laminate at

adjacent casework and countertop surfaces. Provide minimum 25 by 25 by 3 mm (1 inch by 1 inch by 1/8 inch) epoxy coated steel rail bracing for full width of base unit at underside of sink.

6.12.3.3 Countertop Brackets: Where no base cabinets are indicated, provide countertop brackets similar to Rakks EH-1818 or EH-1824 brackets by Rangine spaced at maximum 1200 mm (48 inches).

6.12.3.4 Autopsy Room:

6.12.3.4(1) Provide stainless steel counter with minimum thickness 1.30 mm (0.050 inch), over wood core, and integral sink with minimum thickness 1.0 mm (0.042 inch); Basis of Design: Elkay "Lustertone".

6.12.3.4(2) Provide proprietary downdraft dissection table with stainless steel top and integral ventilation capability, pulling air down and away from technicians, similar to Model LM-1 by Thermo Shandon Canada.

6.13 Special Construction (Division 13)

6.13.1 Performance Criteria

6.13.1.1 Cold Rooms

6.13.1.1(1) Short-term or long-term refrigerated storage for medical supplies, chemicals, food stuffs, and other goods and materials will be accommodated in engineered and manufactured insulated “walk-in” rooms.

6.13.1.1(2) Rooms will be sized and the refrigeration level calibrated for the specific and particular goods or materials to be stored.

6.13.1.1(3) Cold room panel joints, when tested in accordance with ASTM E283 – Air Leakage Rate Testing and ASTM E96 – Water Vapour Permeance Rate Testing, will have an air leakage rate of 75 Pa OF 0.00m3/h-m2 and a water vapour permeance rate of 0.00 perms.

6.13.1.1(4) Cold room wall and ceiling panels will be listed with Underwriters Laboratories of Canada (ULC) in accordance with ULC/ORD-C376-1995 – Fire

Growth of Foamed Plastic Insulated Building Panels in a Full-Scale Room Configuration.

6.13.1.1(5) Positive drainage of condensation occurring within wall construction and water entering at joints will be provided to exterior face of wall in accordance with NRC “Rain Screen Principles”.

6.13.1.1(6) Enclosure elements will be designed to accommodate damage to infills, racking of joints, breakage of seals, water penetration, and glass breakage by using expansion joints, and allowing wall and structural movement without permanent distortion.

6.13.1.1(7) Completed cold rooms will have exterior-to-interior sound attenuation of not less than STC 30.

6.13.1.1(8) Room elements will be designed and assembled to be secured to room frame so that stresses in sealants and seals are within sealant manufacturer’s recommended maximum.

6.13.1.1(9) Room assembly will be designed to permit easy replacement of components.

6.13.1.1(10) Allowance will be made for ceiling, piping, conduits, and other interior dead loads imposed on cold room.

6.13.1.1(11) Doors will be manufacturer’s standard, complete with pre-wired light switch, door closer, and dial thermometer. Freezer door will be supplied with anti-condensate heater, heated vent, and pre-wired sill.

6.13.1.1(12) Enclosure assembly will be complete with exterior skin, glass units, access units (doors, etc), inner air/vapour seal membrane, thermal insulation, interior finish, alarms, condensing unit, evaporating coil, compressor, and lighting as required for cold room or freezer operation. Defrost heating strips will be installed at doors and at wall-floor interfaces.

6.13.1.1(13) Rooms will be complete with shelving, bins, or other storage equipment to suit the specific and particular goods or materials to be stored.

6.14 Conveying Equipment (Division 14)

6.14.1 Basic Requirements

6.14.1.1 The elevator and systems will be designed to accommodate the requirements / needs of the CSB in a manner which contributes to the overall efficiency and effectiveness of CSB operations.

6.14.1.2 Elevator systems will be designed to ensure there is sufficient capacity to accommodate the wide range of user and functionality requirements, in a manner which satisfies expectations for safety, reliability, responsiveness, accessibility and operational efficiency.

6.14.1.3 Provisions will be considered for persons with special mobility needs and other forms of disabilities, such as learning difficulties or mental disorders.

6.14.1.4 Elevators will support access provisions, for people and materials, to all functional areas. Elevator access to all building levels, including mechanical levels, will be provided by at least one elevator.

6.14.1.5 Equipment provided will have a proven track record of at least five years field operation in Canada in similar environments and of similar configuration.

6.14.1.6 Durable elevator cab finishes (including stainless steel fronts as well as hand and bumper rails) will be provided.

6.14.1.7 Emergency power operation of elevators will be provided such that all elevators are fed with emergency power and at least one is capable of operating at a time.

6.14.1.8 Elevators used for support services will be configured with platforms to accommodate easy movement of material carts. Requirements for transport of heavy equipment will be considered and accommodated by at least one elevator.

6.14.2 Performance Criteria for Elevators

6.14.2.1 Scope of Work

6.14.2.1(1) Supply and install a group of two (2) elevators, with equipment and performance characteristics as generally described in this specification and indicated in Architectural drawings, in accordance with the Contract documents. Provide all necessary components to make elevator systems fully

operational and functional, whether or not specifically referenced in this outline specification.

6.14.2.1(2)

6.14.2.1(3) Provide all permits, labour, materials, products, equipment, services and all else necessary for the design, manufacture, delivery, installation and services required for a complete and fully functioning elevator system.

6.14.2.1(4) Obtain and pay for governmental design submission, registration, inspection and permit, as required (except for ownership and operation license), and make such tests as required by the British Columbia Safety Authority prior to licensing.

6.14.2.2 Codes, By-laws, and Regulations

6.14.2.2(1) Provide equipment and perform work in accordance with all local, provincial and federal codes, by-laws, and regulations.

6.14.2.2(2) Provide equipment and perform work in accordance with the latest edition of the B44 Safety Code for Elevators and any other code which may govern the installation.

6.14.2.2(3) At the time of bid submission and during the contract provide written notification of any proposed changes in codes, by-laws, or regulations which may affect the work.

6.14.2.3 Wiring Diagrams and Manuals

6.14.2.3(1) Prior to substantial performance, supply to the Authority, three sets of manuals which include information itemized below.

6.14.2.3(1)(a) Design Submission documents submitted to BCSA for permit

6.14.2.3(1)(b) Final shop drawings

6.14.2.3(1)(c) Description of special features such as firefighters emergency operation,

independent service, emergency power operation, , two-way voice communication, and security operation.

6.14.2.3(1)(d) As-built wiring and schematic diagrams.

6.14.2.3(1)(e) Schedule of recommended routine maintenance procedures.

6.14.2.3(1)(f) Description of diagnostic procedures, including complete Fault Code listing and troubleshooting instructions.

6.14.2.4 Training

6.14.2.4(1) At completion of the job, provide a training session for the Authority consisting of a review of the documentation and operation of the equipment and features.

6.14.2.5 Trademarks

6.14.2.5(1) Arrange that no equipment visible to the public has any trademark, company name, or logo.

6.14.2.6 Barrier-Free Access

6.14.2.6(1) Arrange the controls and fixtures to meet barrier-free access requirements of the B44 Safety Code for Elevators (latest edition) and any other code which may govern the installation.

6.14.2.7 Fixtures

6.14.2.7(1) Unless indicated otherwise in the Specifications or Drawings, provide a choice of fixtures from a third party supplier and your standard products.

6.14.2.7(2) Provide buttons with LED illumination and stainless steel targets.

6.14.2.8 Operating Conditions

6.14.2.8(1) Provide equipment that will operate normally when the machine room and hoistway temperature is between 5 and 35 degrees Celsius.

6.14.2.8(2) Provide equipment that will operate normally when the power supply is within 10 percent of its rated voltage.

6.14.2.9 Seismic requirements

6.14.2.9(1) Comply with Section 8.4 (Elevator Safety Requirements For Seismic Risk Zone 1) of the B44 Safety Code for Elevators and any other code which may govern the installation.

6.14.2.10 Maintainability /

6.14.2.10(1) Arrange the equipment such that there are no times, dates, trips, or other counters that would shut down the equipment or change its operation.

6.14.2.10(2) Elevator equipment provided under this specification shall not contain proprietary features which limit the Authority's ability to engage a registered elevator maintenance contractor, other than the original manufacturer / installer, to provide routine maintenance services.

6.14.2.10(3) In the event specialized tools or software are required to perform routine maintenance services, such tools shall be either provided as "on board" equipment, or as separate devices. Such tools or software shall be provided with the equipment and shall become the property of the Authority.

6.14.2.11 Equipment Summary

6.14.2.11(1) Provide a group of two (2) elevators, located as indicated on the Architect drawings, near the main entrance with the following minimum performance and dimensional requirements:

6.14.2.11(1)(a) Machine-room-less traction equipment.

6.14.2.11(1)(b) Minimum Contract speed of 0.76 m/s (150 fpm).

6.14.2.11(1)(c) Capacity of 2040 kg (4500lb).

6.14.2.11(1)(d) Two speed side opening entrances with a width of 1220 mm (48") and a height of 2134 mm (84").

6.14.2.11(1)(e) Floors served: E1: 1 to 3; E2: 1 to 3, PH

6.14.2.11(1)(f) Stops / Openings :
E1: 3 Stops / 3 Openings
E2: 4 Stops / 6 Openings (Rear at 1, 2)

6.14.2.11(1)(g) Approximate Travel:
E1: 9.0 m (29'-6"); E2: 13.5 m (44'-3");
Confirm from Architectural Drawings

6.14.2.11(1)(h) Minimum clear inside cab dimensions of 1675 mm (5'-6") wide by 2415 mm (7'-11") deep.

6.14.2.11(1)(i) Minimum cClear cab height to suspended ceiling of 2590 mm (8'6").

6.14.2.11(1)(j) Hoistway, pit, overhead dimensions as per manufacturer's specifications.

6.14.2.11(1)(k) Car Loading Classification: Class A

6.14.2.11(1)(l) Core Configuration: 1 across 1; Refer to Architect drawings.

6.14.2.11(1)(m) Operation: Duplex, full selective collective.

6.14.2.11(1)(n) Control: VVVF with Regenerative Drive

6.14.2.12 Elevator Car Machine Room Equipment – Machine-Room-Less Traction Elevators

6.14.2.12(1) Provide a gearless traction hoisting machine located within the hoistway.

6.14.2.12(2) Provide a spring applied electric brake, held open by an electro-magnet actuated by the controller. Design the brake to automatically apply in event of interruption of power supply from any cause.

6.14.2.12(3) Provide an automatic reset governor located in the hoistway that can be maintained from the car top.

When the governor has tripped, arrange that it will be reset when the car is moved in the up direction.

6.14.2.12(4) Provide sound and vibration isolation pads such that there is no direct contact between the machine and the building structure.

6.14.2.12(5) Provide an emergency brake to stop the elevator if it overspeeds or if it moves more than 500 mm (20") away from the floor with the doors open.

6.14.2.12(6) Provide a solid state drive complete with isolation transformers, filters (to meet IEEE Standard 519-1992 for Special Applications), and isolation pads.

6.14.2.12(7) Provide a digital velocity encoder on the motor, giving feedback to the controller on motor speed and position.

6.14.2.12(8) Provide a microprocessor based controller consisting of relays, contactors, switches, capacitors, resistors, fuses, circuit breakers, overload relays, power supplies, circuit boards, static drive units, wiring terminal strips, and related components all enclosed in a cabinet with hinged door panels.

6.14.2.12(9) Provide an electrically released brake system, to permit momentary nudging of elevator within the hoistway under test or emergency conditions.

6.14.2.12(10) Locate controller room remotely at roof level, immediately above, or in rear proximity to elevator core.

6.14.2.13 Hoistway Equipment

6.14.2.13(1) Provide entrances consisting of doors, frames, sills, sight guards, door hangers, tracks, interlocks, door closers, gibs, and all other equipment required for a complete installation. Provide entrance doors and frames finished in brushed stainless steel.

6.14.2.13(2) Provide standard ‘T' section steel guide rails for the car (and counterweight). Install guide rails using brackets fastened to the building structure. Clamp

the guide rails to the bracket with clips arranged to prevent any horizontal movement of the rail. Join the rail sections using steel backing plates.

6.14.2.13(3) Provide hoist ropes/belts of sufficient size and number to lift the load and ensure proper wearing qualities. Provide either steel ropes consisting of at least six strands wound around a hemp core centre or Polyurethane coated belts with high-tensile-grade zinc-plated steel cords. Ensure that all the ropes for a particular elevator are from the same manufacturing run.

6.14.2.13(4) Provide a counterweight to counterbalance the elevator for smooth and economical operation with cast iron or steel plate weights contained in a structural steel frame. Provide a counterweight equal to the weight of the elevator car plus between 45 and 50 percent of the rated capacity.

6.14.2.13(5) Provide for the car (and counterweight) either spring mounted roller guides or slipper guides located at the top and the bottom of the car (and counterweight frame).

6.14.2.13(6) Provide fascias from each hall sill to the entrance header below. Include express zones. Extend the fascias into the pit and the overhead.

6.14.2.13(7) Provide a car frame constructed of steel channels and a platform constructed of steel channels with a wood or metal sub-floor. Isolate the frame and platform from one another so that there is no metal to metal contact in order to prevent the transmission of noise and vibration. Mount the elevator cab shell on the platform in alignment with the hoistway entrances. Isolate the cab from the car frame and platform.

6.14.2.14 Cab Equipment

6.14.2.14(1) Provide durable elevator cab finishes (including stainless steel fronts, hand and bumper rails, and indirect lighting) to suit the building. Cab finishes to

be selected from the manufacturer's standard range of options and approved by the Authority.

6.14.2.14(2) Provide car doors, jambs, headers, hangers, tracks, door closers, gibs, electrical contacts, and all other equipment required for a complete installation.

6.14.2.14(3) Provide swing return car stations incorporating floor push buttons, door open and close buttons, an alarm button, and other fixtures required for normal operation. Provide for each floor button a call registered light and momentary audible tone. Provide a Firefighters' Emergency Operation panel. Provide below the car station a locked service cabinet containing devices other than those used for normal operation. Engrave the car station with the elevator capacity, identification number, government installation number, and other markings required by code.

6.14.2.14(4) For each elevator with front and rear doors provide 2 car stations. Otherwise, provide one car station per elevator.

6.14.2.14(5) Provide a digital (dot matrix or segmented) car position indicator located above each car station with a minimum 50 mm (2") high display.

6.14.2.14(6) Do not install any certificates or licences in the cab. Arrange and pay for a variance from the Authority Having Jurisdiction for this if required.

6.14.2.14(7) Provide a voice synthesizer for each elevator with automatic verbal announcement of each floor at which the elevator stops. Provide a system that will handle a variety of other messages and indications as may be required by the Authority at a later date.

6.14.2.14(8) Provide an infra-red multiple beam door protective device that protect the full width and up to 1830 mm (6') from the floor of the door opening. Locate the device 25 mm (1") behind from the leading edge of the door.

6.14.2.14(9) Provide battery operated emergency cab lighting.

6.14.2.14(10) Provide a two speed exhaust fan mounted in the cab top.

6.14.2.14(11) Provide one set of cab protective pads that cover all walls and the cab front return panel along with pad hooks. Provide pad hooks in each elevator.

6.14.2.14(12) Provide a heavy duty closed loop door operator to open and close the car and hoistway doors simultaneously.

6.14.2.14(13) Provide a hands-free two-way voice intercommunication / telephone system with a lobby rescue station and remote handset. Provide communication from each car enclosure to designated CACF and / or Central Security station located in adjacent Hospital.

6.14.2.15 Hall Equipment

6.14.2.15(1) Where required, provide hoistway access switches located in the entrance frame or in the hall door sight guard.

6.14.2.15(2) 1.1.2.18(2) Provide hoistway door unlocking devices (by lunar key) on the hall doors at all floors.

6.14.2.15(3) Provide one riser of hall stations for each elevator. Provide in each hall station illuminating up and down push buttons (at terminal floors, provide only one button) located with their centreline 1070 mm ± 25 mm (42" ± 1") above the floor.

6.14.2.15(4) Provide a digital (dot matrix or segmented) hall position indicator located above the main floor entrance with a minimum 50 mm (2") high display.

6.14.2.15(5) Provide hall lanterns with electronic tones at each entrance.

6.14.2.15(6) Provide a remote fire recall switch for each group of elevators at the CACF.

6.14.2.15(7) Provide, at the CACF, a lobby panel for the elevators that includes car position indicators, in service pilot lights, parking switches, emergency power switches

and indicators, firefighters emergency operation keyswitch and indicators, voice communication and other elements required by the specification.

6.14.2.15(8) CACF is remotely located in adjacent building.

6.14.2.15(9) Integrate monitoring of elevators E1 and E2 with existing Elevator Monitoring system remotely located in the adjacent building by providing wiring and interface connection to that location. Make the system fully functional by providing the software and equipment required.

6.14.2.16 Electric Wiring

6.14.2.16(1) Provide copper wiring to connect the equipment.

6.14.2.16(2) Run the wire in metal conduit, duct or electrical metallic tubing.

6.14.2.16(3) Provide travelling cable between car stations and the controller in the machine room.

6.14.2.16(4) Provide at least six pair spare shielded wires and a spare coaxial conductor in the travelling cable. This is in addition to the wiring identified elsewhere in this specification.

6.14.2.16(5) Provide at least ten percent spare wires in each travelling cable.

6.14.2.16(6) Provide on one controller a separate junction box for non-elevator devices such as telephones, cameras, and security systems.

6.14.2.17 Operational Features

6.14.2.17(1) Provide electronic card access to any elevators which serve any mechanical levels including the roof.

6.14.2.17(2) Provide for installation of security cameras in the elevators. Install and wire the security cameras provided by another trade. Provide the required wiring in the travelling cable run between the car top and the controller as well as power to the car top for the camera.

6.14.2.17(3) Provide equipment and labour for installation of a card reader security system. Provide the required wiring between the card reader and the elevator security box in the machine room along elevator controller connections and circuits for the security system (including floor tracking).

6.14.2.17(4) Provide independent service.

6.14.2.17(5) Provide Firefighters' Emergency Operation (Phase 1 and Phase II) for all elevators.

6.14.2.17(6) Provide emergency power operation of the elevators such that all elevators are fed with emergency power and capable of operating at least one at a time. Arrange that at least one elevator in each group can operate at the same time on emergency power

6.14.2.17(7) Provide separate riser operation for Elevator E2, including control keyswitch and indicator located at Level1 (rear) hall station. Provide separate, discrete hall stations and indicators within each entrance frame, that may be activated by authorized personnel via card reader or keyswitch.

6.14.2.18 Operating Performance

6.14.2.18(1) Levelling - Arrange that the car stops within 3 mm (1/8") of the floor level.

6.14.2.18(2) Operating time - Adjust the equipment so that the operating time is 17.0 seconds or less (based on 4’0” wide two speed side opening doors and a speed of 150 fpm and travel of 4.5m (14’-9”)). Measure the operating time from the time that the doors begin to close until they are 3/4 open at the next floor.

6.14.2.18(3) Ride quality - Arrange that the lateral acceleration (front to rear and side to side) measured during express runs is less than 150 mm/s/s (0.5 f/s/s) peak to peak.

6.14.2.18(4) Adjust the door equipment so that the noise level is less than 62 decibels during a full door open and door close operation. Measure the noise levels using

a sound level meter set to the "A" scale for a fast response.

6.14.2.18(5) Arrange the machine room equipment so that the noise level with the elevator running is less than 80 decibels. Measure the noise levels using a sound level meter set to the "A" scale for a fast response.

6.14.3 Pneumatic Tube Systems

6.14.3.1 Scope of work

6.14.3.1(1) The system will be a computer-controlled pneumatic tube materials distribution system, consisting of tubing, stations, transfer units, blower packages, carriers, and a control system with a 150 mm diameter tube.

6.14.3.1(2) The system will be configured in groups of stations (zones) connected together by interzone tubes. Each station will be connected to the system by a single tube to a transfer unit. Locate stations as per drawings in Outpatient Collection, Transfusion Medicine Service (Blood Bank) and Accessioning.

6.14.3.1(3) Each zone will contain its own blower and function independently.

6.14.3.1(4) The dispatching, routing and storage of carriers will be directed by a system control centre to provide automatic unattended transmission of carriers between two stations.

6.14.3.1(5) The system will provide shortest route vacuum pressure travel.

6.14.3.1(6) The modular design of the system components will permit changes in the number of stations and/or zones as Authority requirements change.

PART 7. FACILITIES SERVICES SUBGROUP SPECIFICATIONS

7.1 Fire Suppression (Division 21)

7.1.1 Fire Protection

7.1.1.1 Basic Requirements:

7.1.1.1(1) The sprinkler system and equipment will be designed to the occupancy classification that it protects.

7.1.1.1(2) Future expansion shall be in the form of larger capacity through pipe main sizing, fire pump sizing etc. This is to provide a system that can be adjusted, redistributed and added to without requirement of replacing mains or equipment.

7.1.1.1(3) Provide on the sprinkler system take-off from water supply an approved detector type double check valve assembly with approved listed OS&Y gate valves on both sides complete with tamper switches.

7.1.1.1(4) The fire pump, if required, will require emergency power supply and will have a transfer switch which is part of the fire pump controller, package mounted in separate mechanically attached enclosure to form one assembly, specifically approved for the purpose as a complete unit. Fire pump shall have 20% future capacity at design flow.

7.1.1.1(5) Sprinklers subject to freezing temperatures will be supplied by a dry system. This shall include all relevant components related to a dry system such as, but not limited to, an air compressor, automatic air maintenance device, control power.

7.1.1.1(6) Quick response sprinklers will be provided throughout, with temperature ratings to suit the specific hazard area.

7.1.1.1(7) Provide a double interlocked, cross zoned pre-action supplied sprinkler system to all rooms with sensitive equipment and/or records.

7.1.1.1(8) Each fire extinguisher will be located per relevant codes and to the satisfaction of the Authority having Jurisdiction inspection

department and approved for the hazard and classification of the space it serves.

7.1.1.1(9) Future capacities will be proven though submission of design documents clearly showing design flows and sizing as well as the design + 20% flows and sizing.

7.1.1.2 Performance Criteria:

7.1.1.2(1) All fire protection systems will be hydraulically sized to NFPA standards. Including NFPA 45 where applicable..

7.1.1.2(2) All equipment and installation will be in accordance with manufacturers' requirements.

7.1.1.2(3) All equipment will be ULC approved.

7.1.1.2(4) Qualified contractor licensed and regularly engaged in such installations will install all fire protection systems and equipment.

7.1.1.2(5) Provide backflow protection on all fire protection systems in accordance with CSA requirements.

7.1.1.2(6) Locate zone shut-off valves so they are visible and accessible from the floor. Do not conceal from view: do not locate in janitor rooms, storage rooms, or stairwells. All valves controlling water flow will be monitored.

7.1.1.2(7) Fire Department Connection will be installed at a location approved by the local Authorities having Jurisdiction.

7.1.1.2(8) Install fire extinguishers in a semi or fully recessed cabinet.

7.2 Plumbing (Division 22)

7.2.1 Site Services:

7.2.1.1 All materials will be in accordance with CSA standards.

7.2.1.2 Provide individual water, fire protection, gas, sanitary, and storm services as required and sized to suit the usage needs of the CSB.

7.2.1.3 Provide two domestic water service connections. Each supply into the Site will have a water meter and reduced pressure backflow preventer and 25 micron filtration. Each supply will have independent shut-off valves. Submit the projected domestic water supply load. Each connection point shall be from mains located on different streets adjacent to the site. Connection points shall be a minimum 50 m apart.

7.2.1.4 Basic Requirements:

7.2.1.4(1) Domestic water systems will be to the National and Provincial Plumbing Standards. Provide water treatment, as required on-site for service to special equipment, which will be treated through a reverse osmosis water treatment system prior to downstream use. These requirements are detailed further within this document.

7.2.1.4(2) Provide utilities-commission approved meters for domestic water. Meters will be used to measure water consumption.

7.2.1.4(3) The HVAC, plumbing, fire protection, and medical gases systems will be designed to avoid disruption to the operation of the CSB during maintenance or repairs. The systems must be designed so laboratory rooms and Admin/Client do not need to be entered when performing these functions. All isolation, maintenance, balancing, and other service valves located in the corridor ceiling spaces will be accessible from standing or when using a maximum 8-foot tall ladder.

7.2.1.4(4) The design should incorporate flexibility for future alterations or changes in technology standards. Include capacity for future expansion of the laboratory to occupy the entire second and third floors within each system. This shall include extra capacity in mains and risers. As well major equipment shall have spare capacity for future alterations or changes in technology standards.

7.2.1.4(5) All systems will be clearly labelled. Labelling will include, but not be limited to, painting and labelling of all pipes, ceiling identification dots, valve tagging, emergency valve identification signage and flow direction. Each system shall

be labelled or identified at least once in each room and at maximum 15 m intervals. Identify systems where they pass through walls, partitions and floors.

7.2.1.4(6) All fixtures and equipment will be designed and installed to manufacturer's specifications and standards.

7.2.1.4(7) All fixtures and equipment will be provided by manufacturers with supply and service forces capable of maintenance response within 24 hours.

7.2.1.4(8) The water systems will ensure delivery of water supplies at the required pressures to all water outlets.

7.2.1.4(9) Provide water inlet connections on the exterior of the building for supply water through tanker truck connections. The system will be designed in such a way that it may be used as a backup should the municipal services fail during a disaster such as an earthquake.

7.2.1.4(10) Provide durable materials to allow for 24 hour a day operation with minimal downtime.

7.2.1.4(11) Consideration should be given to easy access and serviceability and avoiding interference with other services.

7.2.1.4(12) Provide floor drains with trap primers on all mechanical floors and where required for equipment drainage.

7.2.1.4(13) Floor drains located in chemical storage areas shall not be connected to the drainage system.

7.2.1.4(14) Equipment drains may require hub drains or elevated hubs complete with air gaps as required.

7.2.1.4(15) Provide backflow preventers on the incoming water service as well as at equipment source connections where required by code.

7.2.1.4(16) Provide interceptors as required by Authority having jurisdiction guidelines to intercept oil, grease, dirt, and solids. Provide acid neutralization tanks at drains where acid neutralization is required such as slide preparation sinks.

7.2.1.4(17) Provide domestic water filtration at the incoming service into the building. Filtration shall be dynamic, minimizing

backwash and shall have redundancy to maintain water service during flushing or maintenance.

7.2.1.4(18) If a water booster pump is required, ensure it is designed with 100% redundancy and emergency power capability to provide uninterrupted water service and pressure in the event of malfunction, maintenance, or power loss. It must also be able to work in conjunction with a water tanker truck under post-disaster conditions.

7.2.1.4(19) For proposed plumbing fixture and accessories count, refer to Architectural Drawings and Room Data Sheets.

7.2.1.4(20) All eyewash stations shall be accessible within 10 seconds from work station. All emergency shower assemblies shall be combination shower and eye wash.

7.2.1.4(21) All Autopsy Rooms to be fitted with flushable type floor drains.

7.2.1.4(22) Autopsy Hopper sinks shall be a solid and liquid waste disposal unit with continuous flushing rim.

7.2.1.4(23) All hand wash sinks shown on Architectural Drawings shall be vitreous china and meet all infection control standards referenced in this document.

7.2.1.5 Reverse Osmosis

7.2.1.5(1) The reverse osmosis system will be provided with filters such as carbon and mixed bed and will provide product water suitable for use in equipment requiring reverse osmosis water.

7.2.1.5(2) Provide redundancy for domestic water make up to serve the reverse osmosis water system unit and connect all alarm functions to the building management system.

7.2.1.5(3) Reverse osmosis water piping will be un-plasticized, non-pigmented, Type 1 polypropylene complying with FDA, USDA, 3-A and PSP, Class II sanitary standards.

7.2.1.5(4) No dead legs will be allowed in the reverse osmosis water system piping and all piping will be designed and installed to suit cleaning and disinfection.

7.2.1.5(5) All piping will be supported to the manufacturer's requirements.

7.2.1.5(6) All valves used in the reverse osmosis water system will be compatible with the piping material and ball type.

7.2.1.5(7) Allow for all necessary expansion and contraction of the reverse osmosis water system.

7.2.1.5(8) All reverse osmosis water system piping will be sealed where it passes through walls, floors or ceilings, to conform to fire resistant ratings of the walls, floors and ceilings.

7.2.1.5(9) Reverse osmosis system shall consist of a packaged, floor mounted filtration system, with redundant filter banks for servicing without shutdown. The system shall be comprised of but not limited to redundant filter banks, pressure pumps, control panel, water storage tank with floats and re-pressurization pump. All gauges, valves, pressure vessels, sample ports, flow meters and interconnecting piping as required for a complete functioning systems shall be provided.

7.2.1.6 Performance Criteria:

7.2.1.6(1) All drainage systems will be designed such that the system connects to the Site services. Designs will utilize gravity drainage where possible.

7.2.1.6(2) In the case where pipe foundations are used to support the structure, all underslab piping shall be supported (hung) from the concrete slab above. Hangers and rods shall be of sufficient strength and installed at intervals sufficient to carry the pipe and load, at the required slope. Hangers and rods shall be corrosion resistant. Install light-weight fill above all piping that is supported (hung) from the concrete slab above. Dissimilar metals shall be separated by a dielectrical coupling or membrane (tape). Hanger spacing shall be to the requirements of the B.C. Building Code.

7.2.1.6(3) If a pumping system is required for subsurface, storm, or sanitary drainage, then the design will include 100% redundancy with equipment on emergency power such that the system does not flood the space it is housed in. The sump will have twin compartments: a settling and a pumping

compartment, and will be sized to prevent short cycling of the pump. Provide alarm points for high water and pump failure.

7.2.1.6(4) Insulate interior storm drainage, domestic water piping, and exposed p-traps throughout as per BCICA quality standards. Where piping and / or piping components are subject to freezing, provide insulation and heat tracing on life-safety systems, the heat trace system will be monitored and alarmed for malfunction or service disruption. Ensure that heat trace systems on life-safety systems will be on emergency power.

7.2.1.6(5) All plumbing drainage designated as requiring acid waste system will be 'acid' or equivalent to a point such that dilution renders discharge ineffective or upstream of 'acid neutralizer tanks'. Acid neutralizer tanks shall be located and installed such that removal, maintenance and servicing are reasonably achieved.

7.2.1.6(6) Consideration should be given to reclaiming waste heat from sources such as showers or condensers.

7.2.1.6(7) Provide flushing and disinfection of domestic water systems. Provide independent testing of piping systems once flushing and cleaning has been completed.

7.2.1.6(8) Provide automatic trap primers in floor drains. Trap primers shall be connected to a control valve and set to run every 24 hours by the DDC system. Trap primers that rely on fixture use shall not be acceptable. Provide adequate backflow prevention.

7.2.2 Plumbing Fixtures:

7.2.2.1 Basic Requirements:

7.2.2.1(1) All plumbing fixtures to be suitable for a Healthcare Facility.

7.2.2.1(2) Barrier-free plumbing fixtures and fittings will be suitable for a Healthcare Facility.

7.2.2.1(3) Provide anti-splash fittings (i.e. Laminar flow) that do not entrain air in all care areas, at all handwash sinks and at all

non-laboratory sinks. Laboratory sinks shall have application specific outlets.

7.2.2.1(4) Fixtures will not have an overflow.

7.2.2.1(5) Public toilets will be elongated and low-consumption. They will have an open front seat with electronic hands-free flush valve operation.

7.2.2.1(6) Urinals will be wall-hung and low-consumption. They will have electronic hands-free flush valve operation.

7.2.2.1(7) Public washroom lavatory fixtures will be made of an impervious, durable material. They will have electronic hands-free type faucets with single temperature supply.

7.2.2.1(8) Staff handwash sinks will be porcelain. They will have electronic hands-free type faucets with single temperature supply and gooseneck spouts.

7.2.2.1(9) Staff handwash sinks shall have domestic hot water recirculation connection within 50 mm of thermal mixing valve serving the fixture.

7.2.2.1(10) Showers will have slip resistant flooring and pressure compensated thermostatically controlled valves.

7.2.2.1(11) Provide suitable quantities of janitors' sinks, hose bibbs, eye wash stations, and drinking fountains to provide sufficient service to the CSB and in accordance with ANSI Z358.1-1998.

7.2.2.1(12) Laboratory water faucets with goosenecks must be protected by vacuum breakers.

7.2.2.1(13) Fixture and faucet combinations for sinks, scrub sinks and handwash basins shall be selected to ensure the faucet water stream does not fall directly into fixture drain opening to prevent contaminated trap water splashing out.

7.2.2.2 Performance Criteria:

7.2.2.2(1) Provide isolation valves for all floors and individual rooms for all plumbing services. Clearly identify all valves. Locate valves in corridors.

7.2.2.2(2) Provide accessible clean-outs for all sinks and lavatories (and future sinks and lavatories) minimum 150 mm above the flood-level rim of the sink.

7.2.2.2(3) Construct working mock-ups of all sinks with gooseneck faucets for the Authority's review.

7.2.2.2(4) Toilets will be selected with special attention to reducing spread of infection. Flush valves will be suitably sized for the water consumption of the bowl. Toilet bowls will not splash or spray water onto the toilet rim or anywhere outside of the toilet bowl and will be designed to minimize the aerosolization of the toilet contents. Toilets shall be wall hung.

7.2.2.2(5) All electronic sensor-activated fixtures will be hardwired.

7.2.2.2(6) Provide pressure reducing valves with 100% redundancy in accessible locations if system pressure exceeds acceptable delivery pressure.

7.2.3 Domestic Hot Water Systems:

7.2.3.1 Basic Requirements:

7.2.3.1(1) Domestic hot water demand will be calculated in accordance with ASPE Plumbing Engineering Design Handbook and the National and Provincial Plumbing Codes.

7.2.3.1(2) Domestic hot water will be stored at adequate temperature to serve the needs of the CSB at not less then 70ºC. Provide mixing valves with thermal safety (fail safe) shut-off valves where temperatures are required to be less then 60ºC at point of use. Generally piping distribution is 60ºC and client/public outlets shall be 43ºC (CSA 2317.1)

7.2.3.1(3) Domestic hot water system will be designed with sufficient capacity and recovery rate for the CSB's hot water requirements. Include capacity within each system, piping mains and storage/recovery for future expansion of the laboratory to occupy the entire second and third floors, while deferring the equipment cost until the expansion takes place.

7.2.3.1(4) Domestic hot water system will be designed with a recirculation system to ensure timely delivery of hot water to all fixtures.

7.2.3.1(5) Domestic hot water system will be designed to prevent growth and spread of Legionella bacteria within the tanks, piping, fixtures, or any other component. Design methods to use include, but are not limited to, eliminating dead-leg piping, and minimizing uncirculated piping by connecting the circulation system as close as possible to fixtures.

7.2.3.1(6) Domestic hot water storage shall have the capability of maintaining 80ºC for sanitation purposes.

7.2.3.1(7) Hands free fixture mixing valves shall have hot water recirculation connection within 50 mm of thermal mixing device.

7.2.3.2 Performance Criteria:

7.2.3.2(1) Hot water generating equipment and /or storage will be designed to meet redundancy requirement outlined in CSA Standard for Health Care Facilities, latest edition.

7.2.3.2(2) Generate and store domestic hot water at 70ºC to minimize Legionella.

7.2.3.2(3) Distribute domestic hot water at 60ºC.

7.2.3.2(4) Recirculate domestic hot water from the distribution system(s) back to the generating and/or storage equipment.

7.2.3.2(5) Provide separate booster heaters, with adequate capacity, to serve equipment requiring water above 60ºC.

7.2.3.2(6) Monitor hot water supply temperatures via the BMS system and provide alarm outputs when the temperature exceeds the design setpoint. Provide fail safe devices on distribution.

7.2.3.2(7) The domestic hot water generating equipment will meet the energy efficiency requirements of ASHRAE 90.1.

7.2.4 Medical Gas Systems:

7.2.4.1 Basic Requirements:

7.2.4.1(1) The medical gases for the CSB will be supplied from on-site central supply.

7.2.4.1(2) Medical gases will include Oxygen, Anaerobic Gas and Carbon Dioxide. The central supply shall be located in a dedicated Storage Room on the Ground Floor. Compressed gas bottles in a manifolded, redundant system shall be utilized. Capacity shall be determined through equipment /process usage, availability of supply, frequency of supply and coordination both with the supplier and the designed usage. See high pressure cylinder manifold specifications.

7.2.4.1(3) All pipe and pipe fittings will be in accordance to ASTM B819, de-greased copper Type 'L'.

7.2.4.2 Service Outlets:

7.2.4.2(1) Provide recessed service outlets boxes designed for concealed piping and fabricated for straight insertion of secondary equipment.

7.2.4.2(2) Each recessed wall outlet will have a permanently marked, colour-coded non-interchangeable index system so to prevent the connection of the wrong gases. Provide a secondary check valve to hold the line pressure if the primary valve is removed for maintenance.

7.2.4.2(3) Provide 2-part DISS type outlet connections for each medical gas where applicable. Provide equipment specific outlets/connections at equipment identified as requiring a medical gas supply..

7.2.4.2(4) Ball type shut off valves will be U.L. listed label showing the gas service & pressure rating. Valves will swing out during installation and have a quarter turn from full open to close.

7.2.4.2(5) Area Zone shut off valves will be housed in a single box with multiple shut off valves with tube extensions, lexan glass door with hinges and pull out opening ring. Provide pressure / vacuum gauges for each service.

7.2.4.2(6) Provide connections, with shut off valves, with sufficient capacity to equipment that has specific gas requirements.

7.2.4.2(7) All Medical Gas mains, systems and supplies / reserves shall have 20% future capacity above design capacity.

7.2.4.3 Performance Criteria:

7.2.4.3(1) Install all medical gas piping in the CSB in accordance with CSA Standards.

7.2.4.3(2) Design the system such that there is one zone shut off system per laboratory.

7.2.4.3(3) All medical gas piping in normally inaccessible areas (e.g.: behind walls and boarded ceilings) will be identified.

7.2.4.3(4) Provide BMS alarm interface signal to the central DDC system for critical alarms such as low or high pressure.

7.2.4.3(5) All on-site storage of medical gases will be to CSA Standards.

7.2.4.3(6) All piping, valves and filters will be factory cleaned and capped or sealed to prevent contamination.

7.2.4.3(7) All departments will be provided with local valve boxes and alarm panels in accordance with CSA Standards.

7.2.4.3(8) A master medical gas alarm panel will be provided to monitor all medical gas functions.

7.2.4.3(9) All Master alarm panels will be connected to the Building Management System to meet relevant codes.

7.2.4.3(10) All medical gas systems will be certified in accordance with CSA standards by an independent testing agency. Such independent testing agency shall be retained and paid for by the Authority.

7.2.4.3(11) All medical gas outlets and piping systems will be cleaned in accordance with CSA standards.

7.2.4.3(12) All systems components requiring electrical power will be on emergency power.

7.2.4.3(13) Medical gas outlets will be provided to suit CSA and the CSB requirements.

7.3 High Pressure Cylinder Manifold (Primary Source of Supply)

7.3.1 Basic Requirements

7.3.1.1 Manifold shall consist of two high-pressure header bar assemblies to facilitate connection of primary and secondary cylinder supplies. Each header bar shall be provided with the required number of CGA cylinder pigtail connections incorporating a check valve at the header connection. The high-pressure header bar shall be designed in such a manner that it can be extended to facilitate additional cylinder connections. Each header bar assembly shall be provided with a high-pressure shut-off valve. The manifold shall be fully automatic in operation and shall not require any levers or handles for resetting by maintenance staff.

7.3.1.2 Control equipment shall be made up of a series of regulators to reduce the cylinder pressure to line delivery pressure. The unit shall be capable of automatically changing over from a primary bank of cylinders to a secondary bank of cylinders without interruption or fluctuation in delivery pressure. The manifold shall be housed in a NEMA 1 enclosure.

7.3.1.3 A Microprocessor circuit board assembly shall provide a relay output to give indication when or just before the manifold switches from one bank of cylinders to another. The switch over shall be mechanically controlled. Manifolds using electrically controlled shuttling devices shall not be acceptable.

7.3.1.4 To avoid excess pressure being supplied to the distribution system, a pneumatically relieved valve for the line regulator shall be incorporated. An intermediate pressure relief valve shall be installed between the high-pressure regulators and the line delivery regulators.

7.3.1.5 Gauges shall be installed within the enclosure downstream of each high-pressure regulator and also at the output end of the delivery pressure pipe. Gauges will indicate the regulated pressures of the left and right banks of the manifold.

7.3.1.6 All pressure transducers, micro switches, and display LED's shall be pre-wired to an internal microprocessor circuit board. The manifold must interface with the Building Management System (DDC).

7.3.1.7 Manifold shall be UL/CSA listed.

7.3.1.8 Each manifold shall have the following information labelled: Gas Name _____. Size: _____X_____. Delivery Pressure _____ kPa (_____ psig).

7.3.1.9 Manifolds shall be sized for 20% future extra capacity.

7.3.2 Natural Gas System

7.3.2.1 Basic Requirements:

7.3.2.1(1) This Section of the Specification applies to all natural gas piping systems.

7.3.2.1(2) Submit to the Provincial Gas Inspection Department, drawings, applicable sections of specifications and detailed drawings as required to obtain approval for the gas installation before the work commences.

7.3.2.1(3) Approvals must be received prior to commencing work.

7.3.2.1(4) Arrange and pay for the natural gas connection to the gas utility's distribution system.

7.3.2.1(5) Provide chain link enclosure around gas meter with locking access door.

7.3.2.1(6) Provide spool piece at branch serving outpatient specimen collections area for future meter. Provide minimum 300 mm spool complete with unions. Provide DDC conduit from nearest DDC panel to meter location complete with future pull string.

7.3.2.1(7) Below ground exterior piping shall be polyethylene pipe, CSA certified.

7.3.2.1(8) Above ground piping shall be Schedule 40 seamless Carbon Steel to ASTM A53 and CSA B-63.

7.3.2.1(9) Fittings shall be: Screwed shall be malleable iron with beaded ends. Dielectric type shall be used where a buried service enters and connects to building piping; Welded shall be forged steel of the same weight as the connecting pipe; Unions shall be malleable iron with ground joints.

7.3.2.1(10) Joint Materials: Screwed: Thread lubricant; Flanged: Full faced gasket materials, flanged steel weld neck, raised face type, carbon steel (ASTM A307) square headed bolts with hexagon nuts, bolts bull diameter of bolt holes.

7.3.2.1(11) Valves shall be:

7.3.2.1(11)(a) Provincial Gas Department approved and suitable for temperature to which they are exposed.

7.3.2.1(11)(b) Provide a seismic actuated automatic shut-off valves, 20 to 150 mm [3/4" to 6"]: C.G.A., UL and State of California certified seismic gas shut-off check valve with acceleration trigger mechanism, soft seat construction, visual open/close indicator and a manual reset capable of operating between –23°C to 66°C [-10°F to 150°F]; The sensing means of the valve shall actuate the shut off within 5 seconds when subjected to a horizontal sinusoidal oscillation having a peak acceleration of 0.3 G (2.94 m/s^2 [9.65 ft/s^2) and a period of 0.4 seconds;

7.3.2.1(12) Master Gas Shut Off (for laboratories):

7.3.2.1(12)(a) Valve: Ball type, full line size minimum 2065 kPa [300 psi] ULC listed with locking handle.

7.3.2.1(12)(b) Box: Flush mounted box to accommodate one master gas shut off valve.

7.3.2.1(13) Gas pressure reducing valves shall be: Corrosion resistant; High performance reducing pounds to inches.

7.3.2.1(14) Gas meters shall conform to the following:

7.3.2.1(14)(a) Positive Displacement Meters: Natural gas meter for up to 42.5 m3/hr [1,500 cfh] at 34.5 kPa [5 psi], non-temperature compensated; 12 mm [1/2"] threaded connections; Low frequency pulsed output (4-20 mA) for monitoring by the BAS.

7.3.2.1(14)(b) Rotary Meters: Natural gas meter for up to 11.8 m^3/hr [415 cfh] at 34.5 kPa [5 psi], non-temperature compensated; 30 mm [1-1/4"] threaded connections; Low frequency pulsed output (4-20 mA) for monitoring by the BAS.

7.3.2.1(15) Interior gas service - screw or weld up to 50 mm [2"], weld 65 mm [2-1/2"] and larger.

7.3.2.1(16) Interior gas service in unvented space, in supply or return air ceiling plenum, or operating at 35 kPa [5 psi] pressure - weld all sizes.

7.3.2.1(17) Exterior gas service - weld all sizes except for polyethylene pipe which shall have no joints other than those allowed in NSC CAN/CGA-B149.1.

7.3.2.1(18) All branch connections except those less than half diameter of main shall be made with welding tees.

7.3.2.1(19) Branch connections less than half diameter of main may be made with weldolets or thredolets.

7.3.2.1(20) Do not paint dielectric isolating couplings.

7.3.2.1(21) Provide pressure regulator and lockable shut-off at discharge of gas meter before entry into the building.

7.3.2.1(22) Heat shrink factory extruded polyethylene sleeves over bare metallic pipe at weld.

7.3.2.1(23) Employ an independent testing agency to test the continuity of the polyethylene jacket, when metallic piping is buried, using a 12,000 volt Holiday Detector. Repair any breaks in polyethylene jacket with two layers of polyken tape. Submit report from testing agency certifying continuity of polyethylene jacket.

7.3.2.1(24) Install unions or flanges in connections to all equipment and specialty components.

7.3.2.1(25) Arrange piping connections to allow ease of access and for removal of equipment.

7.3.2.1(26) Align and independently support piping connections to prevent piping stresses being transferred to equipment.

7.3.2.1(27) Install gas shut-off valves complete with handle at the following locations:

7.3.2.1(27)(a) At the service entry point to each building immediately prior to entry.

7.3.2.1(27)(b) At each branch to an individual item of equipment or appliance.

7.3.2.1(27)(c) At each service to each laboratory bench (install valve in readily accessible location).

7.3.2.1(27)(d) At each service to each laboratory (install valve in readily accessible location).

7.3.2.1(27)(e) Note that individual shut offs are required to each individual outlet in all fume hoods.

7.3.2.1(28) All building isolation valves shall possess locking lugs. Provide seismic valve at building main.

7.3.2.1(29) Terminate vent outlets to atmosphere at the following minimum lateral distances:

7.3.2.1(29)(a) 1.5 m [5 ft] from any door, openable window or building opening.

7.3.2.1(29)(b) 3.0 m [10 ft] from any forced air intake.

7.3.2.1(30) Allow for expansion with suitable anchors, guides and expansion loops to prevent undue stress on any part of the system. Such anchors and guides shall be rigidly fastened to structural members through the roof deck. Supports shall be set in sheet metal gum pans wrapped into the roofing. Coordinate with roofing subtrade.

7.3.2.1(31) All piping shall be welded with approved flexible connectors at point of connection to gas fired equipment.

7.3.2.1(32) Apply one coat of Rust-Oleum 769 damp proof red primer, one coat of Rust-Oleum 960 zinc chromate and one finish coat of Rust-Oleum 850 grey to piping.

7.3.2.1(33) Test piping in accordance with the National Standard of Canada "Natural Gas Installation Code" CAN/CGA-B149.1.

7.3.3 Specialty Systems

7.3.3.1 Basic Requirements:

7.3.3.1(1) Supply and install all specialty systems as required to provide a complete installation. These systems include, but are not limited to:

7.3.3.1(1)(a) Acid waste, venting, and neutralization;

7.3.3.1(1)(b) Reverse osmosis water system;

7.3.3.1(1)(c) Oil, grease, dirt, and solids interceptors,

7.3.3.1(1)(d) Medical gas systems.

7.3.3.2 Performance Criteria:

7.3.3.2(1) Filtration system must be sized to handle 120% design flow rate with redundant filters piped in parallel to allow for cleaning and repair.

7.3.3.2(2) Provide and install cross-connection capability including valves and piping on domestic water service.

7.3.3.2(3) The incoming water filtration system will be capable of removing bacteria and particulates larger than 25 microns.

7.3.3.2(4) Acid waste, vent piping, and fittings will be suitable for the pH levels of the waste system.

7.3.3.2(5) Interceptors will be designed to manufacturer's specifications.

7.4 Heating, Ventilating and Air Conditioning (Division 23)

7.4.1 Heating

7.4.1.1 Basic Requirements

7.4.1.1(1) The heating plant will be provided with adequate backup capacity and equipment redundancy to ensure continuous CSB operation at all times, with no noticeable reduction in service outcomes. Redundancy will be as per CSA standards.

7.4.1.1(2) Space heating capacity will be sufficient to meet the required indoor design temperatures outlined in CSA Standards while using the January 1 outside design temperature outlined in the BC Building Code.

7.4.1.1(3) The heating equipment will be sized sufficiently to meet the maximum simultaneous CSB demand for all systems served by the heating plant. It also must be capable of controlling and responding to periods of low usage. Modular or multiple units shall be employed within the heating plant.

7.4.1.1(4) Apply energy recovery systems to offset plant heating requirements. These shall be glycol heat exchanger loops or similar means to prevent cross contamination or mixing of exhaust flows.

7.4.1.1(5) It is essential that perimeter heating with radiant ceiling panels be utilized for the entire CSB.

7.4.1.2 Performance Criteria

7.4.1.2(1) Any ventilation, electric or electronic filtration, air cleaner system and/or radiant heating sources serving the laboratories will be connected to the building's emergency power supply.

7.4.1.2(2) Boilers will operate at a minimum AFUE efficiency of 93% at all firing rates. Consideration shall be given to designing and providing a heating system with condensing boilers.

7.4.1.2(3) Provide adequate expansion compensation for heating piping throughout. Location of anchors and guides, design of expansion compensation loops and selection of expansion compensation devices will be based upon a thorough review of piping layout, and piping stress analysis.

7.4.1.2(4) All high points in piping will be equipped with automatic air removal devices such as air collection chambers and air vents.

7.4.1.2(5) Equipment and piping will be installed with adequate service space, access panels and ability to remove equipment from building for servicing or replacement.

7.4.1.2(6) Isolation valves, unions and bypass piping will be provided to allow for equipment isolation and removal without unduly affecting the system operation or major drain down.

7.4.1.2(7) Balancing valves, flow-measuring devices, temperature and pressure sensors will be provided throughout the system to facilitate system balancing.

7.4.1.2(8) Pumps will be selected to operate at the system fluid temperature without vapour binding and cavitation, will be non overloading in parallel or individual operation, and will operate within 25% of the mid point of published maximum efficiency curve.

7.4.1.2(9) Pump construction and installation will permit complete pump servicing without breaking piping or motor connections.

7.4.1.2(10) Boilers will be dual fuel fired with natural gas as the primary fuel and propane as the secondary fuel. Adequate storage of secondary fuel will be provided on-site to operate the boilers for a minimum of 24 hours (CSA), under maximum demand conditions. Complete boiler plant shall be sized such that low load and shoulder season loads can be achieved at high efficiency and that the total capacity will accommodate flexibility for future expansion of the laboratory to occupy the entire second and third floors.

7.4.1.2(11) Locate services that require regular maintenance access above non-critical spaces such that there is minimal to no disruption to the laboratory spaces.

7.4.1.2(12) Insulate all heating water piping, equipment and accessories to BCICA and ASHRAE Standards.

7.4.1.2(13) Utilize screw fittings for 50mm piping and smaller and welded fittings for 65mm piping and larger.

7.4.2 Air Conditioning

7.4.2.1 Design Principles:

7.4.2.1(1) The cooling plant will be provided with adequate back up capacity and equipment redundancy to ensure continuous Facility operation at all times, with no noticeable reduction in service outcomes. Provide 100% cooling capacity redundancy for laboratory areas and 50% for office / administration / exam areas.

7.4.2.1(2) Cooling will be available continuously for all laboratory areas and where continuous internal heat gains exist such as electrical and communication rooms. The systems serving these areas shall be on emergency power.

7.4.2.1(3) Space cooling capacity must be sufficient to meet the required indoor design temperatures outlined in CSA Standards while using the July 2.5% outside design wet and dry bulb temperatures outlined in the BC Building Code.

7.4.2.1(4) Utilize 100% outdoor air for free cooling as the first means of space cooling.

7.4.2.1(5) Utilize heat recovery chillers where there is demand for cooling all year round to offset plant heating requirements.

7.4.2.1(6) Investigate alternate source of cooling such as ground source systems.

7.4.2.2 Performance Criteria

7.4.2.2(1) Ensure no air within the air conditioning system, outside of the central air handling equipment, drops below its dew point temperature.

7.4.2.2(2) CFC and HCFC based refrigerants will not be used in the refrigeration equipment.

7.4.2.2(3) Utilize magnetic bearing compressors for chillers.

7.4.2.2(4) Locate cooling towers to ensure absolutely no potential of cooling tower discharge entering the building through air intakes and other openings in the CSB.

7.4.2.2(5) Cooling tower location and its discharge will not disrupt the operation of the heli-pad in adjacent facilities.

7.4.2.2(6) Piping will be installed in an orderly manner. Slope piping to permit complete drainage of the system.

7.4.2.2(7) All high points in the closed loop piping will be equipped with automatic air removal devices, such as air collection chambers and air vents.

7.4.2.2(8) Equipment and piping will be installed with adequate service space, access panels and ability to remove equipment from building for servicing or replacement.

7.4.2.2(9) Isolation valves, unions and bypass piping will be provided to allow for equipment isolation and removal without unduly affecting the system operation or major drain down.

7.4.2.2(10) Pumps will be selected to operate without vapour binding or cavitation, will be non-overloading in parallel or individual operation, and will operate within 25% of the mid-point of published maximum efficiency curve.

7.4.2.2(11) Pump construction and installation will permit complete pump servicing without breaking piping or motor connections.

7.4.2.2(12) Locate services that require regular maintenance access above non-critical spaces such that there is minimal to no disruption to the delivery of health care services.

7.4.2.2(13) Insulate all chilled water and condenser water piping, equipment and accessories to BCICA and ASHRAE Standards.

7.4.2.2(14) Utilize screw fittings, welded fittings or roll grooved mechanical couplings for all piping.

7.4.3 Ventilation

7.4.3.1 Design Principles:

7.4.3.1(1) Heating, ventilation and air conditioning (HVAC) system will provide a comfortable internal environment for clients and staff and will meet the required environmental conditions for the equipment.

7.4.3.1(2) The HVAC system will maintain required pressure relationships between various areas of the CSB and will provide necessary air filtration, cleansing and exhaust to control the transmission of infection and / or contamination.

7.4.3.1(3) HVAC systems will be provided with adequate backup capacity and equipment redundancy to ensure continuous CSB operation at all times. HVAC systems serving laboratories shall be on emergency power.

7.4.3.1(4) Air handling units will be provided with sectional heating and cooling coils with manual isolation valves, enabling isolation of the damaged sections of the coils.

7.4.3.1(5) For exam / administration / office area units will provide redundant capacity so that in the event of a failure or scheduled serviced shutdown of one unit the other unit will continue to run and provide approximately 70% capacity to the affected area.

7.4.3.1(6) 100 percent redundancy will be provided for the laboratory.

7.4.3.1(7) 100 percent redundancy will be provided for Autopsy exhaust.

7.4.3.1(8) Design the ventilation system and all components in accordance with ASHRAE Standards and CSA Standards.

7.4.3.1(9) At a minimum, ventilation rates for all spaces will meet the design requirements described in CSA Standards. If a space is not listed, ventilation rates will comply with the applicable standards and codes. Comparisons shall be made to applicable laboratory standards and make-up air requirements for hoods etc. and provide the greater ventilation rate.

7.4.3.1(10) Provide the minimum filtration levels as described in CSA and all other Appliance Standards.

7.4.3.1(11) Spaces will maintain pressurization requirements described in CSA Standards.

7.4.3.1(12) Air handling equipment will be factory fabricated to ensure the highest construction standard. No Site built-up units will be allowed.

7.4.3.1(13) Fans will be designed with Variable Frequency Drives (VFDs) for energy savings under part-load conditions.

7.4.3.1(14) Provide an indirect and/or direct heat recovery system on the general exhaust air systems.

7.4.3.1(15) Provide supply and exhaust filtration as required by the specific equipment / hoods. Laboratory exhaust shall not be mixed with exhaust from other laboratories or spaces.

7.4.3.1(16) Each Autopsy, Dissection and GrossingTable shall have exhaust air at or near the floor level and/or directly from connections provided by manufacturer.

7.4.3.2 Performance Criteria

7.4.3.2(1) The CSB design will incorporate a strategy to install and remove major building equipment such as fans, etc.

7.4.3.2(2) Locate fans, common filters (e.g.: HEPA), and other equipment in the central mechanical rooms. Allow for adequate clearance for service access.

7.4.3.2(3) All supply air, return air and general exhaust air systems will be located in interior mechanical rooms free from exposure to the elements. A penthouse is considered desirable but at minimum roof top units shall be screened.

7.4.3.2(4) Make allowances in duct sizing and equipment selections to accommodate flexibility for future expansion of the laboratory to occupy the entire second and third floors. Allow for a future increase in capacity in duct mains, branch lines and Air Handling Unit sizing.

7.4.3.2(5) Design the fresh air intakes, cooling coil drain pans, air handling units, duct mounted humidifiers, ductwork, and all other interconnected components to prevent moisture or contaminants from collecting within the system. Utilize double scoped drain pans to eliminate standing water. Provide sufficient access panels to allow for inspection and cleaning.

7.4.3.2(6) Fresh air intakes will be located to not entrain contaminants from outdoor sources. All intakes will be located in areas not accessible by the public. Special consideration should be given to avoid the intake of obnoxious odours from the helipad located adjacent to the CSB.

7.4.3.2(7) All supply, return, and exhaust air will be fully ducted to the space being served.

7.4.3.2(8) Locate services that require regular maintenance access above non-critical spaces such that there is minimal to no disruption to the delivery of health care services.

7.4.3.2(9) All laboratory area ventilation shall utilize laminar or non-aspirating air diffusion to minimize disturbances at work areas and fume/biological safety hoods.

7.4.3.2(10) Generally air shall be designed to flow from clean to dirty areas.

7.4.4 Sound Attenuation and Vibration Isolation

7.4.4.1 Design Principles:

7.4.4.1(1) Design all mechanical systems to prevent sound and vibration transmission between spaces, and transmission from mechanical equipment to the spaces and maintain sound to levels as per design standards. Design mechanical systems located at or near the Building exterior to minimize sound transmission to the neighbouring residential community. Daytime sound levels at the property line shall not exceed 60 dBa. Nighttime (after 22:00) sound levels shall not exceed 50 dBa.

7.4.4.1(2) Provide vibration isolation devices on all equipment with rotating components.

7.4.4.1(3) All hung equipment will utilize spring isolators designed for the weight and vibration characteristics of the equipment.

7.4.4.1(4) Provide flexible connectors on all pump, duct, and wiring connections to isolated equipment.

7.4.4.2 Performance Criteria

7.4.4.2(1) Ensure duct silencers meet or exceed the requirements of the ductwork for cleanliness and inspection.

7.4.4.2(2) Utilize fibre free internal insulation.

7.4.4.2(3) Duct silencers shall be manufactured, engineered devices not fabricated built-up devices.

7.4.5 Testing, Adjusting, Balancing and Commissioning:

7.4.5.1 Demonstrate to the Authority that the mechanical and electrical systems are substantially operational by testing, adjusting, balancing, and commissioning the systems in accordance with Good Industry Practice.

7.4.5.2 Retain complete records of all TAB and commissioning data; and provide the Authority with a copy of the final documents for review.

7.5 Major Equipment – Performance Specification

7.5.1 Custom Air Handling Units

7.5.1.1 Air handling units shall be designed and manufactured to the specific requirements of this project. This specification applies to the custom air handling units.

7.5.1.2 The following shall be used as selection criteria and shall be as specified: airflow rates, external static pressures, water flow rates. The following are to be equaled or bettered: coil face velocities, filter face velocities, casing leakage rates, casing and base deflection. The following shall be met within 10% of specified values: water pressure drop.

7.5.1.3 Units shall be produced by a recognized manufacturer who maintains a local service agency and parts stock.

7.5.1.4 Air handling units and major components shall be products of manufacturing firms regularly engaged in production of such equipment whose products have been in satisfactory use in similar service for not less than 10 years.

7.5.1.5 Fans shall conform to AMCA bulletins regarding testing and construction.

7.5.1.6 Coils shall be ARI certified.

7.5.1.7 Filter media shall be ULC listed.

7.5.1.8 Units with factory wiring shall be factory approved and labelled. Failure to comply with this requirement will necessitate the manufacturer, at his expense, to have a certified representative inspect the equipment prior to affixing a label.

7.5.2 Approved Equals (Also See List of Manufacturers 3.1.25)

7.5.2.1 The following manufacturer is the basis of design: Haakon Industries.

7.5.2.2 The following manufactures are approved provided all aspects of the specifications, plans and Haakon standard of construction are met.

7.5.2.3 Approved Manufacturers: PACE, RACAN, SCOTT SPRINGFIELD. This specification shall over-ride any other published approved manufacturer's list.

7.5.2.4 Contractor shall assume all risks and extra costs associated with using approved manufacturers these manufacturers in lieu of the specified product.

7.5.3 Submittals:

7.5.3.1 Contractor shall assume all risks and extra costs associated with using approved manufacturers these manufacturers in lieu of the specified product.

7.5.3.2 The submittal shall provide all technical information relevant to the product being provided, including but not limited to, all the information shown in the schedules of this specification. It is the responsibility of the supplier to highlight any variances his equipment has with the requirements of this specification whether or not pre-approval has been obtained. Information shall be provided in the same measurement units as indicated elsewhere in this specification.

7.5.3.3 The submittal shall provide fan curves [not fan tables], with specified operating points clearly plotted.

7.5.3.4 The submittal shall provide coil selection worksheets, clearly showing proper consideration for altitude, air density, glycol corrections and indicate coil tube fin and casing construction.

7.5.3.5 The submittal shall provide filter information, including: initial APD, final APD, dust spot efficiency, final dust holding capacity, filter media description, filter frame details, and filter removal details.

7.5.3.6 The manufacturer shall submit sound power levels for both air handling unit inlet and outlet at rated capacity. If the unit exceeds sound power levels at scheduled conditions, the manufacturer must provide additional sound attenuators and meet specified BHP.

7.5.3.7 The manufacturer shall submit electrical requirements for power supply wiring including wiring diagrams for interlock and control wiring, clearly indicating factory-installed and field-installed wiring.

7.5.3.8 The manufacturer shall submit the manufacturers recommended installation instructions.

7.5.3.9 Omission of any of the above information will cause shop drawings to be immediately returned without review. Approval of submittal drawings of other manufacturers other than specified will not constitute final acceptance.

This contractor will remedy any variances found on units that vary from the specification or plans to match the specified unit at no cost to the Authority.

7.5.4 Operating and Maintenance Data

7.5.4.1 The manufacturer shall submit operation and maintenance data.

7.5.4.2 The manufacturer shall include instructions for lubrication, filter replacement, motor and drive replacement, spare parts lists, and wiring diagrams.

7.5.5 Environmental Requirements

7.5.5.1 Units shall not be operated for any purpose, temporary or permanent, until ductwork is clean, filters are in place, bearings lubricated, isolators adjusted, belt tension checked, sheaves aligned and the fan has been test run under observation.

7.5.6 General

7.5.6.1 The manufacturer shall provide the factory assembled air handling unit in configuration, dimensions and weight as indicated on the drawings. The unit shall include all specified components installed at the factory. Field fabrication of units and their components will not be accepted. The unit shall include dual spring-isolated supply fans (with inlet isolation dampers), dual spring-isolated return fans (with inlet isolation dampers), integral supply and return fan silencers, pre-filters and Dynamic Sterile Sweep microbial eliminator (refer to unit drawing and schedule), dampers, cooling coil, heating coil, space for future heating coil, and factory mounted and wired VFD's. A total of 4 VFD's shall be supplied – one independent VFD for each fan motor to allow for maximum redundancy.

7.5.6.2 The unit shall be designed to be supported by a housekeeping pad.

7.5.6.3 Units too large to be legally shipped by truck may be shipped to the site in sections. Contractor shall allow for site assembly of the factory supplied unit sections. This includes mounting of all accessories shipped loose, wiring across splits, touch up painting, etc. Otherwise units shall be shipped in one piece.

7.5.7 Casing

7.5.7.1 Walls and roofs shall be constructed of 16 gauge satin coat galvanized steel 50 mm (2") thick acoustic thermal panels. The inner liner shall be 22 gauge 304 stainless steel washdown liner (in all sections). Insulation shall be 50 mm (2") thick 3 lbs/cubic ft. rigid neoprene coated insulation. All permanently joined flanged panel surfaces shall be sealed with an individual

strip of 0.12" x 0.38" tape sealer. Wall seams shall be turned inward to provide a clean flush exterior finish. All panel seams shall be sealed during assembly to produce an airtight unit.

7.5.7.2 The internal liner shall be 304 stainless steel and shall be suitable for washing with a pressure washer or steam cleaner without risk of wetting the insulation. The liner shall be installed over top of the panel flanges and each liner seam shall be sealed with a lap joint. The wall liner shall be installed over top of the base water dam such that any water run-off from the liner will drip into the water tight base rather than into the wall panel. The roof liner shall be installed over top of the roof support so that water cannot enter the roof insulation.

7.5.7.3 All panels shall be joined on 200mm (8") centers using cadmium plated TEK screws.

7.5.7.4 All insulation edges shall be protected with metal lagging. Insulation systems using stickpins or adhesives are not acceptable.

7.5.7.5 Stiffeners of angle steel shall be supplied as required to maintain casing deflection criteria of 1/200 at 1.5 times the working pressure. If panels cannot meet this deflection, an additional internal reinforcing shall be added.

7.5.7.6 Acoustical Performance:

7.5.7.6(1) The housing shall have been tested for acoustical performance by an accredited independent laboratory.

7.5.7.6(2) Test methods and facilities used to establish sound transmission loss values shall conform explicitly with the ASTM designation E90-85 and E413-73..

7.5.7.6(3) The manufacturer shall submit the lab report for approval

7.5.7.6(4) Sound Transmission Loss DB ASTM E-90 & E413-73.

	1	2	3	4	5	6	7	8	
50 mm (2") Walls	18	19	27	33	43	52	52	52	STC=37

7.5.7.6(5) Test methods and facilities used to establish sound absorption values shall conform explicitly with the requirements of the ASTM Standard Test Method for Sound Absorption Coefficients by the Reverberation Method: ASTM C423-84A and E795-83.

7.5.7.6(6) Sound Absorption ASTM C423-84A & E795-83

	1	2	3	4	5	6	7	8	
50 mm (2”) Walls	.10	.23	.75	1.08	1.05	.99	.97	.95	STC=37

7.5.7.7 Base Construction:

7.5.7.7(1) Units shall be constructed from structural steel C-channel around the perimeter of the unit with intermediate channel and angle iron supports. Unit shall have a minimum 6 in channel.

7.5.7.7(2) A 12 gauge aluminum checker plate floor shall be installed on the base. All seams on aluminum floor shall be continuously welded. The floor shall be flat, reinforced below with all seams continuously welded. Drive screw attachment and caulking are not acceptable. The base shall be provided with lifting lugs, a minimum of four [4] per unit section. The base shall be insulated with 50mm (2") fiberglass insulation and sheeted with a 22 gauge galvanized steel liner. Floors that "oil can" are not acceptable and will be site-remedied at this contractor's expense.

7.5.7.7(3) The manufacturer shall provide a 40mm (1.5") perimeter collar around the entire unit and around each floor opening to ensure the unit is internally watertight. The entire base shall act as an auxiliary drain pan and hold up to 40mm (1.5") of water.

7.5.7.7(4) The manufacturer shall provide auxiliary drains in fan sections downstream of cooling coils and in mixing sections.

7.5.7.7(5) All drain connections on floor mounted air handling units shall terminate at the side of the unit.

7.5.7.7(6) Maximum base deflection shall be 6mm (0.25") on 600cm (240") in unsupported span.

7.5.7.7(7) Unit shall be constructed to sit on a concrete housekeeping pad. Drain traps coil drain pans and unit sections shall be field provided and installed by this contractor.

7.5.7.8 Access Doors

7.5.7.8(1) Access doors shall be manufactured from 16 gauge. The doors shall be double wall construction with 22 gauge stainless steel liner on the inside. Stainless steel liner shall be "wash-down compatible" as specified in the preceding casing section. Corners of the doors shall be continuously welded for rigidity. 50mm (2") 3 lbs/cubic ft density

insulation shall be sandwiched between the 16 gauge outer layer and the 22 gauge inner layer (stainless steel). Doors MUST be the same thickness as the unit casing to maximize thermal and acoustical resistance. A 300mm (12") HERMETICALLY SEALED double glazed laminated glass window shall be provided in each door. Hinges shall be continuous piano type stainless steel.

7.5.7.8(2) Two [2] "Ventlok" Model #310 high pressure latches operable from either side of the door shall be provided. The door opening shall be fully gasketed with continuous 0.5 in closed cell hollow round black gasketing and a metal encapsulated reinforcing backing that mechanically fastens to the door frame. Door frames shall be made from 16 gauge with the outside of the door flush with the unit. The minimum door opening size shall be 18 in x 70 in [where height permits]. Fan compartments must have a door of minimum width to remove the motor.

7.5.7.8(3) All access doors must swing against the air pressure [positive pressure plenum doors must swing in]. Access doors that do not comply must be remedied by this contractor at the jobsite.

7.5.7.9 Non-Scrolled Fans – Plenum Type

7.5.7.9(1) Fans shall be manufactured by Haakon, Twin City or Pace. Fans shall be airfoil as indicated in the schedule or the fans shall be centrifugal plenum [plug] type, designed without a scroll type housing. Fans shall incorporate a wheel, heavy gauge reinforced steel inlet plate with removable spun inlet cone, structural steel frame, and shaft and bearings in AMCA Arrangement 3 configuration as an entire assembly.

7.5.7.9(2) All fan wheels shall have tapered spun wheel cones or shrouds providing stable flow and high rigidity. The wheels shall be non-overloading type.

7.5.7.9(3) The blades shall be continuously-welded, die-formed aluminum Airfoil type, designed for maximum efficiency and quiet operation. Partial welding will not be acceptable on airfoil blades.

7.5.7.9(4) Impellers shall be statically and dynamically balanced and the complete fan assembly shall be test balanced at the operating speed prior to shipment.

7.5.7.9(5) Shafts shall be of AISI C-1018, 1040 or 1045 hot rolled steel accurately turned, ground, polished, and ring gauged for accuracy.

7.5.7.9(6) Shafts shall be sized for first critical speed of at least 1.43 times the maximum speed for the class. Bearings shall be heavy duty, grease lubricated, anti-friction ball or roller, self-aligning, pillow block type and selected for minimum average bearing life [AFBMA L-50] in excess of 200,000 hours at the maximum class RPM.

7.5.7.9(7) When specified, the fans shall be supplied with internal or nested type variable inlet vanes for wheel diameter 16.5 in and larger.

7.5.7.9(8) Cantilevered vane blades shall be used through Size 490 to minimum air performance insertion losses and noise. The operating mechanism shall be outside the inlet air-stream.

7.5.7.9(9) The manufacturer shall provide WORKSAFEBC / OSHA approved fully enclosed metal belt guard sides of galvanized steel and an expanded metal face. The belt guard shall be sized to allow either sheave to be increased by two sizes.

7.5.7.9(10) The plenum fan assembly MUST have an enclosed safety screen as per WORKSAFEBC / OSHA Standards. Safety screen shall completely encase the fan and assembly per OSHA requirements. No exceptions. Fans that are provided without a safety screen that covers the complete fan, motor and belt assembly will have one field-provided at this contractor's expense.

7.5.7.9(11) Fans shall have inlet WORKSAFEBC / OSHA approved inlet screens.

7.5.7.9(12) Fans shall have inlet isolation dampers to allow one fan to be isolated and the second fan run. Fan sheaves shall be sized to allow the fan to be run within 3% of its class limit to allow maximum redundant airflow (i.e. – the supply or return fan shall have it's rpm increased on a failure of the second fan – to maximize the airflow). Each isolation damper shall

be TAMCO 1000 aluminum airfoil damper – no exceptions. Refer to damper specification in this section.

7.5.7.9(13) Dual fans (two fans) may be provided for each supply and return fan section. Each fan motor must have an independent VFD for reasons of redundancy (a total of 4 VFD's must be supplied for this AHU – refer to VFD section of this specification). VFD's shall be factory set – with fan sheaves properly sized – to operate at 55 Hz. This allows for 15% increase in speed for redundancy of airflow. Alternatively, a separate fan unit may be provided that connects to each supply and return fan section in order to provide the required redundancy without dual fans.

7.5.7.10 Vibration Isolation:

7.5.7.10(1) An integral all welded steel vibration isolation base shall be provided for the fan and motor.

7.5.7.10(2) Isolators shall be free standing with sound deadening pads and levelling bolts.

7.5.7.10(3) The spring diameter to compressed operating height ratio shall be 1 to 1.

7.5.7.10(4) The spring deflection shall be 75 mm (3 in).

7.5.7.10(5) Isolators shall have earthquake restraints.

7.5.7.11 Motors, Drives and Variable Frequency Drives

7.5.7.11(1) Fan motors shall be mounted and isolated on the same integral base as the fan.

7.5.7.11(2) Fan motors shall be heavy duty, premium efficiency open drip-proof, operable at scheduled electrical duty. MOTORS SHALL MEET USA EPACT OF 1992.

7.5.7.11(3) The V-belt drive shall have a constant pitch sheave rated at 1.5 times the motor nameplate.

7.5.7.11(4) Air handling units shall have factory mounted, factory wired variable frequency drives with bypass to allow fan operation while frequency drive is removed. VFD shall accept 0-10 V or 4-20 mA signal provided by controls contractor. VFD's shall be mounted on the exterior wall of the AHU. All power

wiring from VFD's to motors shall be factory supplied. All control wiring shall be by controls contractor. Control contractor shall run control wiring per unit manufacturer's requirements and direction.

7.5.7.11(5) Div 16 shall provide power and connect 575 Volt / 3 phase power to each of two (2) SF VFD's, two (2) RF VFD's (a total of 4 VFD's), and 120 volt power circuits to the lighting & sterile sweep circuit within the unit. VFD's shall include a disconnect switch, internal link reactors and NEMA 3R Enclosure. Keypad functions shall include Hand/Off/Auto feature.

7.5.7.11(6) VFD's shall be commissioned and fans sheaved so that each SF and RF will have their speed increased by 12% on a failure of the redundant fan. (IE. If one SF fails – the second SF will have its RPM increased by 12%). DDC controls shall be programmed to increase the speed of one fan upon failure of the other fan. DDC system shall monitor failure contact of each VFD separately.

7.5.7.11(7) VFD's shall automatically adjust the voltage to the motor to optimize energy savings under changing load and speed conditions.

7.5.7.11(8) Fan motors and speed drives shall be warranted for a period of 3 years by VFD manufacturer. VFD manufacturer shall include required internal components (LRC filter, Line and Load Reactors as required).

7.5.7.11(9) Trane TR200 is the basis of this specification. Acceptable VFD manufacturers include: ABB and Allen Bradley.

7.5.7.11(10) VFD start up shall be by factory trained representative. Provide start-up report.

7.5.7.12 Airflow Measuring Probes:

7.5.7.12(1) Provide on each fan air flow measuring probes capable of continuously monitoring the air handling capacity of the respective scrolled (plenum) fan.

7.5.7.12(2) Each airflow probe shall contain multiple, averaged velocity pressure taps located symmetrically around the throat of the fan inlet and a single static pressure tap located on the fan

housing. The entire airflow monitoring probe must be located outside the inlet throat as to not obstruct airflow.

7.5.7.12(3) The probes shall be capable of producing steady, non-pulsating signal of the velocity pressure, independent of the upstream static pressure without adversely affecting the performance of the fan. The sensing probes shall be accurate ±3% of actual fan airflow. The fan inlet sensing rings shall be **FreeFlo Sensing Ring** as manufactured by Haakon Industries Ltd. Approved equivalent: EBTRON.

7.5.7.13 Airflow Display:

7.5.7.13(1) Provide on indicated fans a method of displaying digitally, in real time, the fans current air flow.

7.5.7.13(2) The display shall be capable of showing the airflow of two (2) independent fans simultaneously.

7.5.7.13(3) For interaction with a controller, the display shall output one (1) 0-10VDC signal for each fan being monitored. Integrate all air flow displays and sensors with the BMS.

7.5.7.13(4) The output signal shall be accurate to ±0.5% of Natural Span, including non-linearity, hysteresis and non-repeatability.

7.5.7.13(5) The display must be water tight allowing for use in outdoor locations. If the display is not water tight it shall be enclosed in a weatherproof housing.

7.5.7.13(6) Approved equal: EBTRON.

7.5.7.14 Coils:

7.5.7.14(1) Coils shall be manufactured by Haakon, Trane, Colmac, or Pace. Fins shall have collars drawn, belled and firmly bonded to the tubes by means of mechanical expansion of the tubes. No soldering or tinning shall be used in the bonding process. Coils shall be mounted in the unit casing to be accessible for service. Capacities, pressure drops and selection procedure shall be certified in accordance with ARI Standard 410.

7.5.7.14(2) Coils shall be fully enclosed within the casing. Cooling coils shall be on mounted 304 stainless steel angle racks

manufactured to allow coils to slide out individually. Heating coils shall be mounted on galvanized angle racks manufactured to allow coils to slide out individually.

7.5.7.14(3) Removable coil access panels shall be provided for removal of coils through the casing wall. Coils shall be individually removable towards the access side. Coils must be individually racked, removable through the side access panels.

7.5.7.14(4) All pipe connections shall be on the same unit end, extended through the casing for ease of connection.

7.5.7.14(5) Water coils handling recently mixed air, or direct outside air, shall be fully drainable for servicing.

7.5.7.14(6) The primary surface shall be round seamless 16 mm (0.62 in).508mm (.020") wall thickness copper tube on 1.5 in centers. All joints shall be brazed.

7.5.7.14(7) The secondary surface shall consist of rippled plate fins for higher capacity and structural strength. Fins shall have full drawn collars to provide a continuous surface cover over the entire tube for maximum heat transfer. Bare copper tube shall not be visible between fins and the fins shall have no openings or holes which might accumulate lint and dirt. Tubes shall be mechanically expanded into the fins to provide a continuous primary to secondary compression bond over the entire finned length for maximum heat transfer rates.

7.5.7.14(8) The casings shall be constructed of continuous 16-gauge galvanized steel casings for heating coils and 304 stainless steel for cooling coils, and heat extraction coils. Coil side plates shall be of reinforced flange type.

7.5.7.14(9) The coil connection locations shall permit universal mounting of the coil for right or left hand airflow and have equal pressure drop through all circuits. Coils shall be circuited for counterflow heat transfer to provide the maximum mean effective temperature difference for maximum heat transfer rates.

7.5.7.14(10) The complete 5W coil core shall be tested with 300 lbs air pressure under warm water and be suitable for operation at

200 psig working pressures. Individual tube and core tests before installation of headers is not considered satisfactory. Hydrostatic tests alone will not be acceptable.

7.5.7.14(11) All cooling coils shall have stainless steel drain pans pitched in 2 directions to ensure complete drainage. Drain pans found to have “standing water” shall be remedied by this contractor at the job site. Drain pans must be recessed below AHU floor level.

7.5.7.14(12) Heating and cooling coils shall have capacities as scheduled.

7.5.7.14(13) Heat recovery coils shall be provide where show on schedules and drawings. Heat extraction coils shall comply with cooling coil and drain pan specification.

7.5.7.15 Filters:

7.5.7.15(1) Merv 8 pre-filters shall be utilized in exhaust air streams for protection of heat extraction units. Dynamic 1” pre-filters shall be used with sterile sweep UV lights in units with return air. Provide 3 sets of spare media for all pre-filters.

7.5.7.15(2) Final filters shall be Dynamic Air Cleaner V8 with UV Sterile Sweep (Sterile sweep is only required on units with mixing of return air with OA – not on 100% OA units). Units with Sterile Sweep shall have a 1” Dynamic pre-filter upstream of the V8 bank. Units that have 100% outside air shall not require sterile sweep lights – and shall not have pre-filters (the Dynamic V8 bank will be both pre-filter and final filter).

7.5.7.15(3) The air cleaner shall have been tested and meet CSA Standard C22.2 No. 187-M19986 and UL Standard 867 for electrostatic air cleaners.

7.5.7.15(4) The air cleaner shall remove 97% of contaminants at 0.3 microns and above in a re-circulating system. The pressure drop of the V8 air cleaner bank shall not exceed 100 Pa (0.30” wpd) when the filter media is new. The pressure drop shall not exceed 160 Pa (0.65”) when panels are fully loaded. Provide a 5 year media guarantee including all V8 final filter media and labour costs. Filter media shall be changed when the pressure drop reaches 0.65” wpd. (Note

– this media guarantee is for the final filter V8 bank – not for the pre-filters).

7.5.7.15(5) The air cleaner shall have an active electrostatic field that polarizes a dielectric media. The unit shall not ionize airborne particles and shall not produce ozone. Units that utilize “ion cloud” ozone (carcinogen) producing technology shall not be acceptable. Zero tolerance.

7.5.7.15(6) The high voltage Powerheads shall require 24 volts AC input. The Powerheads must be fully potted and connected in parallel. Powerheads shall be factory wired and shall include factory supplied and mounted transformer.

7.5.7.15(7) The 24VAC power supply must be a UL or CSA certified transformer, class “2” type, which shall permit one side of the secondary output (24V) to be attached to electrical ground.

7.5.7.15(8) Each Air Cleaner shall have a disposable and recyclable media pad with a minimum of a class “2” fire rating. It shall have a positive seal in the frame.

7.5.7.15(9) The cleaners will be arranged in a pre-fabricated module assembly comprised of separate air cleaners and galvanized metal sides and attachment flanges. Each “V” Bank shall be nominally 610 mm (24” in.) overall height, width as shown on drawings and 750 mm (29.5”) depth in direction of airflow.

7.5.7.15(10) Sterile Sweep UVC emitters shall be installed upstream of the V8 air cleaner module on units with mixed air. The V8 shall shine directly on 1” Dynamic media. The units shall be tested and meet UL standards 1995 and 1570. Provide 3 sets of spare media for 1” air cleaner. (The media for the flat panels is not covered by the 5 year media guarantee).

7.5.7.15(11) Sterile Sweep emitter shall employ an oscillating parabolic reflector in close proximity to the lamp. The sweep of the reflector shall be adjustable from 50 to 130 degrees. Each unit shall be mounted on a bracket so that the lamp is 4.5 “ form the leading edge of the air cleaner to ensure sufficient intensity by repeated sweeps with focused beam of UVC. UV lights must shine directly on the electronic air cleaner media.

7.5.7.15(12) Each emitter shall consist of a housing containing the ballast, reflector motor and interlock switch. Attached to the

housing, and upstream of the lamp shall be an aerodynamic shield to push air around the lamp rather than over it. The housing and shield shall be constructed of powder-coated galvanized steel. Each housing shall have an operational indicator light and an on/off switch.

7.5.7.15(13) The UVC lamps shall be high output T6 lamps that produce UV light in the 250-260 nm range. The units shall not produce ozone.

7.5.7.15(14) The air cleaner shall test at MERV 13 using the ASHRAE 52.2 protocol. When using the ASHRAE 52.2nc protocol, the air cleaner shall test at MERV 15. It will have a clean static pressure drop of 75 Pa (0.30" w.g.) and shall increase in resistance no more than 87 Pa (0.35" w.g.) with a dust loading of 2,855 grams. It shall hold a total of 4,582 grams of dust at its final resistance of 1.4" w.g. per 24x24 modules. Each V8 bank shall be guaranteed for 5 years from substantial completion. All labour and material shall be covered by this contract.

7.5.7.15(15) Each Air Cleaner shall have a disposable and recyclable media pad with a minimum of a class "2" fire rating. It shall have a positive seal in the frame to prevent air bypass.

7.5.7.15(16) The high voltage powerheads shall require 24 volts AC input. The Powerheads must be fully potted and connected in parallel.

7.5.7.15(17) Dynamic Sterile Sweep unit shall be connected to the 120 volt lighting circuit in the AHU. Manufacturer shall include disconnect switch to allow power to be disconnected at the unit for servicing. All AHU access doors shall have switches that will turn off the UV lights when they are opened. Provide internal 24 volt transformer from 120 volt circuit for air cleaner power heads.

7.5.7.15(18) Dynamic UV Sterile Sweep is the basis of this specification. No manufacturers shall be approved unless approval is published by addendum. Vendors wishing to submit shall do so in advance of the close of tenders. Full submittal data shall be submitted. This shall include, but not be limited to, Merv 13 test report with dust loading, proof that ionizing technology is not utilized, and a minimum of 5 references

(with the name and phone numbers of chief engineers) of hospitals where the product has been in use for a minimum of 5 years.

7.5.7.15(19) No spare air cleaner media is required for the V8 banks (five years of operation will be provided with these original panels). Provide 3 spare sets of media for both Merv 8 and Dynamic 1" pre-filters.

7.5.7.16 Filter Gauges:

7.5.7.16(1) The manufacturer shall provide Dwyer 2000 magnehelic gauges.

7.5.7.16(2) Magnehelic gauges shall be accurate to +/- 2% of full range.

7.5.7.16(3) One gauge shall be provided for each filter bank.

7.5.7.16(4) Gauges shall be recessed into the exterior cabinet casing to provide a "flush" finish.

7.5.7.17 Lights:

7.5.7.17(1) Provide 1219mm (48") vapour proof fluorescent lights with T8 ballasts in each section (where shown on drawings). Duplex receptacles shall be installed in each fan section on the wall across from the access doors. A switch with an indicator light shall be installed on the unit outer wall at each access door location. Electrical power shall be 120V/1/60. All lights shall be wired back to a single point on the unit for connection of power by Div 16. This circuit shall also be factory wired to the Dynamic Air cleaner system for single point 120 Volt power.

7.5.7.17(2) Please refer to AHU sections shown on mechanical plans. Lights shall be located as drawn on sections.

7.5.7.18 Finish:

7.5.7.18(1) The unit shall be finish painted with two components, etch bond primer and alkyd enamel. All uncoated steel shall be painted with grey enamel. All metal surfaces shall be prepainted with vinyl wash primer to ensure paint bonds to metal. Unit colour shall be Haakon standard grey.

7.5.7.19 Unit Mounted Silencers:

7.5.7.19(1) Each silencer pod shall consist of radiused noses and tails and perforated metal panels stiffened for flatness. Silencers shall be rated in accordance with ASTM E477.

7.5.7.19(2) Acoustic media shall be compressed and supported to minimize dusting and erosion. Mineral wool is not acceptable. Insulation shall be encapsulated with Tedlar.

7.5.7.19(3) One 915 mm (36") silencer with 50% free area shall be provided for each of supply fan and return fan.

7.5.7.19(4) Silencer pods shall be full height and full width of the plenum.

7.5.7.19(5) Stacked duct type silencers are not acceptable.

7.5.7.19(6) Sound Power Levels: The following octave band data shall be met or exceeded. Sound data shall be submitted as part of the submittal process to confirm these numbers will be met.

Octave Band Sound Power Levels								
Band	63	125	250	500	1000	2000	4000	8000
AHU typical SA discharge	85	90	88	77	65	59	62	59
AHU typical RA inlet	84	87	77	62	56	55	55	55

7.5.7.20 Aluminum Airfloil Dampers:

7.5.7.20(1) Aluminum airfoil frames and blades shall be a minimum of 12 gauge extruded aluminum. Blades shall be of a single unit airfoil design 6 in wide.

7.5.7.20(2) Frames shall be extruded aluminum channel with grooved inserts for vinyl seals. Standard frames shall be 2 in x 4 in x 0.62 in on the linkage side, 1 in x 4 in x 1 in on the other 3 sides.

7.5.7.20(3) Pivot rods shall be 0.88 in hexagon extruded aluminum interlocking into the blade section. Bearings shall be of a double sealed type with a Celcon inner bearing on a rod within a Polycarbonate outer bearing inserted into the frame to prevent the outer bearing from rotating.

7.5.7.20(4) The bearing shall be designed so there are no metal-to-metal or metal-to-bearing riding surfaces. The

interconnecting linkage shall have a separate Celcon bearing to eliminate friction inside the linkage.

7.5.7.20(5) Blade linkage hardware shall be installed in a frame outside the airstream. All hardware shall be of non-corrosive, reinforced cadmium plated steel.

7.5.7.20(6) Damper seals shall be designed for minimum air leakage by means of overlapping seals.

7.5.7.20(7) Actuators shall be provided, installed and wired by controls contractor.

7.5.7.20(8) Jack-shaft assemblies shall be provided for multiple damper installations.

7.5.7.20(9) Dampers shall be TAMCO 1000 or equivalent.

7.5.7.21 Humidifiers – Gas-Fired Steam Humidification System

7.5.7.21(1) DRI-STEEM Corporation GTS Model, gas-fired steam humidifier.

7.5.7.21(2) Electrical Services and Connections – Division 26.

7.5.7.21(3) Certifications:

7.5.7.21(3)(a) CSA/AGA/CGA

7.5.7.21(3)(b) CE

7.5.7.21(4) Submittals:

7.5.7.21(4)(a) Comply with Submittal Procedures and Execution and Closeout Requirements.

7.5.7.21(4)(b) Submit product data (manufacturer's specifications, and technical data including performance, construction and fabrication) for each manufactured component.

7.5.7.21(5) Warranty: Product shall be warranted to be free from defects in materials and fabrication for a period of two years after installation or 27 months from ship date.

7.5.7.22 Products:

7.5.7.22(1) Fabrication requirements:

7.5.7.22(1)(a) Tank: 14-gauge 304-stainless steel with Heli-arc welded seams.

7.5.7.22(1)(b) Removable cover allowing easy access to probe assembly in the tank.

7.5.7.22(1)(c) Easily accessible cleanout plate.

7.5.7.22(1)(d) Steam outlet on top of tank configured to connect to hose or pipe(GTS Models 100-200) or a flange (GTS Models 300-800).

7.5.7.22(1)(e) Stainless steel round flue outlet to vent products of combustion. Humidifier shall be certified to use Class B flue materials.

7.5.7.22(1)(f) Painted aluminum enclosure to protect all humidifier components. Enclosure shall have integral base with openings designed for moving with a fork lift or pallet jack.

7.5.7.22(1)(g) Enclosure with integral base and openings designed for moving with a forklift or pallet jack.

7.5.7.22(1)(h) Stainless steel heat exchanger with welded joints.

7.5.7.22(1)(i) Factory insulation: Humidifier shall be covered with 1"-thick (25 mm), rigid, foil-faced fiberglass insulation. . All surfaces except front face panel shall have insulation.

7.5.7.22(1)(j) Size: Units with capacities of 300 lbs/hr (136 kg/hr) or less shall be capable of fitting through 36" (91 mm) door.

7.5.7.22(2) Water Requirements: The humidifier shall be capable of generating steam from tap, softened or DI/RO water.

7.5.7.22(3) Drain: An electric drain valve shall be mounted on humidifier assembly to allow tank to drain automatically at the end of a humidification season (standard water models only).

7.5.7.22(4) Burner Assembly:

7.5.7.22(4)(a) Humidifier and burner assembly shall be CSA/AGA/CGA certified and tested to support natural or LP gas.

7.5.7.22(4)(b) Gas train assembly shall be complete with burner/mixing tube assembly, igniter, sight glass, flame rod electrode, gas manifold integral gas valve and venture.

7.5.7.22(4)(c) Each burner shall freely modulate or time proportion with a gas input turndown ratio of up to 4:1, and shall time-proportion below that threshold.

7.5.7.22(5) Integral water tempering device: A factory-installed thermostatically controlled water valve shall meter an amount of cold water into a stainless steel mixing chamber to temper 212°F (100°C) water with a 6 gpm (0.38 l/s) in-flow rate to a 140°F (60°C) discharge temperature to sanitary system.

7.5.7.23 Humidifier Options: Tank and heat exchanger shall be 316 stainless steel with Heli-arc welded seams.

7.5.7.24 Humidifier Controls:

7.5.7.24(1) Control subpanel: Control subpanel shall be factory - attached to humidifier with all wiring between subpanel and humidifier completed at factory. A wiring diagram shall be included.

7.5.7.24(2) Vapour-logic4 microprocessor controller with the following features or functions:

7.5.7.24(2)(a) Web interface and server, included standard on all models:

7.5.7.24(2)(b) Web interface shall have same functionality as Vapor-logic4 keypad/display.

7.5.7.24(2)(c) Web interface shall allow multiple remotely located users to simultaneously view system operation and/or change system parameters.

7.5.7.24(2)(d) Web interface shall have password-protected secure access.

7.5.7.24(2)(e) Web interface shall be compatible with standard Internet browsers.

7.5.7.24(2)(f) Interoperable with any Modbus® network.

7.5.7.24(2)(g) Redundant low water safety control.

7.5.7.24(2)(h) Fully modulating (0% to100%) control of humidifier outputs.

7.5.7.24(2)(i) PID control capability with field-adjustable settings.

7.5.7.24(2)(j) Water level control for softened or hard water.

7.5.7.24(2)(k) Automatic refill, low water cutoff field adjustable skimmer bleed off functions and automatic drain-down of humidifier. System shall consist of: (a) a water level sensing unit comprised of three metallic probes screwed into a threaded probe head. Probe head shall incorporate probe isolation chamber to eliminate short- circuiting between probes caused by mineral coating of probe head. Probe head shall be mounted on the humidifier assembly; (b) A solenoid operated fill valve factory mounted on the humidifier assembly; (c) End-of-season drain automatically drains humidifier tank after a user-defined period of system inactivity.

7.5.7.24(2)(l) Temperature sensor: A factory mounted sensor, with a temperature range of -40 to 248°F (-40 to 120ºC) mounted on the humidifier to enable the following functions: (a) Maintain the evaporating chamber water temperature above freezing; (b) Maintain a

user-defined preset evaporating chamber water temperature; (c) Allow rapid warm-up of water in evaporating chamber after a call for humidity, providing 100% operation until steam production occurs.

7.5.7.24(3) USB port on the control board for software updates, data backups, and data restoration.

7.5.7.24(4) Real-time clock to allow time-stamped alarm/message tracking, and scheduled events.

7.5.7.24(5) Factory commissioning of humidifier and control board, including system configuration as-ordered, factory unit testing, and operation with water before shipping.

7.5.7.24(6) Unit-mounted keypad/display operable within a temperature range of 32 to 158 °F (0 to 70 °C), and that provides backlighting for viewing in low light.

7.5.7.24(7) Alarms, unit configuration, and usage timer values shall remain in non-volatile memory indefinitely during a power outage.

7.5.7.24(8) The capability to monitor, control, and/or adjust the following parameters: (a) Relative humidity (RH) set point, actual conditions in the space (from humidity transmitter), RH offset; (b) Dew point set point, actual conditions in the space (from dew point transmitter) dew point offset; (c) Relative humidity (RH) duct high limit set point (switch) and actual conditions; (d) Relative humidity (RH) duct high limit set point, actual conditions (from transmitter), high limit span, and high limit offset; (e) Total system demand in % of humidifier capacity; (f) Total system output in lbs/hour (kg/h); (g) Drain/flush duration, allowed days, and frequency based on usage; (h) End-of-season drain status (on standard water systems and if ordered as a DI water option) and hours humidifier is idle before end of season draining occurs; (i) Window glass surface temperature (in % RH offset application using sensor ordered as an option) with programmable offset; (j) Air temperature or other auxiliary temperature monitoring with programmable offset (using sensor ordered as an option); (k) System alarms and system messages, current and previous; (l) Adjustable water skim

duration; (m) Programmable outputs for remote signalling of alarms and/or messages, device activation (such as a fan), or for signalling tank heating and/or steam production; (n) System diagnostics that include: (i) Test outputs function to verify component operation; (ii) Test humidifier function, by simulating demand to validate performance; (iii) Data collection of RH, air temperature, water use, energy use, alarms, and service messages for viewing from the keypad/display or Web interface; (o) Service notification scheduling; (p) Password-protected system parameters; (q) Keypad/display or Web interface displays in English; (r) Numerical units displayed in inch-pound or SI units.

7.5.7.25 Humidifier Control Options

7.5.7.25(1) Interoperability using LonTalk. Integrate all air flow displays and sensors with the BMS.

7.5.7.25(2) Multiple humidifier tank control. Vapor-logic4 shall be programmed and configured at the factory to control multiple humidifier tanks. Controller functions shall include all Vapor-logic4 functions listed above plus:

7.5.7.25(2)(a) The controller shall control up to 16 humidifier tanks.

7.5.7.25(2)(b) Automatic run-time balancing. The controller shall assign duty to all humidifier tanks in the multi- tank group such that each humidifier accrues approximately the same hours of duty, thereby ensuring equal wear across all humidifiers in the multi-tank group.

7.5.7.25(2)(c) One humidifier tank shall be capable of being controlled as a redundant tank.

7.5.7.25(2)(d) One Vapor-logic4 keypad/display shall be included with each multi-tank group.

7.5.7.25(3) Control input accessory options:

7.5.7.25(3)(a) Humidity transmitter, room: Humidity transmitter shall be a room-mounted device that measures from 0% to 100% of RH range and provides a linear output (10% RH to 90%

RH) from 4 mA to 20 mA. Accuracy ± 2% RH. Supply voltage 21 VDC. Operating temperature range: -4 ℉ to 140 ℉ (-20 ℃ to 60 ℃).

7.5.7.25(3)(b) Humidistat, on-off, high limit: Electric humidistat control shall be an off-on style, duct mounted with a control range of 15% to 95% RH. Compatible with 24, 120, 240 VAC. Operating temperature range 40 ℉ to 125 ℉ (4 ℃ to 52 ℃).

7.5.7.25(3)(c) Modulating high limit control: The modulating high limit control system shall include two modulating electronic humidity transmitters (one space-mounted, the other duct-mounted downstream of the humidifier). Both shall transmit to the microprocessor controller to modulate humidifier output and maintain the highest desired space humidity possible, at all airflow volumes, without saturation of the airstream. (For this application, it is recommended to use a sail type airflow-proving switch).

7.5.7.25(3)(d) Airflow proving switch, pressure type: Airflow proving switch shall be diaphragm-operated with pitot tube for field installation. Switch shall have an adjustable control point range of 0.05” wc to 12" wc (12.5 Pa to 2988 Pa) Operating temperature range -40 ℉ to 180 ℉ (-40 ℃ to 82ºC) Compatible with 24, 120 and 240 VAC.

7.5.7.26 Humidifier Dispersion Options

7.5.7.26(1) Ultra-sorb® steam dispersion panel:

7.5.7.26(1)(a) The factory assembled steam dispersion panel shall include the following components: (a) Steam supply header/separator; (b) Condensate collection header; (c) Closely spaced steam dispersion tubes spanning the distance between the two headers.

7.5.7.26(1)(b) Each dispersion tube shall be fitted with two rows of steam discharge tubelets inserted into the tube wall, centered on the diametric line, and spaced 1-1/2" (38 mm) apart. Each tubelet shall be made of a thermal-resin material designed for high steam temperatures. The two rows of tubelets in each dispersion tube shall discharge steam in diametrically opposite directions, perpendicular to airflow.

7.5.7.26(1)(c) Each tubelet shall extend through the wall of and into the center of the dispersion tube and contain a steam orifice sized for its required steam capacity.

7.5.7.26(1)(d) The humidifier shall provide absorption characteristics that preclude water accumulation on any in-duct surface within 15" (381 mm) of the humidifier tube panel while maintaining conditions of 80% maximum relative humidity at a minimum of 55°F (13°C) in the duct airstream.

7.5.7.26(1)(e) Air pressure loss across the humidifier panel shall not exceed 0.017" water column (4 Pa) at a duct air velocity of 436 fpm (2 m/s).

7.5.7.26(1)(f) Each packaged humidifier panel assembly of tubes and headers shall be contained within a galvanized metal casing to allow convenient duct mounting, or to facilitate the stacking of and/or the end-to-end mounting of multiple humidifier panels in ducts or air handler casings. When so designated, the humidifier panel shall be shipped unassembled.

7.5.7.26(1)(g) All tubes and headers shall be 304 stainless steel and be Heli-arc welded.

7.5.7.26(1)(h) Tubes shall be joined to headers with slip-fit couplings.

7.5.7.26(1)(i) Tubes and headers shall be 316 stainless steel and be Heli-arc welded.

7.5.7.26(1)(j) Insulated dispersion tubes. Dispersion tubes shall be insulated with a plenum-approved insulating material for in-duct installation and have an R-value not less than 0.5 at a thickness not more than 0.125" (3.2 mm), for minimal increase in dispersion tube diameter. (i) Airstream heat gain shall not exceed the values as scheduled; the values shall be supported by the manufacturer's published data. (ii) Insulating material shall meet the following criteria at 0.125" (3.2 mm) thickness; (1) Fire/smoke index shall be 0/0 per any of the following test procedures: - UL 723 fire/smoke index (Test for Surface Burning Characteristics of Building Materials) – NFPA 255 (Standard Method of Test of Surface Burning Characteristics of Building Materials) - ASTM E84 (Surface Burning Characteristics for Materials Used in Plenums) (2) Stable up to 300 °F (148 °C) continuous - to prevent material degradation, hardening, or crumbling at high temperatures; (3) Closed-cell construction does not absorb water or support microbial growth - to negate the need for vapour barriers and jackets; (4) Non-toxic and pure as documented in manufacturer's data - to prevent off-gassing and to facilitate use in clean rooms, pharmaceutical applications, and food industries; (5) Will not degrade when exposed to UVC light - to negate the need for UV wraps; (6) Continuous, seam-welded, and held in place without bands or clamps – to minimize surfaces for the accumulation of particulate matter.

7.5.7.26(1)(k) Dispersion tubes that are not insulated will not be considered.

7.5.7.26(1)(l) Dispersion tubes are to be factory installed in air handling units.

7.5.7.27 Air Leakage Testing

7.5.7.27(1) The unit manufacturer shall factory pressure test each air handling unit to ensure the leakage rate of the casing does not exceed 1.0% of the unit air flow at 1.5 times the rated static pressure. A leakage test shall be performed with VSD installed.

7.5.7.27(2) The test shall be conducted in accordance with SMACNA duct construction manual. A calibrated orifice shall be used to measure leakage airflow.

7.5.7.27(3) An officer of the manufacturing company shall certify test results and forward copies of the certified test results to the consultant.

7.5.7.27(4) "Double duct" or "side by side" units shall have each duct or side tested independently.

7.5.7.27(5) Positive pressure plenums shall be tested positively and negative pressure plenums shall be tested negatively.

7.5.7.28 Drains

7.5.7.28(1) The manufacturer shall provide 1 inch capped floor drain connections on the side of the unit for complete drainability of the base pan for the following sections:

7.5.7.28(1)(a) Fresh air plenums.

7.5.7.28(1)(b) Fan sections.

7.5.7.28(1)(c) Sections upstream and downstream of coils.

7.5.7.28(1)(d) All sections in unit with wash-down liner.

7.5.8 Marley NC Steel Cooling Tower Specification (3 Cell Tower)

7.5.8.1 Options:

7.5.8.1(1) Stainless Steel Cold Water Basin

7.5.8.1(2) Factory Mutual Approved

7.5.8.1(3) Air Inlet Screens

7.5.8.1(4) Motor Outside Airstream

7.5.8.1(5) Equalizer Flume Weir

7.5.8.1(6) Basin Equalizers

7.5.8.1(7) Basin Heaters

7.5.8.1(8) Ladder and Guardrail

7.5.8.1(9) Ladder Safety Cage

7.5.8.1(10) Vibration Switch

7.5.8.1(11) Marley "ACH550" Variable Speed Drive

7.5.8.1(12) Premium Efficiency Motor

7.5.8.1(13) Marley Single-Point TF Terminal Box

7.5.8.2 Base: Provide an induced draft, cross-flow type, factory assembled, film fill, industrial duty, galvanized steel cooling tower situated as shown on the plans. The limiting overall dimensions of the tower shall be 18.17 ft wide, 25.775 ft long, and 11.939 ft high. Total operating horsepower of all fans shall not exceed 30 Hp, consisting of 3 @ 10 Hp motor(s). Tower shall be similar and equal in all respects to Marley Model NC8403NAN3.

7.5.8.3 Thermal Performance:

7.5.8.3(1) The tower shall be capable of cooling 1260 gpm of water from 100 °F to 90 °F at a design entering air wet-bulb temperature of 67 °F, and its thermal rating shall be Certified by the Cooling Technology Institute.

7.5.8.3(2) The tower shall be capable of a minimum efficiency per ASHRAE Standard 90.1.

7.5.8.4 Performance Warranty:

7.5.8.4(1) CTI Certification notwithstanding, the cooling tower manufacturer shall guarantee that the tower supplied will meet the specified performance conditions when the tower is installed according to plan. If, because of a suspected thermal performance deficiency, the Authority chooses to conduct an on-site thermal performance test under the supervision of a qualified, disinterested third

party in accordance with CTI or ASME standards during the first year of operation; and if the tower fails to perform within the limits of test tolerance; then the cooling tower manufacturer will pay for the cost of the test and will make such corrections as are agreeable to the Authority to compensate for the performance deficiency.

7.5.8.5 Design Loading:

7.5.8.5(1) The tower structure, anchorage and all its components shall be designed by licensed structural engineers per the International Building Code to withstand a wind load of 30 psf, as well as a .3g seismic load. The fan deck and hot water basin covers shall be designed for 50 psf live load or a 200 lb. concentrated load. Guardrails, where specified, shall be capable of withstanding a 200 lb. concentrated live load in any direction, and shall be designed in accordance with OSHA guidelines.

7.5.8.6 Construction:

7.5.8.6(1) 1 Except where otherwise specified, all components of the cooling tower shall be fabricated of heavy-gauge steel, protected against corrosion by G-235 galvanizing. The tower shall be capable of withstanding water having a pH of 6.5 to 8.0; a chloride content (NaCl) up to 300 ppm; a sulfate content (SO4) up to 250 ppm; a calcium content (CaCO3) up to 500 ppm; silica (SiO2) up to 150 ppm; and design hot water temperatures up to 125°F. The circulating water shall contain no oil, grease, fatty acids or organic solvents.

7.5.8.6(2) The specifications, as written, are intended to indicate those materials that will be capable of withstanding the above water quality in continuing service, as well as the loads described in paragraph 4.1. They are to be regarded as minimum requirements. Where component materials peculiar to individual tower designs are not specified, the manufacturers shall take the above water quality and load carrying capabilities into account in the selection of their materials of manufacture.

7.5.8.6(3) The tower shall include all design and material modifications necessary to meet the fire rating requirements of Factory Mutual. The product proposed shall be listed in the FM Approval Guide, latest edition.

7.5.8.7 Mechanical Equipment:

7.5.8.7(1) Fan(s) shall be propeller-type, incorporating wide-chord aluminum alloy blades and galvanized hubs. Blades shall be individually adjustable. Maximum fan tip speed shall be 13,000 ft/min. Fan(s) shall be driven through a right angle, industrial duty, oil lubricated, geared speed reducer that requires no oil changes for the first five (5) years of operation. The gearbox bearings shall be rated at an L10A service life of 100,000 hours or greater.

7.5.8.7(1)(a) The motor shall be mounted outside the casing of the tower, and shall be connected to the gear reducer by a dynamically-balanced, stainless steel tube and flange driveshaft.

7.5.8.7(1)(b) The cooling tower shall consist of a minimum of 3 cells, with 3 separate fans, motors, and VFDs.

7.5.8.7(2) Motor(s) shall be 10 Hp maximum, TEFC, 1.15 service factor, variable torque, and specially insulated for cooling tower duty. Speed and electrical characteristics shall be 1800 rpm, single-winding, 3 phase, 60 Hz, 575 volts. Motor shall operate in the shaft-horizontal position, and nameplate horsepower shall not be exceeded at design operation.

7.5.8.7(3) The complete mechanical equipment assembly for each cell shall be supported by a rigid steel structural support that resists misalignment between the motor and the gear reducer. The mechanical equipment assembly shall be warranted against any failure caused by defects in materials and workmanship for no less than five (5) years following the date of tower shipment. This warranty shall cover the fan, speed reducer, drive shaft and couplings, and the mechanical equipment support. The electric motor shall carry a manufacturer's warranty of at least one year.

7.5.8.7(4) 5 A complete UL listed Variable Speed Drive system in a NEMA 1 indoor, NEMA 12 indoor or NEMA 3R outdoor enclosure shall be provided. The VFD shall use PWM technology with IGBT switching and integrated bypass design. VFD out put switching shall not cause mechanical issues with gearbox teeth or drive shafts. The VFD shall catch a fan spinning in the reverse direction without tripping. The panel shall include a main disconnect with short circuit protection and external operating handle, lockable in the off position for safety. The VFD system shall receive a speed reference signal from the Building Management System monitoring the tower cold-water temperature. As an option to receiving the speed reference signal from a building management system, the drive must have the capability to receive a 4-20 ma temperature signal from an RTD transmitter. The VFD shall have an internal PI regulator to modulate fan speed maintaining set point temperature. The drive's panel display shall be able to display the set-point temperature and cold-water temperature on two separate lines. The bypass shall include a complete magnetic bypass circuit and with capability to isolate the VFD when in the bypass mode. Transfer to the bypass mode shall be manual in the event of VFD failure. Once the motor is transferred to the by-pass circuit the fan motor will run at constant full speed. The bypass circuit will not modulate ON and OFF based on cold-water temperature. The application must be able to handle very cold water while VFD is in a by-pass mode. Operator controls shall be mounted on the front of the enclosure and shall consist of start and stop control, bypass/VFD selection, Auto/Manual selections, manual speed control. To prevent heating problems in the cooling tower fan motor the VFD system shall de energize the motor once 25% motor speed is reached and cooling is no longer required. The cooling tower manufacturer shall supply VFD start-up assistance. Tower vibration testing throughout the speed range is required to identify and lockout any natural frequency vibration levels which may exceed CTI guidelines.

7.5.8.7(5) A vibration limit switch shall be installed on the mechanical equipment support assembly and wired into the control panel. The purpose of this switch will be to interrupt power to the motor in the event of excessive vibration. It shall be adjustable for sensitivity, and shall require manual reset.

7.5.8.7(6) An externally mounted and wired terminal box shall be provided for each cell providing a single access location to the internal wiring. Terminate wiring for fan motor and options such as vibration switch, oil level switch and water level probes to the terminal box. The terminal box shall be built to UL508 standards and all terminal points marked for ease of connection in the field. The enclosure shall be NEMA 4X fiberglass. Entry points shall be into and out of the bottom of the enclosure preventing water collection in the enclosure.

7.5.8.8 Louvers and Drift Eliminators:

7.5.8.8(1) Fill shall be film type, thermoformed of 15 mil thick PVC, with louvers formed as part of each fill sheet. Fill shall be suspended from hot dip galvanized structural tubing supported from the tower structure, and shall be elevated above the floor of the cold water basin to facilitate cleaning. Air inlet faces of the tower shall be free of water splash-out. Fill shall be capable of withstanding a hot water temperature of 125°F.

7.5.8.8(2) Drift eliminators shall be PVC, triple-pass, and shall limit drift losses to 0.005% or less of the design water flow rate.

7.5.8.9 Hot Water Distribution System

7.5.8.9(1) Two open basins (one above each bank of fill) shall receive hot water piped to each cell of the tower. These basins shall be installed and sealed at the factory, and shall be equipped with removable, galvanized steel covers capable of withstanding the loads described in paragraph 4.1. The water distribution system shall be accessible and maintainable during tower fan and water operation.

7.5.8.9(2) Each basin shall include an inlet hole and bolt circle to accept a 125# flange connection per ANSI B16.1. Removable, interchangeable polypropylene nozzles installed in the floor of these basins shall provide full coverage of the fill by gravity flow.

7.5.8.9(3) The water distribution system shall be accessible and maintainable while tower is operating.

7.5.8.10 Casing, Fan Deck and Fan Guard:

7.5.8.10(1) The casing and fan deck shall be heavy-gauge galvanized steel, and shall be capable of withstanding the loads described in paragraph 4.1. The top of the fan cylinder shall be equipped with a conical, non-sagging, removable fan guard, fabricated of welded 5/16" and 7 gauge rods, and hot dip galvanized after fabrication. Fan cylinders 5'-0" in height and over shall not be required to have a fan guard.

7.5.8.10(2) The air inlet faces of the tower shall be covered by 1" mesh hot-dipped galvanized welded wire screens. Screens shall be secured to removable galvanized U-edge frames. Screens shall be designed so bottom half can be removed for easy access to the cold water basin.

7.5.8.11 Access:

7.5.8.11(1) A large galvanized, rectangular access door shall be located on both end panels for entry into the cold water basin. Doors shall provide access to the fan plenum area to facilitate inspection and allow maintenance to the fan drive system.

7.5.8.11(2) The top of the tower shall be equipped with a sturdy guardrail, complete with kneerail and toeboard, designed according to OSHA guidelines and factory welded into subassemblies for ease of field installation. Posts, toprails and kneerails shall be 1.5 " square tubing. The guardrail assembly shall be hot dipped galvanized after welding and capable of withstanding a 200 pound concentrated live load in any direction. Posts shall be spaced on centers of 8'-0" or less. A 1'-6" wide aluminum ladder with 3" I-beam side rails and 1.25" diameter rungs shall be permanently attached to the endwall casing of the tower, rising from the base of the tower to the top of the guardrail.

7.5.8.11(3) Ladder Safety: A heavy gauge aluminum safety cage shall surround the ladder, extending from a point approximately 7'-0" above the foot of the ladder to the top of the guardrail.

7.5.8.12 Cold Water Collection Basin:

7.5.8.12(1) The collection basin shall be heavy-gauge S300 stainless steel, and shall include the number and type of suction connections required to accommodate the outflow piping system shown on the plans. Suction connections shall be equipped with stainless steel debris screens. A factory-

installed, float-operated, mechanical make-up valve shall be included. An overflow and drain connection shall be provided in each cell of the cooling tower. The basin floor shall slope toward the drain to allow complete flush out of debris and silt which may accumulate. Towers of more than one cell shall include stainless steel flumes for flow and equalization between cells. The basin shall be accessible and maintainable while water is circulating. All steel items which project into the basin (columns, diagonals, anchor clips, etc.) shall also be made of stainless steel.

7.5.8.12(1)(a) A hole and bolt circle shall be provided in the depressed section of the basin for equalizer piping between cells. A full-face, .25" thick, 50 durometer gasket shall be provided at each equalizer location.

7.5.8.12(2) Provide a system of electric immersion heaters and controls for each cell of the tower to prevent freezing of water in the collection basin during periods of shutdown. The system shall consist of one or more stainless steel electric immersion heaters installed in threaded couplings provided in the side of the basin. A NEMA 4 enclosure shall house a magnetic contactor to energize heaters; a transformer to provide 24-volt control circuit power; and a solid-state circuit board for temperature and low water cut-off. A control probe shall be located in the basin to monitor water level and temperature. The system shall be capable of maintaining 40°F water temperature at a Kelowna winter design temperature.

7.5.8.12(3) The interconnecting flume between cells shall be equipped with a removable cover plate to permit the shutdown of one cell for maintenance purposes, or to permit independent cell operation.

7.5.9 Laboratory Systems and Controls – Electric

7.5.9.1 The intent of this Specification is to define the hardware and control requirements for the airflow and temperature control of laboratories. The system specified shall be based on variable fume hood exhaust volume with sash position reset control of fume hoods, synchronization of supply and exhaust airflows, and control of lab room temperature via reheat coils and airflow reset.

7.5.9.2 All control equipment required to fulfill this Specification shall be manufactured and provided by the laboratory airflow control equipment manufacturer.

7.5.9.3 The laboratory airflow control systems shall digitally interface to the Central Building Automation System (BAS) as provided by the temperature control contractor. The laboratory airflow control contractor shall be responsible to provide an interface device between the laboratory airflow controls and the BAS,

7.5.9.4 The Building Automation System (BAS) contractor shall be responsible for the following:

7.5.9.4(1) Installation of all LACS controllers, with exception to sash sensors and fume hood monitor displays. (Sash sensors and fume hood monitor displays shall be supplied by the LACS and factory mounted by fume hood manufacturer.)

7.5.9.4(2) Provision, installation and connection of all LACS required pneumatic tubing and devices for a complete and operable system. (Refer to BAS section for pneumatic tubing specifications.)

7.5.9.4(3) Provision, installation and final termination of all control wiring, including network communications wiring to LACS. (Refer to BAS section for control wiring specifications.)

7.5.9.4(4) Provision and installation of power wiring to all LACS controllers as required.

7.5.9.4(5) Provision of laboratory reheat control valve (where required). Valve requirement shall receive either a 4-20 MA or 2-10 VDC signal.

7.5.9.5 The HVAC contractor shall:

7.5.9.5(1) Install all laboratory airflow control system air valves provided by the LACS contractor.

7.5.9.5(2) Provide a minimum of three (3) duct diameters of straight duct upstream from every laboratory airflow control system air valve provided by the LACS contractor to ensure lowest pressure drop for the device.

7.5.9.5(3) Install all airflow measuring devices in ductwork provided by the LACS contractor.

7.5.9.5(4) Standard fittings, hangers, and ancillary devices required to install duct devices shall be provided by this contractor.

7.5.9.6 The air balancing contractor shall:

7.5.9.6(1) Verify fume hood face velocities, airflow volume readings and control points in each control mode. Coordination of such shall be through LACS contractor.

7.5.9.7 System Turnover:

7.5.9.7(1) Equipment shall be commissioned by the laboratory airflow controls system contractor.

7.5.9.7(2) The LACS contractor shall demonstrate to the Engineer the ability of the controls to maintain setpoints in all modes of operation.

7.5.9.8 Training/Authority's Instruction

7.5.9.8(1) The laboratory airflow control system contractor shall provide thirty-two (32) hours in two (2) sessions (introductory and follow-up) of training to site personnel in the use and maintenance of the laboratory airflow controls provided. Training shall be conducted during normal working hours and shall consist of both hands-on and classroom training at the job site.

7.5.9.8(2) The ATC contractor shall be responsible to provide training to site personnel in the use and maintenance of all controls and systems related to the lab controls, including the Central BMS computer.

7.5.9.9 Guarantee

7.5.9.9(1) The laboratory airflow control system contractor shall provide two (2) years standard warranty.

7.5.9.9(2) If a Venturi valve is provided by the LACS contractor, said Contractor shall provide the Authority with a 5-year maintenance contract at no additional cost to the Authority, due to the higher maintenance associated to the Venturi type valve. The maintenance contract shall provide for every valve to be inspected via the inspection doors once per quarter. The LACS contractor shall provide the Authority with a quarterly report verifying that the cones are

not sticking and no debris from the exhaust airstream has attached itself to the valve mechanism.

7.5.9.10 Quality Assurance

7.5.9.10(1) Laboratory airflow controls system contractor shall provide written approvals and certifications after installation has been completed.

7.5.9.10(2) LACS contractor must prove that he has been engaged in the provision, installation and service of this type of equipment for at least ten (10) years and has a fully equipped, factory trained and authorized service organization.

7.5.9.10(3) For any equipment submitted for approval, the LACS contractor shall state what, if any, specific points of the system operation differ from these Specifications.

7.5.9.10(4) The LACS contractor shall continue to bear the liability for replacement of substituted equipment in the event that the equipment fails to perform as specified, or to meet approval of all authorities having jurisdiction, within twelve (12) months after beneficial use by the Authority.

7.5.9.11 Acceptable Manufacturers: Tek-Air Systems, Inc. (Basis of Design) and AccuValve™ (Contact: Trane Northwest, Timo Lucas, 250-414-7523).

7.5.9.12 The laboratory airflow control system shall include the following components:

7.5.9.12(1) Fume Hood Exhaust Air Valves (consists of airflow control valve with airflow sensor and electric actuator).

7.5.9.12(2) Fume Hood Face Velocity Controllers and Display units (consists of controller, display and sash sensors).

7.5.9.12(3) General Exhaust Air Valves (consists of airflow control valve with airflow sensor and electric actuator).

7.5.9.12(4) Supply Air Valves (consists of airflow control valve with airflow sensor and electric actuator).

7.5.9.12(5) Exhaust Airflow Measuring Device if required (consists of insertion airflow probe w/ integral transmitter).

7.5.9.12(6) Room Temperature Sensor.

7.5.9.12(7) Duct Mounted Temperature Sensor.

7.5.9.13 Fume Hood Airflow Volume Controller

7.5.9.13(1) Exhaust airflow volume shall be controlled based on sash position at each laboratory fume hood by a dedicated fume hood controller. The fume hood controller shall be a fully functioning, independent control unit, capable of operating as a standalone element in a distributed laboratory airflow control system. Control hardware distribution shall be such that the failure of one controller shall not affect any other fume hoods on the network.

7.5.9.13(2) The fume hood controller shall consist of a controller, display module, sash position sensors, sash position transmitter and vortek-shedding type duct airflow probe. The sash position sensors shall mount physically on the fume hood sash and frame assemblies and cable-connect to the transmitter. The transmitter shall cable-connect to the controller.

7.5.9.13(3) The fume hood controller shall also have integral Airflow Measurement Circuitry to receive a signal directly proportional to duct air velocity, from a vortex-shedding type airflow measuring device, for the purpose of monitoring and controlling fume hood airflow volume. The signal shall be digitally processed by the controller, with no analog-to-digital circuitry required, eliminating A/D conversion error. The airflow measurement shall be incorporated in the control sequence as performed by the airflow controller, and communicated to other airflow controllers, via the network, as required. Measurement system accuracy shall be plus or minus 2% of volumetric airflow rate. Turndown capability shall be at least 10:1.

7.5.9.13(4) The fume hood sash shall be fitted with sash position measuring sensor(s) and associated sash position transmitter. Vertical position measuring devices shall be of the retracting drawstring potentiometer type. The sensors shall be permanently affixed to the fume hood structure and the drawstring affixed to the moving sash frame as best fits the particular hood design. The sash sensor

transmitter shall convert potentiometer resistance values to a linear 4-20 mA output signal. The monitor shall have input ports for up to four (4 sash position measuring arrays for application on multiple-sash hoods. The monitor shall be cable-connected to and powered by the controller.

7.5.9.13(5) Horizontal position sensors shall be magnetic reed switch type, and utilize true proximity location sensing technology as opposed to resistance measurement. The sesnor strip shall mount on the hood structure and a magnet shall be affixed to each sash frame. The horizontal sensing system shall be capable of measuring any number of sashes for hood widths up to 16'.

7.5.9.13(6) The transmitter/controller module shall be microprocessor based. The transmitter module shall be powered by 24VAC. It shall be provided with two 4-20mA analog outputs, two contact inputs, a SPDT alarm relay output, and an RS-485 communications port.

7.5.9.13(7) The RS-485 communications port shall provide communications with all other lab airflow and fume hood face velocity controllers in the CSB via a single network operating at 625 kilobits speed. This shall be a peer-to-peer, token pass type of communications network. The individual controllers shall not be dependent upon this communications port for operation, and communication interrupts shall not slow the control response of the system. In the event that the network continuity is broken, the controllers shall automatically re-configure so that the labs will continue to control.

7.5.9.13(8) In the controller, the actual fume hood exhaust duct airflow (CFM) shall be compared to the desired fume hood exhaust airflow setpoint. The setpoint shall be continuously reset proportional sash open area, based on sash position.

7.5.9.13(9) Control equations shall be of the P+I type. Microprocessor based controllers shall read the airflow, perform control calculations, and update the output to the damper a minimum of ten times per second.

7.5.9.13(10) The controller shall output a 4-20mA electronic signal to a dedicated electronic to pneumatic converter and airflow control valve, as specified elsewhere in this document. Control response time shall be sufficient to contain fumes at all times when the sash is opened.

7.5.9.13(11) The fume hood controller shall be capable of communicating digitally with the supply and general exhaust airflow controllers and a communications adapter via an RS485 digital peer-to-peer, token-pass network operating at 625 kilobits speed. The adapter shall permit connection to the BAS. All parameters, including sash position, face velocity, airflow, setpoint, alarm limits, output, and override condition, shall be available for communication to the BAS.

7.5.9.13(12) The fume hood controller shall be fully configurable via a hand-held setup tool or a PC. The tool shall have a keypad and digital display. Configuration shall be accomplished through simple operator-selectable menus.

7.5.9.13(13) The Controller shall have unoccupied mode capability. A digital input shall be assignable, through menu selection, to effect the transfer from occupied to unoccupied mode. The “Low Face Velocity Alarm” setpoint shall be replaced by a lower, adjustable, “Low-Low Alarm” setpoint during the unoccupied mode.

7.5.9.13(14) The unoccupied mode shall have the menu-selectable option for a countdown period with audible and visual warnings of the pending transfer to unoccupied mode. The duration of the countdown period shall be adjustable from 10 to 60 minutes in 10 minute intervals. The adjustable parameters shall be adjusted using the hand-held programming tool or a PC.

7.5.9.14 Fume Hood Controller Display

7.5.9.14(1) The fume hood controller shall provide a 4-digit display to indicate the calculated face velocity and actual exhaust airflow in CFM, plus setpoint parameters. Energy use meters shall not be acceptable alternatives to the digital display of the above parameters.

7.5.9.14(2) A green LED shall indicate a safe condition at the fume hood. A red LED indicator shall display either a high or low face velocity alarm condition. When an alarm condition occurs, the alarm LED shall flash and the alarm beeper shall sound. The operator shall be able to silence the beeper through a mute button located on the face of the controller.

7.5.9.14(3) The display shall provide the option to read in “Alpha” mode instead of numeric. The “Parameters” button on the face of the display shall allow the operator to scroll through all operating parameters and alarm setpoints, which shall be displayed on the LCD, including but not limited to:

7.5.9.14(3)(a) Controller Software Revision Number.

7.5.9.14(3)(b) Controller Output Level, %.

7.5.9.14(3)(c) Sash Position, %

7.5.9.14(3)(d) Calculated Face Velocity, FPM

7.5.9.14(3)(e) Exhaust Airflow Measurement, CFM

7.5.9.14(3)(f) High Airflow Alarm Setpoint, CFM

7.5.9.14(3)(g) Low Airflow Alarm Setpoint, CFM

7.5.9.14(3)(h) Low-Low Airflow Alarm Setpoint, CFM

7.5.10 Electronic Airflow Controllers: Supply Air Valves

7.5.10.1 An electronic airflow controller shall be factory mounted on the respective airflow control valve and pre-programmed to provide control schemes applicable for a variety of room sequences which can be implemented by menu-selection via a lap-top or personal computer. The airflow controllers shall be programmed in a high level language designed for airflow control. Pre-programmed functions shall include: scaling of flow inputs, flow summation, flow subtraction, flow bias, flow control, temperature input scaling and temperature control. The controller shall be powered by 24VAC. It shall be provided with four analog inputs, three analog outputs, two contact inputs, two digital outputs a SPDT alarm relay output, and an RS-485 digital communications port

7.5.10.2 The RS-485 communications port shall provide communications with all other lab airflow and fume hood face velocity controllers in the facility via a

single network operating at 625 kilobits speed. This shall be a peer-to-peer, token pass type of communications network. The individual controllers shall not be dependent upon this communications port for operation, and communication interrupts shall not slow the control response of the system. In the event that the network continuity is broken, the controllers shall automatically re-configure so that the labs will continue to control.

7.5.10.3 The controller shall store controller configuration programs in EEPROM indefinitely. Memory shall not be affected by loss of power or “brown-outs”. The controller configuration program shall be stored in non-volatile memory to allow for any future modifications required to the configuration. The use of disk based systems shall not be acceptable.

7.5.10.4 The controller shall scan all inputs, perform control calculations, and update all outputs at least five times per second. Slower scan times shall not be acceptable because of the detrimental effect on laboratory airflow control.

7.5.10.5 The airflow controller shall be fully configurable via a lap-top computer or a PC utilizing a user-friendly Graphic User Interface software package. Configuration shall be accomplished through simple operator-selectable function blocks. Display of current readings of all flows, outputs, tuning values, setpoints, and status values shall be available through this interface. Entry of control setpoints, and scaling and tuning constants shall also be provided by this interface.

7.5.10.6 The airflow control supplier shall provide a full documentation package to the Authority on completion of the project. Documentation shall include as-built drawings, device lists, and controller configuration lists for each controller.

7.5.10.7 Power voltage requirements for the controllers shall be 24VAC. Power can be provided by individual or centralized power transformers, provided by the installing contractor.

7.5.10.8 The Controller shall have the following I/O compliment

7.5.10.8(1) Four analog inputs, 4-20mA (two configurable for thermistor).

7.5.10.8(2) Three analog outputs, 4-20mA.

7.5.10.8(3) One airflow direct input for vortek probes.

7.5.10.8(4) Two digital inputs.

7.5.10.8(5) Two digital outputs.

7.5.10.8(6) Communications port, RS485.

7.5.10.8(7) One SPDT relay output.

7.5.11 Supply, Exhaust and Fume Hood Exhaust Airflow Control Valves

7.5.11.1 The Airflow Control Valve shall be a multichamber AccuValve™ or approved equal.

7.5.11.2 The Airflow Control Valve shall consist of a compression section, two airflow control surfaces, factory-mounted digital VorTek airflow measuring device and factory-mounted high speed actuator.

7.5.11.3 The compression section shall divide the airstream into at least two separate airstreams. Each airstream shall be approximately equal in size and the total open area shall be approximately 50% of the duct open area. The divided sections shall cause compression therefore creating a more laminar flow for better airflow measurement and turndown. The compression section shall be of an aerodynamic shape with a static regain section to insure minimal pressure drop. The valve shall not require any duct straight runs either upstream or downstream of the airflow valve to achieve required performance.

7.5.11.4 Airflow control valves shall be a linear type and shall operate with a minimum turndown ratio of 8 to 1.

7.5.11.5 The airflow control valve shall respond within one second of a change in duct static pressure when provided with factory controls.

7.5.11.6 Accuracy of the airflow valve shall be 5% of reading in the 8 to 1 range of the damper.

7.5.11.7 Valves for fume hood or other corrosive service shall incorporate stainless steel materials of all components in contact with the airstream. Valves made of aluminum or steel that are coated will not be acceptable. Valves for non-corrosive service shall be made of galvanized steel.

7.5.11.8 Airflow control valves shall operate without linkages, springs, levers, or bearings, in the airstream due to the effect of fume hood exhaust on those materials, and shall exhibit no deadband or hysteresis. Airflow control valves shall be field selectable fail-safe to either the open or closed position depending on the application.

7.5.11.9 All critical components of the airflow control valve shall be easily accessible from one side of the valve. All linkages shall be out of the airstream to avoid possible corrosion and loss of accuracy.

7.5.11.10 Airflow control valves shall be of a low pressure drop design for energy efficiency. Valves shall not require greater than 62 Pa [0.25”] pressure drop at 8 m/s [1500 fpm] and 100 Pa [0.4”] pressure drop at 10 m/s [2000 fpm]. Airflow control valves that require higher pressures to operate shall not be acceptable. The airflow valve shall be complete with a digital vortex type airflow sensing device providing true airflow feedback for the system.

7.5.11.11 Airflow measuring devices shall be of the Vortex Shedding type, capable of continuously monitoring the airflow volume of the duct served and electronically transmitting a signal linear to the airflow volume. A VorTek airflow sensor shall be provided in each chamber of the airflow control valve. Airflow measuring devices shall be capable of measuring velocity over the full range of 400 to 5000 FPM.

7.5.11.12 Velocity measurements from individual sensors shall be summed in the associated Airflow Controller via integral Airflow Measurement circuitry or an integral Airflow Transmitter. The measurement shall be input and conditioned digitally to eliminate Analog-to-Digital conversion error. The airflow measurement shall be incorporated in the control sequence as performed by the Airflow Controller, and communicated to other Airflow Controllers, via the network, as required. Measurement system accuracy shall be plus or minus 2% of volumetric airflow rate. Turndown capability shall be at least 8:1.

7.5.11.13 The airflow sensors shall be easily accessible in the valve for inspection.

7.5.11.14 Direct airflow measurements must be taken.

7.5.11.15 Airflow Control Valve shall have factory installed electric actuator which shall operate on 24VAC. Actuator shall accept either a 4-20maDC or 2-10VDC signal and shall modulate the valve over the range of CFM. The actuator shall modulate the valve between 0 to full scale CFM in under 2 seconds.

7.5.12 Laboratory Airflow Control

7.5.12.1 The lab temperature sensor shall report the room temperature to the supply airflow controller where it will be scaled and compared to the setpoint. The controller shall reset the duct-mounted temperature setpoint. The duct mounted temperature sensor shall report the duct room temperature to the airflow controller where it will be scaled, compared to the setpoint and modulate the reheat valve as required (see Section 1.4 below). The temperature value shall also be utilized in the calculation of lab ventilation rate, in conjunction with lab air change requirements. Alternate approaches using just duct temperature sensors or just room temperature sensors shall

not be acceptable as they will result in large room temperature swings or hunting of the reheat control valve.

7.5.12.2 The total exhaust airflow volume from the lab shall be measured by one vortek airflow sensor in the common exhaust duct leaving the lab. This airflow measurement shall be transmitted to the supply airflow controller. The controller shall compare this value to the lab general exhaust setpoint and modulate its air valve to supplement the exhaust airflow volume as required to maintain the required lab ventilation rate.

7.5.12.3 The supply air valve airflow sensor shall measure the supply airflow volume and transmit its value to the supply air valve controller. The controller shall compare the airflow to its setpoint. The setpoint shall be calculated as lab ventilation rate less a differential airflow value (100 CFM). The differential airflow value shall be sufficient to induce a negative pressure in the Lab Room with doors closed and with hoods and ventilation system under normal operating conditions. The supply air valve controller shall modulate its air valve to maintain the required supply airflow volume, thereby tracking the exhaust airflow.

7.5.12.4 As hood sashes are raised and lowered, changing the total exhaust airflow volume, the tracking scheme outlined above shall vary the supply and general exhaust airflow volumes to compensate and maintain the room at a negative pressure at all times.

7.5.13 Airflow Execution

7.5.13.1 The laboratory airflow control system contractor shall functionally check all controls prior to setup by the test and balance contractor.

7.5.13.2 The laboratory airflow control system contractor shall assist the test and balance contractor in adjusting the setpoints to meet the specified airflow, pressure and temperature setpoints.

7.5.13.3 It shall be the responsibility of the General Contractor to secure the room envelope sufficiently to maintain required pressure levels with the airflow volumes specified. The laboratory airflow control system contractor shall advise the General Contractor of any condition which might compromise the ability of the room to achieve the specified pressure levels.

7.5.13.4 All dampers shall be fast-acting in operation without any sticking or binding.

7.5.13.5 All controls shall operate without cycling or hunting.

7.5.13.6 The laboratory airflow control system contractor shall demonstrate to the Engineer and/or Commissioning Agent the ability of the controls to maintain setpoints in all modes of operation.

7.5.14 Multistack®MagLev™ Centrifugal Chiller

7.5.14.1 Summary: Section includes design, performance criteria, refrigerants, controls, and installation requirements for Multistack water cooled centrifugal chillers.

7.5.14.2 References Comply with the following codes and standards: ARI 550/590-2003; ANSI/ASHRAE 15; ASME Section VIII; NEC; OSHA.

7.5.14.3 Submittals shall include the following:

7.5.14.3(1) Chiller dimensional drawings with elevation overview. Drawings to include required service clearances, locations of all field installed piping and electrical connections.

7.5.14.3(2) A summary of all auxiliary utility requirements for normal system operation required. Auxiliary utility requirements include: electrical, water, and air. Summary of auxiliary equipment shall include quantity and quality of each specific auxiliary utility required.

7.5.14.3(3) Chiller Control documentation to include: Chiller control hardware layout, wiring diagrams depicting factory installed wiring, field installed wiring with points of connection, and points of connection for BAS control/interface points.

7.5.14.3(4) Sequence of operation depicting overview of control logic used.

7.5.14.3(5) Installation and Operating Manuals.

7.5.14.3(6) Manufacturer certified performance data at full load in addition to either IPLV or NPLV.

7.5.14.4 Quality Assurance:

7.5.14.4(1) Regulatory Requirements: Comply with the codes and standards as defined in Section 7.5.19.2 titled References.

7.5.14.4(2) Chiller is required to be run test at manufacturer's facility to job specific requirements, prior to shipment. Report available upon request.

7.5.14.5 Delivery and Handling:

7.5.14.5(1) Chillers shall be delivered to the job site completely assembled and charged with complete refrigerant charge.

7.5.14.6 Warranty

7.5.14.6(1) The manufacturer's equipment warranty shall be for a period of (1) One year from date of equipment start up or 18 months from the date of shipment, whichever occurs first.

7.5.14.6(2) The warranty shall include parts and labour costs for the repair and or replacement of defects in components or workmanship.

7.5.14.7 Acceptable Manufacturers:

7.5.14.7(1) Multistack LLC.

7.5.14.7(2) Approved Equal – note that a total of 6 MagLev compressors are required – 3 per machine – for those vendors wishing to apply for equal.

7.5.14.8 Product Description

7.5.14.8(1) Provide and install as shown on the plans a factory assembled, charged, and run tested, water-cooled packaged chiller.

7.5.14.8(2) Each unit shall include: MagLev®, oil-free, magnetic bearing, variable speed two stage centrifugal compressor equipped with inlet guide vanes and load balancing valve. Each compressor to utilize its integrated variable speed drive in conjunction with the compressors inlet guide vanes and load balancing valve, to optimize the chillers part load efficiency.

7.5.14.8(3) The chillers evaporator, condenser, and electronic expansion valves shall be common to all compressors. The chiller shall operate with (1) one refrigerant circuit. Each chiller shall utilize a minimum of 3 MagLev compressors per chiller.

7.5.14.8(4) Chiller shall utilize R-134A refrigerant only.

7.5.14.9 Design Requirements:

7.5.14.9(1) Provide a complete factory assembled, water cooled, oil free centrifugal chiller equipped with MagLev® compressors as specified herein.

7.5.14.9(2) Chillers to utilize one of the following compressor arrangements for the specified nominal tonnages found in this specification.

7.5.14.9(3) Each chiller shall be equipped with the following: One (1) flooded evaporator heat exchanger, one (1) water cooled condenser heat exchanger, three (3) or more MagLev® Compressors (refer to section 2.03 B) with integrated variable speed drive, soft start, magnetic bearings, and inlet guide vanes, two (2) or more electronic expansion valves, one (1) liquid level refrigerant sensor, one (1) load balance valve per compressor, one (1) master chiller control with necessary operating controls and system safeties, while all mechanical pressure safeties to be located at each individual compressor.

7.5.14.9(4) Unloading: Chiller shall be capable of unloading to 15 tons. All unloaded capacity values are without the use of hot gas bypass.

7.5.14.9(5) Loading: Chiller shall be able to lead lag compressor(s) without drastically unloading compressors on-line or creating check valve chatter on lag compressors. Total pressure ratio shall not be decreased below 2.4 pressure ratio as observed at the suction and discharge flanges of each individual compressor.

7.5.14.9(6) Acoustics: Sound data shall be measured in accordance with ARI 575-87 Standard. Unit sound performance data shall be measured at the highest level recorded at all load points. Unit sound performance shall not exceed a level of 70 DBA measured at a distance of five (5) feet. Daytime sound levels at the property line shall not exceed 60 dBa. Nighttime (after 22:00) sound levels shall not exceed 50 dBa.

7.5.14.9(7) Electrical: Chiller shall feature single-point power connection not utilizing adjoining power cabinets as pull boxes.

7.5.14.9(8) Minimum Operating Conditions: Lowest evaporator saturated suction temperature shall not be below 34°F. Lowest leaving

chilled water temperature shall not be below 38°F. Lowest entering condenser water temperature shall not drop below 55°F. A differential of 12°F between the leaving chilled water temperature and entering condenser water temperature is required to ensure chiller can maintain minimum lift requirements.

7.5.14.10 Chiller Components:

7.5.14.10(1) Compressors:

7.5.14.10(1)(a) Chiller to have three (3) or more MagLev®, magnetic bearing, oil-free, two-stage, hermetical centrifugal compressor(s). Each compressor to contain integrated variable speed drive with soft start, movable inlet guide vane assembly.

7.5.14.10(1)(b) Each compressor to be microprocessor controlled. Each compressor to be networked to master controller via Etherbus connection with a refresh rate of 50 microseconds and the micro processor of each compressor to control the variable speed drive and inlet guide vanes on each compressor to maximize unit efficiency.

7.5.14.10(1)(c) Each compressor shall be capable of coming to a controlled safe stop in the event of a power outage. Unit shall be capable of auto restart in the event of a power outage, once power has been restored.

7.5.14.10(1)(d) All compressors are required to be mechanically and electrically isolated to facilitate proper maintenance, service, and or removal.

7.5.14.10(2) Refrigerant, Evaporator and Condenser:

7.5.14.10(2)(a) All heat exchangers to be built in accordance to Section VIII of the ASME code and carry a manufacturer's name plate certifying ASME compliance.

7.5.14.10(2)(b) The evaporator to be of shell and tube construction. Evaporator to be constructed of a single shell. Evaporator to be of flooded type with refrigerant surrounding the tubes and water passing through the tubes. Tubes to be enhanced and rifled. Minimum tube velocity of two (2) feet per second required. Design to not exceed a maximum tube velocity of eight (8) feet per second. Internal intermediate tube supports, liquid eliminator baffle plate, pressure relief vent, water drains and vents required. Pressure relief to be spring loaded self seating type in accordance to ASHRAE 15 standard. Evaporator to be pressure tested at a test pressure of 1.1 times the operating pressure however no less than 100 PSIG. Evaporator, water boxes, suction piping, and any other component subject to condensate shall be insulated with a UL recognized ¾ inch or 1 ½" closed cell insulation. All joints and seems to be sealed so a vapour barrier is created. Factory mounted differential pressure transmitters required for flow safety. Flow switches are not to be used.

7.5.14.10(2)(c) The condenser to be of shell and tube construction. Condenser to be constructed of a single shell. Condenser to be water cooled type with refrigerant surrounding the tubes and water passing through the tubes. Tubes to be enhanced and rifled. Minimum tube velocity of two (2) feet per second required. Design to not exceed a maximum tube velocity of eight (8) feet per second. Internal intermediate tube supports, pressure relief tree with isolation valves, water drain and vents required. Pressure relief tree to be equipped with isolation/transfer valve to prevent the loss of refrigerant when relief is removed for testing and or replacement. Rupture disks are not acceptable. Condenser to be pressure tested at a test pressure of

1.1 times the operating pressure however no less than 100 PSIG. Factory mounted differential pressure transmitters required for flow safety. Flow switches are not to be used.

7.5.14.10(2)(d) Heat Exchangers to feature enhanced and rifled individual tubes. Tubes shall be individually replaceable. Tubes shall be mechanically rolled into steel tube sheets and sealed with Loctite® or equivalent sealant. Tubes shall be supported by intermediate tube supports at a maximum spacing of 18" apart. Waterside to be designed to a minimum of 150 psig or 300 psig, whichever is specified. Heat exchangers to be equipped with either dished heads or marine boxes with drain and vent reports, whichever is specified. Piping connections to be either mechanical grooved connection or flange, whichever is specified.

7.5.14.10(2)(e) Refrigerant Control: Chiller with multiple compressors to feature dual electronic expansion valves with a step count of 6386 steps to full open. A single compressor machine to have one electronic expansion valve with 6386 steps. Fixed orifices and float controls are not acceptable. The electronic expansion valve to operate from minimum chiller capacity to the full load of the chiller's capacity. A high side refrigerant level sensor, constructed out of stainless steel, with a stainless steel canister with sight glass is to be used to provide feedback to the expansion valves for proper control. This ensures that a proper liquid seal is always present on the compressors power electronics. A refrigerant sight glass is required on the main liquid line feeding the electronic expansion valves. Isolation valves before and after the EXV required for proper service without removing the entire refrigerant charge.

7.5.14.10(3) Prime Mover:

7.5.14.10(3)(a) The prime mover shall be of sufficient size to effectively meet the compressor horsepower requirements. Prime mover shall be a one or more liquid refrigerant cooled, hermetically sealed, permanent magnet synchronous motor. Motor shall be controlled by variable speed drive. Motor shall utilize soft start capabilities with an inrush current no greater than two (2) amps. Motor shall have internal thermal overload protection devices embedded in the winding of each phase of the motor.

7.5.14.10(4) Variable Speed Drive:

7.5.14.10(4)(a) The chiller shall be equipped with multiple variable speed drives unless one compressor is used. Please refer to section 2.03 B for compressor requirements. The variable speed drive to utilize Insulated Gate Bi-Polar Transistors. Variable speed drive to create its own simulated AC voltage for the motor connected to it. Voltage shall be 575 volt.

7.5.14.10(4)(b) Variable speed drive in conjunction with the compressors inlet guide vanes will be controlled via compressor microprocessor to optimally match the lift and load requirements.

7.5.14.10(4)(c) Each compressor circuit is required to have a line reactor and circuit breaker.

7.5.14.10(5) Chiller Controls:

7.5.14.10(5)(a) The unit shall have an industrial grade cpu with an Intel-based processor. Chiller required to have fail to run mode. All chiller and compressor I/O to be controlled via Etherbus with an update rate of 50 microseconds. Controller to have 15 inch touch screen interface that can be disconnected and chillers still runs properly.

Controller to use proprietary control logic to optimize loading, unloading, and control of multiple MagLev compressors. User shall operate chiller via HMI located on touch screen or remote web connection. All system parameters, compressor status, alarms, and faults, trend graphing, fault logging, bas communication window , manuals, wiring diagrams, log book, and control set points shall be viewable. Shall be able to fully commission and adjust all components on the chiller, including the compressors without an auxiliary computer or software.

7.5.14.10(5)(b) The chiller controller shall include the following features: Hardware - Two EXV Outputs; Eight Digital Inputs; Eight Digital Outputs; Ten Analog Inputs; Eight Analog Outputs (0-10 VDC); Eight Temperature Inputs; One Compressor hub per compressor including – Addressable Bus Couple; RS-485 Module; RS-232 Module; Four Digital Inputs; Two Digital Outputs;

7.5.14.10(5)(c) Windows®-based industrial PC featuring Intel® Processor for maximum reliability and performance.

7.5.14.10(5)(d) Dual-Hard drives for maximum reliability and redundancy. Hard drives feature no moving parts to ensure nothing mechanically fails. With dual-hard drives there is no need to partition a single drive. One drive handles the operating system while the other handles all data acquisition to ensure no data is corrupted.

7.5.14.10(5)(e) DC Powered to ensure maximum resistance to EMI and RFI noise.

7.5.14.10(5)(f) Built in 2-port Ethernet Switch for easy integration to BAS interface and web control feature.

7.5.14.10(5)(g) Features industrial-style battery back-up in the event of a power outage.

7.5.14.10(5)(h) On board USB drives to support external peripheral devices including, keyboard, mouse, and printer15 “TFT Display featuring 1024 X 768 Resolution.

7.5.14.10(5)(i) All hardware, including I/O is CE and UL Certified.

7.5.14.10(5)(j) I/O features modular design to simplify troubleshooting and or replacement if required.

7.5.14.10(5)(k) I/O has LED Indicators for all inputs and outputs to ease the troubleshooting process.

7.5.14.10(5)(l) I/O can be directly connected to without the use of terminal blocks.

7.5.14.10(5)(m) All wiring utilizes spring capture technology to prevent loose connections or wires from falling out.

7.5.14.10(5)(n) Dedicated Ethernet communication at a communication rate of 50 microseconds to all compressors and I/O.

7.5.14.10(5)(o) MagLev hubs feature dedicated inputs for high pressure switch, low pressure switch, dedicated compressor interlocks, and dedicated compressor communications. This allows for each compressor to be handles independently by itself without affecting the rest of the system.

7.5.14.10(6) Software:

7.5.14.10(6)(a) Can control one (1) to eight (8) compressors on single or multiple refrigerant circuits.

7.5.14.10(6)(b) Include: Water Cooled Flooded Chillers, Water Cooled DX Chillers, Air Cooled Flooded Chillers, Air Cooled DX Chillers, DX

Built Up Systems, Liquid Overfeed Systems, Modular Chillers, Heat Recovery Chillers.

7.5.14.10(6)(c) Control System can control up to 24 EXVs with proper hardware and network all EXVs to the control system.

7.5.14.10(6)(d) HMI interface is only control system on the market with a user definable points list, tag names, and functions without special software. With this feature, end user can scale an all inputs and outputs, change what controls it, change the functionality, the name of it etc.

7.5.14.10(6)(e) Control system can be field reconfigured through HMI to remap I/O to change functionality on the fly. This allows for customized integration into the end users system.

7.5.14.10(6)(f) Control system can trend graph up to two (2) years of data, without overwriting or decreasing data acquisition time

7.5.14.10(6)(g) Chiller controller utilizes the Danfoss Turbocor Compressor Software on board. This allows for no laptops for a service tech in additional to advanced remote troubleshooting.

7.5.14.10(6)(h) Control System features easy to use web interface. This allows the user to do anything remotely that could be done on site.

7.5.14.10(6)(i) Most advanced trend graphing available on the market. Over 200 data points are recorded in five (5) second intervals. Data can be analyzed with zoom feature. Data stored on separate 32 GB drive. Trend graph images can be exported. Trend graphs can be exported to CSV files as well.

7.5.14.10(6)(j) Advanced Fault Logging featuring calendar capability for ease of use. Data can be

recalled up to two (2) years. Data can be sorted by alarm type, time stamp, or compressor.

7.5.14.10(6)(k) Color coded data. Green data means good, yellow means alarm, red means fault or off.

7.5.14.10(6)(l) Controller logs when user makes any type of change.

7.5.14.10(6)(m) Controller is loaded with all manuals, wiring diagrams, and supporting data which can be recalled via touch screen.

7.5.14.10(6)(n) Controller has onboard maintenance log to store system information.

7.5.14.10(6)(o) Controller features e-mail fault notification.

7.5.14.10(6)(p) Controller offers real time capacity and efficiency data:

7.5.14.10(6)(q) BAS Interfaces include: Modbus RTU; Modbus TCP/IP; BACNET MSTP.

7.5.14.10(6)(r) BAS interface dashboard shown on HMI. This allows the user to view what data is being written to the BAS system. Also, it shows if there is an error, last com, and how many times the data was sent or received.

7.5.14.10(6)(s) Control system uses proprietary optimization logic to perform accurate energy balance on all systems for maximum system performance.

7.5.14.10(6)(t) Control System features an optimum start function to ensure initial lift is always made. This prevents nuisance check valve flutter and compressor faults.

7.5.14.10(7) Controls:

7.5.14.10(7)(a) BACNET MSTP; BACNET IP; LONWORKS.

7.5.14.10(8) Warranties: 5 year compressor parts warranty.

7.5.14.11 Installation

7.5.14.11(1) Chiller must be installed per all of the manufacturer's documentation. This includes: IOM Manual, Submittal documentation, CAD Drawings, other.

7.5.14.11(2) All local structural codes must be observed. Chiller to mounted and aligned on chiller pad or mounting rails as specified on CAD drawings.

7.5.14.11(3) All local plumbing codes must be observed. Piping must be run in such a way that the proper required clearances for head removal for tube cleaning are observed.

7.5.14.11(4) All National and Local Electrical codes must be observed. Instillation of the electrical on the chiller must follow the associated documentation from the chiller manufacturer. Electrical installation shall be coordinated with electrical contractor. Controls installation shall be coordinated with the controls contractor.

7.5.14.11(5) Provide all material required for a fully operational and functional chiller.

7.5.14.12 Start-Up

7.5.14.12(1) Units shall be factory charged with R-134A refrigerant unless unit is knocked down.

7.5.14.12(2) Factory Start-Up Services: An authorized factory start agent is required. At minimum, (2) two days shall be spent on-site to ensure proper unit operation.

7.5.14.12(3) During the start up period, the factory authorized agent will instruct the Authority's representative on proper care and operation of the chiller.

7.6 Reserved for Future Expansion (Division 24) – NOT USED

7.7 Integrated Automation (Division 25)

7.7.1 Controls:

7.7.1.1 Design Principles:

7.7.1.1(1) The Building Management System (BMS) will perform the following functions:

7.7.1.1(1)(a) Automatically operate, monitor and manage the building mechanical systems to provide a high level of occupant comfort and maintain a healthy and productive environment without disruption to the clinical and client treatment delivery.

7.7.1.1(1)(b) Display building related alarms at the management control centre Helpdesk.

7.7.1.1(1)(c) Provide a form of external monitoring for the Authority including all associated hardware and software.

7.7.1.1(1)(d) Meter and trend data related to flow of electrical power, natural gas and domestic water to the CSB and as required to monitor energy performance.

7.7.1.1(1)(e) Interface with the building electrical and communication systems including fire alarm, lighting, UPS and emergency power systems for monitoring, control and alarming.

7.7.1.1(1)(f) Monitor equipment status, temperature, humidity and alarms in clinical areas, such as freezers, coolers, labs and other medical equipment as identified in the program.

7.7.1.1(2) The BMS system will be non-proprietary and designed with open protocol. The BMS must seamlessly interface with the main Siemens BMS within the existing facility. Provide all necessary interfaces, graphics and translators to achieve complete control from the Siemens system.

7.7.1.1(3) The BMS system will optimize the system performance under all operating conditions to minimize the CSB energy usage.

7.7.1.1(4) The BMS system configuration will accommodate future technological changes and the architecture of the BMS system will permit expansion.

7.7.1.1(5) The controls system will be designed as a Building Management System (BMS), to allow monitoring and operation of the entire building from a single location or remote Internet connection.

7.7.1.1(6) The BMS will be a completely integrated (front-end and back-end) Native BacNET DDC system.

7.7.1.1(7) The BMS system will be an independent system separate from the building fire alarm and other control systems.

7.7.1.1(8) The BMS will be capable of expanding in scope and size with future CSB renovations.

7.7.1.1(9) The BMS will be provided as a complete package from one manufacturer, not a composite system from several manufacturers.

7.7.1.1(10) Provide airflow sensors at infectious control isolation dampers in ductwork to ensure isolation has been achieved. Provide local audio and visual alarms for these sensors in addition to the BMS alarms.

7.7.1.1(11) Provide differential pressure sensors between pressure critical areas as identified in the Room Data Sheets. Provide local audio and visual alarms for these systems in addition to the BMS alarms. .

7.7.1.1(12) Provide current sensors on all HVAC and exhaust fans, pumps and rotating equipment to provide status of the equipment back to the BMS.

7.7.1.2 Performance Criteria

7.7.1.2(1) Zoning for HVAC systems will be based on occupancy, room location within the building, room orientation, and thermostatic room loads.

7.7.1.2(2) Failsafe components will be hard-wired to provide reliable operation in all circumstances.

7.7.1.2(3) The BMS will meter and trend all data related to the flow of services into and out of the building including, but not limited to, domestic water and electricity.

7.7.1.2(4) The BMS will meter and trend all data related to the flow of services within the building, including but not limited to, chilled water, heating water, medical gases and propane.

7.7.1.2(5) The BMS will monitor, control, indicate alarms, and provide trending where applicable for all connected sensors and control points.

7.7.1.2(6) The BMS will be connected to emergency power.

7.7.1.2(7) The BMS will monitor critical alarms for essential building and life safety systems. These alarms will notify the Authority as well as the building's master control centre. These critical alarms include, but are not limited to:

- 7.7.1.2(7)(a) Fire alarm system for alarm, supervisory and trouble;
- 7.7.1.2(7)(b) All temperature alarms resulting from setpoint deviations;
- 7.7.1.2(7)(c) Medical gas system high and low pressure alarms;
- 7.7.1.2(7)(d) All alarms relating to the fire protection system.
- 7.7.1.2(7)(e) Critical pressure relationships and critical equipment including, but not limited to, biological safety hoods, refrigerators and freezers.

7.7.1.2(8) The BMS system will control all public area lighting such as parking lots, walkways, exterior signage, and corridor and lobby lights located in areas not occupied 24 hours per day. Exterior lighting will include an input for photocell over-ride.

7.7.1.2(9) The BMS documentation will include a detailed narrative description of the sequence of operation of each system.

7.7.1.2(10) User interface will be graphical in nature with animated graphics to indicate equipment operation. Graphics will be grouped in systems and in departments.

7.7.1.2(11) The central BMS contractor shall provide thirty-two (32) hours in two (2) sessions (introductory and follow-up) of

training to site personnel in the use and maintenance of the laboratory airflow controls provided. Training shall be conducted during normal working hours and shall consist of both hands-on and classroom training at the job site.

7.8 Electrical (Division 26)

7.8.1 Electrical General

7.8.1.1 Basic Requirements

7.8.1.1(1) All electrical systems, materials, and equipment in the CSB will be of a type and quality intended for use in a permanent health care facility. The electrical systems will provide redundancy, proper protection, continuity of service and a safe working environment for clients, visitors, and staff.

7.8.1.1(2) All electrical systems and equipment required for the function of each identified program will be provided and configured with due regard for the details of delivery of the programs. Devices identified as provided by other divisions will be the responsibility of their respective divisions, with coordination of all electrical or systems interfaces between all divisions involved.

7.8.1.1(3) Understand and incorporate into the design and construction the principle that change will be a constant and inevitable fact within the CSB. All systems will be constructed so as to facilitate this change while minimizing the cost of change and the amount of interruption to the regular activities of the CSB. Electrical rooms, equipment and systems control panels are to have extra space and provisions for future expansion of the laboratory to occupy the entire second and third floors unless noted otherwise. Clearly demonstrate the design concept for serving the future lab expansion, i.e., future electrical distribution equipment should be shown dotted in the extra space in electrical rooms. Spare capacities allowed for in the main equipment (transformers, diesel generators, UPS, and associated switchboards and panelboards) for the future lab expansion should be separately identified in the equipment sizing calculations required under 7.8.6.2(5).

7.8.1.1(4) Systems and equipment will be designed and installed in a coordinated fashion. Systems will work together where advantageous, take advantage of current best available

technology and through synergy and provide the CSB with reliable electrical systems performance directed to facilitating the various functions of the CSB, now and into the future.

7.8.1.1(5) Comply with all Applicable Standards including, but not limited to, those standards listed in Section 2.1 Standards and the following:

7.8.1.1(5)(a) Standards produced by Interior Health (available in the data room);

7.8.1.1(5)(b) CAN/CSA Standard C282 Emergency Electric Power Supply for Buildings

7.8.1.1(5)(c) CSA Z32-04 Electrical Safety and Essential Electrical Systems in Health Care Facilities

7.8.1.1(5)(d) CSA C22.1 Canadian Electrical Code

7.8.1.1(5)(e) IEEE Standard 519 – Harmonics;

7.8.1.1(5)(f) IEEE Standard 1250 – Voltage Quality; and

7.8.1.1(5)(g) IEEE Standard 1346 – Recommended Practice for Evaluation Electric Power System.

7.8.1.2 Performance Criteria

7.8.1.2(1) Every electrical system will be installed in a fixed and permanent manner, seismically restrained to meet the standards for a post-disaster building. The installation will economically occupy available space, leaving space for future additions and will be planned to facilitate easy access to other systems and equipment, including but not limited to mechanical equipment, building systems access ways, and architectural building components which may require periodic inspection or maintenance.

7.8.1.2(2) Redundancy will be incorporated into systems and equipment such that the failure of a single piece of major equipment or major conductor will not impair the operation of the CSB nor the clinical or administrative activities.

7.8.1.2(3) The protection, grounding and/or isolation, insulation and control of all circuits and systems will be designed and

constructed specifically to address the clinical and functional requirements of the locations where they are installed.

7.8.1.2(4) Automatic type power factor correction equipment will be provided to correct the facility power factor to above 0.9 lag. All components in each automatic power-factor correction cabinet will be designed to accommodate an additional 20% of the initial kVAR capacity in the future. The harmonic profile of the building distribution system will be verified and a tuned circuit design will be provided to minimize resonance conditions. The final installation will be tested at site during commissioning and within one month of building occupancy to verify harmonic profile, and the system will be re-tuned as necessary.

7.8.2 Wiring Methods and Materials

7.8.2.1 Basic Requirements

7.8.2.1(1) Wiring methods and materials will result in safe reliable and flexible electrical power, control, communication, data, and life safety systems in the CSB.

7.8.2.1(2) All wiring will be neatly and securely installed in such a way that it is protected from damage, is not in conflict with mechanical or architectural components of the building(s) and allows for future changes and additions.

7.8.2.1(3) Wiring methods will accommodate additions removals and relocations within the CSB for the projected working life of the building.

7.8.2.1(4) Main trunk wiring connected to emergency power will consist of two-hour fire rated wiring or equal.

7.8.2.2 Performance Criteria

7.8.2.2(1) All conductors and all conducting components of electrical equipment, which form part of the wiring systems in the CSB will be of non-alloyed copper. Conductors and conducting components larger than 100A may be aluminum.

7.8.2.2(2) Wiring and wiring support systems will be concealed from public view unless specific exemption is granted by the Authority.

7.8.2.2(3) All wiring will be protected from mechanical damage throughout each wiring system. Entry or accumulation of moisture into any wire, cable, or wire way will be prevented. Wiring to be in conduit unless otherwise noted. Final connection of branch wiring from ceiling space conduit and junction box systems to electrical devices on dropped ceilings may be in BX or flex such that the length of flex connection does not extend 10'-0". Final connection to motorized devices to be in liquid tight flex.

7.8.2.2(4) Wiring for systems of different voltages and from different sources of supply will be separated and will not be run in common systems such as conduits and cable trays. Interference between wiring of power supply systems and wiring of data and communication systems will be prevented by maintaining adequate separation, a minimum of 300mm, or adequate shielding throughout with a minimum of 50 mm separation.

7.8.2.2(5) Ease of maintenance and continuous service to the clinical operations is considered a benefit such that the wiring systems while being serviced or added to do not cause or require major service disruptions in the building.

7.8.2.2(6) Conduit fill will not exceed 40%.

7.8.2.2(7) Back boxes and junction boxes will not exceed 80% of the maximum fill allowable by Code. Splitters to have at least 3 spare terminals on each set of lugs.

7.8.2.2(8) All conductors and cables will be clearly labelled at both ends.

7.8.2.2(9) All pull boxes, junction boxes and conduits will be identified with purpose-manufactured durable and clearly legible marking to identify the function and voltage of the system. Follow the identifications systems or methods employed in the most recent building addition to the site.

7.8.2.2(10) Approved fire stopping will be installed and maintained at all fire separations and at any locations required by Code or by the local inspection authority.

7.8.2.2(11) All circuits to be complete with insulated copper ground wires, or insulated aluminum ground wires if feeders are aluminum.

7.8.3 Raceways

7.8.3.1 Basic Requirements

7.8.3.1(1) For the purpose of this specification, the word “raceway” will have the same meaning as defined in the Canadian Electrical Code, Section 0.

7.8.3.1(2) Raceways for wiring and cabling will be provided to support, protect and organize wiring and cabling systems throughout the CSB.

7.8.3.1(3) Raceways will be designed and installed in such a way to provide ease of access, capacity for expansion and change, which is consistent with the requirements of the equipment and systems that they serve.

7.8.3.2 Performance Criteria

7.8.3.2(1) Separate raceways or barriered raceways will be provided for cables and conductors of different voltages or system types.

7.8.3.2(2) Conduits, other than conduits dedicated to a single feeder or branch circuit, will have space for installation of a minimum of 50% additional capacity in future circuits. Cable trays, in-floor tray or duct systems will have space for installation of a minimum of 50% additional capacity in future cables. Wherever multiple raceways are required in a group, such as a duct bank or tray system interconnecting two or more major areas, provide matching empty raceway equal to a minimum of 50% of the total installed group. Raceways for high voltage cables shall have space provisions for an additional three phase feeder including any necessary neutrals or grounds.

7.8.3.2(3) Raceways will be planned to facilitate easy access to other systems and equipment, including but not limited to mechanical equipment, building systems access ways, and architectural building components which may require periodic inspection or maintenance.

7.8.3.2(4) Raceways will be designed and installed without sharp edges or sharp bends, must be a minimum of 10 times the radius, so that cables can be pulled in or laid in and removed without damage to the cables. Manufacturer’s maximum bend radii will be observed.

7.8.3.2(5) All metallic raceways will be continuously bonded with a bonding conductor installed within the raceway. Raceways to be metallic except when underground or in slab on grade they are to be PVC. High voltage cable raceways external to the building are to be buried underground and encased in re-enforced concrete. High voltage cable raceways internal to the building to be rigid metal conduit.

7.8.3.2(6) Provide spare raceways/ducts from the main electrical room to all sub-electrical rooms.

7.8.3.2(7) Install conduits or raceways to conserve ceiling heights.

7.8.3.2(8) Use rain tight connectors or hubs where conduits are exposed in sprinklered areas.

7.8.3.2(9) Run two spare 25 mm conduits to ceiling and floor spaces from lighting panels for future use. Terminate in 150 x 150 x 100 mm junction boxes.

7.8.3.2(10) Do not install conduits in ceiling slabs.

7.8.3.2(11) Plated heavy-guage wire mesh basket type tray will be utilized for data, telephone and systems cabling.

7.8.3.2(12) Power duplex receptacles and data outlets will be located every 1000mm along laboratory benches. Maximum of three (3) receptacles per two (2) normal power circuits. Maximum of three (3) receptacles per one (1) emergency power circuit.

7.8.4 Electrical Utilities

7.8.4.1 Basic Requirements

7.8.4.1(1) Ensure that the supply of electrical energy from Fortis BC to the CSB will be designed and installed to meet the IEEE Standards listed in 7.8.1 General.

7.8.4.1(2) Ensure the arrangement of Fortis BC power service to the CSB complies with CSA Z32-04 Electrical Safety and Essential Electrical Systems in Healthcare Facilities.

7.8.4.2 Performance Criteria

7.8.4.2(1) Provide one Fortis BC service at 12.47kV to the CSB.

7.8.4.2(2) The capacity of the Utility connections, cable and incoming high voltage switchgear, will, in the initial installation, allow for the initial connected load requirements plus 25% spare capacity. The design will anticipate the need for future expansion of the electrical facilities to accommodate projected future growth to the CSB and to the connected load. The cost for any additional expansion will be borne by that expansion project.

7.8.4.2(3) The design and construction of the 12.47kV Utility incoming switchboard at ground level will be metal enclosed style and include one incoming load-break switch-fuse unit. This will feed the main high-voltage switchboard for the facility, located at the roof level electrical room. The main high voltage switchboard design and construction will be metal enclosed style and include one incoming load-break switch-fuse unit and two outgoing load-break switch-fuse units. Offsite civil work related to Fortis BC is not included as part of this contract. All Fortis BC costs related to this Project will be included as part of this contract.

7.8.4.2(4) Vulnerability of the Utility connections will be reduced by the mechanisms of burial, concrete encasement and location marking and other available means to guard against accidental disruption by on-site or near-site activities. Concrete encased duct bank for utility incoming service from Fortis BC to have one spare 103mm duct for future.

7.8.4.2(5) The location of the Fortis BC switches, metering cabinets, and underground concrete duct banks will not interfere with any known future expansion of the Facility.

7.8.5 Emergency Power

7.8.5.1 Basic Requirements

7.8.5.1(1) Provide diesel generators as a source of power to all essential areas and systems within the CSB. The emergency power system will be available 100% of the time.

7.8.5.1(2) Fuel system will comply with CSA B139 and ULC CAN4-S601.

7.8.5.1(3) Compliance with CSA Z32-04 and CAN/CSA-C282-00, Emergency Electrical Power Supply for Buildings

7.8.5.1(4) Diesel Generators supplied will comply with local noise bylaws.

7.8.5.2 Performance Criteria

7.8.5.2(1) A minimum of one (1) generator will be supplied with automatic transfer between normal and emergency sources.

7.8.5.2(2) Generator will be fuelled with commercial grades of diesel fuel oil readily available locally to ensure a continuous fuel supply as in the case of an extended power outage.

7.8.5.2(3) Fuel supply stored on Site is to be in permanent storage and will provide for continuous operation of the Emergency Power System at 80% rated load for a period of at least 72 hours.

7.8.5.2(4) Generator will be located within the building in the roof level or in a secure, enclosed room on the main level so as to permit convenient servicing and monitoring and to prevent unauthorized access.

7.8.5.2(5) Generator will be located, vibration isolated, and muffled so that sound and vibration are limited to the roof level mechanical and electrical room or the secure room on the main level of the CSB. Daytime sound levels at the property line shall not exceed 60 dBa. Nighttime (after 22:00) sound levels shall not exceed 50 dBa.

7.8.5.2(6) Generator set will be capable of undergoing testing each week for at least ½ hour with actual CSB load.

7.8.5.2(7) Ease of maintenance and the ability to maintain continuous service to the clinical operations is considered a benefit such that the distribution equipment while being serviced or added to does not constitute major service disruptions in the building. The main emergency switchboard will be configured with draw-out type air circuit breakers and have minimum two prepared spaces, with internal bus connections and equipped with draw-out cradles, for future outgoing breakers.

7.8.5.2(8) The automatic transfer switches will be close-transition-transfer type to allow seamless transfer between Hydro and emergency generator. The automatic transfer switches will have dual-source bypass and isolation features to permit

servicing the automatic transfer switch without interruption to the emergency loads.

7.8.5.2(9) The generator loads and alarms will be annunciated and recorded on an engine-mounted digital control system panel which will also be interfaced to the Building Management System..

7.8.5.2(10) The generator will be sized for a minimum 65% of the total initial normal power demand of the Facility, or greater as required to meet the initial emergency loads, including capacity for future expansion of the laboratory to occupy the entire second and third floors.

7.8.5.2(11) In addition to code requirements, the following areas will be supplied with emergency power:

- 7.8.5.2(11)(a) all communication rooms;
- 7.8.5.2(11)(b) fire alarm systems;
- 7.8.5.2(11)(c) Uninterruptible Power Supply (UPS) systems;
- 7.8.5.2(11)(d) emergency communications devices;
- 7.8.5.2(11)(e) main computer server room;
- 7.8.5.2(11)(f) security / access control systems;
- 7.8.5.2(11)(g) labs;
- 7.8.5.2(11)(h) exterior signage and walkway lighting;
- 7.8.5.2(11)(i) rooms designated as emergency operations centres;
- 7.8.5.2(11)(j) alarmed freezers and coolers; and
- 7.8.5.2(11)(k) DDC/BAS control systems.
- 7.8.5.2(11)(l) both elevators to be connected to emergency power. Diesel generator to be sized to allow for the operation of either elevator at any time.

7.8.5.2(11)(m) Mechanical equipment designated to be provided with diesel generator backup.

7.8.5.2(12) Where emergency power is needed to meet program requirements or to protect equipment from damage, it will be provided.

7.8.5.2(13) An automatic transfer switch will be provided for the elevators to ensure their continued operation during emergency power tests. The automatic transfer switch will be sized to carry both of the elevators.

7.8.5.2(14) The main 600V emergency switchboard of this facility will have an interconnection to the Centennial Building emergency switchboard in the main KGH hospital campus for a partial backup connection in the event the diesel generator in the CSB building fails to start or is out of service in order to support the most critical operations in the CSB building like lab equipment, fridges and freezers. This back up connection between the buildings will be sized for minimum 400amp.

7.8.5.2(15) Uninterruptible Power Supplies (UPS) will be provided for all equipment that requires a continuous and uninterrupted source of power. UPS units for single isolated small loads less than 1 kilowatt may be freestanding units, located adjacent to the supplied equipment and rated for the connected load and capacity for future expansion of the laboratory to occupy the entire second and third floors. Where there are a number of units in a location, all of which require UPS power, the UPS will be mounted in an electrical room and a separate UPS distribution panel will be provided with UPS receptacles provided for each of the UPS loads. Loads larger than 1 kilowatt will be circuited from a UPS distribution panel which is energized from a centralized UPS system. Centralized UPS system supplying UPS panels will have integral static bypass and be sized for the connected load plus minimum 40% for future and configured with multiple modules to provide N+1 redundancy. The multi-module UPS system will be provided with an external ‘wrap-around’ maintenance bypass path to permit concurrent maintenance of the UPS modules or static bypass without interrupting power to the critical loads. Centralized UPS system shall be provide with the Ethernet communications port and UPS management

software that will connect to Hospital LAN. System will be monitored from remote location using LAN and web browser.

7.8.5.2(16) UPS units will be fed by circuits supported by an emergency generator and will be rated for a minimum of 15 minutes at full rated load. Where vital functions are connected to a UPS circuit, an audible warning will sound in the vital function area 5 minutes before the UPS battery supply is exhausted.

7.8.5.2(17) 3-phase UPS units larger than 1500 watts will have static bypass maintenance switching to permit servicing of the UPS without power interruption. All UPS units will automatically transfer the load to and from the emergency power supply without any interruption or disturbance of supply to the load.

7.8.5.2(18) Areas or equipment requiring UPS power will include but not be limited to:

- 7.8.5.2(18)(a) computer server rooms;
- 7.8.5.2(18)(b) computer network equipment;
- 7.8.5.2(18)(c) communication rooms; and
- 7.8.5.2(18)(d) lab equipment.
- 7.8.5.2(18)(e) Post Disaster Communication and Control room.

7.8.6 Transmission and Distribution

7.8.6.1 Basic Requirements

7.8.6.1(1) Electrical power of the voltage, current, and phase(s) required will be provided, from the main sources of supply, to each load requiring supply of power, and to convenience and special purpose outlets designed to meet all requirements of building operation and clinical and administrative functions.

7.8.6.1(2) Distribution equipment and feeder systems form the backbone of all electrical operation of the Facility. They will be robust, reliable, easily operated and maintained and will be designed with 20% extra capacity to accommodate load growth and equipment additions. The spare capacity for each distribution equipment and feeder will be proven through sizing calculations submitted during the design stage.

7.8.6.1(3) The transmission and distribution systems will allow for future changes and additions.

7.8.6.1(4) Transmission and distribution equipment will be of a “specification grade” and “institutional” or “industrial” quality and not of a “light duty” or “commercial” quality.

7.8.6.2 Performance Criteria

7.8.6.2(1) Major electrical equipment, which includes but is not limited to transformers, main distribution centres, transfer switches, motor control centres, and power factor correction equipment will be grouped together in a configuration that allows for addition or expansion of each type of equipment, logical arrangement in terms of the interconnection, operation and maintenance of the equipment. Metal enclosed load-break switch and fuse units will be used for the 12.47kV utility incoming switchboard and the 600V main distribution will consist of drawout type power-circuit breakers.

7.8.6.2(2) Major electrical equipment will be located in rooms dedicated to electrical equipment so as to provide a clean, dry, safe, accessible installation protected from unauthorized access.

7.8.6.2(3) All components of transmission and distribution systems will be selected, configured, located, and installed so as to minimize the transmission of noise, vibration or unwanted heat into other parts of the CSB.

7.8.6.2(4) Protection and coordination of protection equipment will be designed and installed so that the initial electrical installation, and future additions and modifications to the installation will be protected and fully coordinated, meaning that in the event of a fault or overload, protective devices will act to isolate only the faulty portion of the system and areas downstream, leaving all other portions of the system fully operational. Protection equipment will adequately protect against injury to persons and damage to property. The 600V secondary main switchgear will consist of breakers not fuses.

7.8.6.2(5) The following engineering studies will be provided for review prior to starting the installation:

7.8.6.2(5)(a) Building power load demand calculations, separate for normal and emergency branches.

7.8.6.2(5)(b) Equipment and feeder sizing calculations

7.8.6.2(5)(c) Short circuit study

7.8.6.2(5)(d) Voltage drop study

7.8.6.2(5)(e) Protective device co-ordination study

7.8.6.2(5)(f) Arc-flash hazard analysis

7.8.6.2(6) Where required by system characteristics or operational requirements, special shielding, isolation, grounding, bonding, harmonic filtration or other treatment will be provided to prevent interference between systems or degradation of performance of an individual system. Provide harmonic filters on the line side of variable-frequency drives and UPS system to limit the input current harmonic distortion (iTHD) to less than 5% of the full-load fundamental current.

7.8.6.2(7) Provide minimum 20% extra space in distribution centres fully equipped to permit addition of circuit breakers in the future.

7.8.6.2(8) Components of the transmission and distribution systems which are in any public, clinical, administrative or staff area will be of a type which gives both long life expectancy without perceptible deterioration, and good appearance, and will be designed, selected and installed so as to permit cleaning. These components include but are not limited to light switches, receptacles, wire ways, equipment grounding points, and status displays.

7.8.6.2(9) Single phase 120VAC grounding receptacles conforming to CEC and specifically to CSA Configuration 5-15R are to be provided at each location where electrical equipment requiring a supply of normal or emergency power will be plug connected.

7.8.6.2(10) Locations of receptacles will comply with all applicable codes and standards. See Appendix 1C for the minimum required for each functional area.

7.8.6.2(11) Receptacles in client care areas will be Hospital Grade. Receptacles in all other areas will be Specification Grade. Residential Grade and commercial grade receptacles will not be permitted. All receptacles will have stainless steel cover plates, except for the receptacles on the lab-bench raceways.. Grouped receptacles will have a single cover plate covering the whole group. Receptacles on normal power circuits will be white, receptacles on emergency power circuits will be red, and receptacles on UPS circuits will be blue and identified as UPS circuits.

7.8.6.2(12) All receptacles will be permanently marked with lamicoid labels identifying the circuit and panel number.

7.8.6.2(13) A complete enlarged single line schematic diagram of the electrical distribution will be framed and wall mounted in the main Electrical room.

7.8.7 Metering

7.8.7.1 Basic Requirements

7.8.7.1(1) Digital pulse metering will be supplied to provide detailed information about power quality and power consumption at the following key points in the CSB:

7.8.7.1(1)(a) Main high voltage switchboard

7.8.7.1(1)(b) Secondary main of each 12.47kV-600V step-down transformer

7.8.7.1(1)(c) Input mains of each motor control centre, or distribution panel feeding mechanical equipment.

Input of the main 600V emergency switchboard

7.8.7.1(2) Any metering which is to be used to charge tenants or agencies for their power consumption will be “revenue certified”.

7.8.7.1(3) The metering system will be a networked system, with terminals for maintenance and plant administration, and data transfer to the Building Management System.

7.8.7.1(4) Electrical consumption meters will be connected to the Building Management System.

7.8.7.2 Performance Criteria

7.8.7.2(1) The metering system will provide easily read locally displayed information for all distribution at primary voltage and for each secondary distribution switchboard.

7.8.7.2(2) Historical data from the metering system network will be stored and will be capable of generating user configurable electronic and printed reports on demand.

7.8.7.2(3) The metering system will not be dependant on power from the metered circuit for its operation, and will be supported by a backup power source or sources, which ensure operation when the metered circuit is de-energized.

7.8.7.2(4) The metering system will, at a minimum, provide the following information about each metered circuit: Phase-to-Phase Voltage (all phases), Line-to-Neutral Voltage (all phases), Phase Current (all phases and neutral), KW, KVA, Power Factor, KWH, VAR hours.

7.8.7.2(5) The meters will be power quality type able to monitor harmonics and surges / sags.

7.8.7.2(6) Draw-out circuit breakers on the 600V main normal and emergency switchboards will be provided with trip units with integral 3phase true RMS digital meter with local LCD display to indicate the phase current for each phase, and the present energy demand.

7.8.7.2(7) The outpatient blood collection area is proposed to be rented to an external tenant in the future. The electrical distribution to this area will be arranged to permit Interior Health to meter the electrical energy consumption in this area. A minimum 100A or larger as required, 208V, 3-phase, 4 wire panel with main breaker and a tenant-metering socket on the line side will be provided to serve this area. The tenant-metering socket will be connected to the CSB electrical metering network.

7.8.8 Grounding and Bonding

7.8.8.1 Basic Requirements

7.8.8.1(1) All electrical equipment and systems in the CSB will be bonded and grounded to meet code requirements, IEEE guidelines, and any special requirements for lab equipment .

7.8.8.1(2) Grounding and bonding will provide for safety of personnel and for protection against damage to equipment or property in the case of a fault occurring in any of the equipment or systems.

7.8.8.2 Performance Criteria

7.8.8.2(1) All conductors and all conducting components of electrical equipment which form part of the grounding and bonding systems in the CSB will be of non-alloyed copper or aluminum.

7.8.8.2(2) The electrical system will be a solidly grounded system.

7.8.9 Seismic Requirements for Electrical Systems

7.8.9.1 Basic Requirements

7.8.9.1(1) Seismic restraint for all electrical equipment and components of electrical systems which are part of the building electrical systems in all parts of the CSB will be seismically restrained to the post disaster standards in accordance with the applicable BC Building Code to prevent injury or hazard to persons and equipment and to retain equipment in a safe position in the event of a seismic disaster.

7.8.9.1(2) Seismic restraint systems and methods will be selected to facilitate ease of maintenance and ease of replacement and reconfiguration of electrical equipment and systems and other equipment and building components.

7.8.9.1(3) Seismic restraint systems and methods will be selected to coordinate with the building Architecture and finishes. Components of seismic restraints will, wherever practicable, be concealed from public view. Where concealment is not practicable the systems will be designed to complement building Architecture and finishes.

7.8.9.1(4) Seismic restraints will meet or exceed the requirements of the current edition of the B.C. Building Code.

7.8.9.1(5) Seismic restraint design will follow the recommended practices published in the Seismic Restrain Standards Manual (AIBC) as adopted by the Electrical Contractors Association of BC and CSA S832-06 Guidelines for Seismic Risk Reduction of Operational and Functional Components.

7.8.9.2 Performance Criteria

7.8.9.2(1) Seismic restraint systems will either be designed by a professional engineer registered in British Columbia, or, where an identified pre-designed standard restraint device or system exists for a particular item, that equipment may be used provided that written confirmation of its acceptability for the installation is provided by a professional engineer registered in British Columbia.

7.8.10 Power Quality

7.8.10.1 Basic Requirements

7.8.10.1(1) An overall power quality which assures suitable conditions for operation of all electrical and electronic equipment throughout the CSB will be established.

7.8.10.1(2) A wide variety of electrical and electronic equipment types will be in use in the CSB. Equipment and systems which assure that electrical equipment and systems will not be harmed or impaired either by external events or conditions, such as lightning and disturbances on the utility service, or by internal events or conditions generated within the CSB are to be provided.

7.8.10.1(3) Power quality will meet or exceed the IEEE established standards for power quality, including but not limited to Harmonic Mitigating Transformers, Harmonic Filters, Surge Protective Devices (SPD's), etc., provided where deemed necessary by the Design-Builder and the following publications:

7.8.10.1(3)(a) IEEE Standard 519 - Harmonics

7.8.10.1(3)(b) IEEE Standard 1250 - Voltage Quality

7.8.10.1(3)(c) IEEE Standard 1346 - Recommended Practice for Evaluation Electric Power System Compatibility with Electronic Process Equipment

7.8.10.1(4) Methods and equipment consistent with IEEE Standard 1159 - Monitoring Electric Power Quality will be provided by installing a built-in power quality meter at the BCH incoming service. All other system testing will be done by a technician using portable test equipment. Power quality meters will be provided at all secondary distribution centres. Prove that power quality meets or exceeds published standards.

7.8.10.1(5) Provide station class lighting arrestors on the primary side of the 12.47kV-600V main step down transformers. Provide surge protective devices (SPD's) on all 600V switchboards, all 208V switchboards, and 120/208V panel boards serving lab areas, lab equipment, and data/communication rooms.

7.8.10.2 Performance Criteria

7.8.10.2(1) The CSB is to include equipment specifically designed to control and remove all adverse power quality conditions that could damage or impair function of any of the electrical or electronic equipment, which will be in use in the facilities. Adverse power quality conditions to be addressed include but are not limited to voltage spikes, dips and droops, transients, harmonics, power factor and radio frequency interference.

7.8.10.2(2) demonstrate to the Authority during the commissioning phase that there are no potentially harmful power conditions present and that equipment intended to guard against such conditions is in proper working order.

7.8.11 Lighting

7.8.11.1 Basic Requirements

7.8.11.1(1) All luminaries of greater than 60W to have lamps with minimum efficacy of 50 lumens/watt.

7.8.11.1(2) Lighting will optimize use of daylight and will be achieved through a combination of natural light and luminaires and controls.

7.8.11.1(3) Exterior and interior lighting will create a safe and secure environment for clients and staff.

7.8.11.1(4) Lighting will comply with all characteristics recommended by the CSA Standard Z317.5-98 Illumination Systems in Health Care Facilities.

7.8.11.1(5) Lighting energy consumption will comply with ASHRAE Standard 90.1 and will exceed that standard by as much as possible with a reasonable standard being a 10% reduction range while still meeting program requirements.

7.8.11.1(6) Lighting will follow LEED for New Construction Gold Certification when selecting lighting source types, e.g. low mercury content light sources.

7.8.11.1(7) Lighting design will comply with the light pollution reduction requirements as outlined in LEED Canada-NC 1.0 to eliminate light trespass from the building and site, improve night sky access and reduce development impact on nocturnal environment. This light pollution reduction credit will be incorporated into the overall LEED certification application for this building.

7.8.11.2 Performance Criteria

7.8.11.2(1) Selection of luminaires and light sources will meet the stated energy efficiency and quality and quantity requirements, but will also meet the objective of providing both a comfortable working environment and an environment conducive to healing and recovery.

7.8.11.2(2) Special task lighting designed for the types of procedures conducted will be provided as per Section 7 for rooms and areas where treatment is provided and rooms and areas where specialized analytical or diagnostic work is carried out.

7.8.11.2(3) Luminaires in all areas will be so constructed as to require minimal cleaning and will permit practical and easy access and disassembly. All lighting components will be institutional grade.

7.8.11.2(4) Lighting in areas where computer terminals and similar screens will be used will be specifically designed to eliminate glare and will meet or exceed the IES recommended cut off for VDT luminaires.

7.8.11.2(5) Lighting in technology conference rooms and video conferencing facilities will maximize viewing of monitors and screens and will provide suitable illumination of people being viewed.

7.8.11.2(6) Exterior luminaires will be vandal resistant.

7.8.11.2(7) Use of battery-operated unit emergency lighting will be minimized, however battery-operated emergency lighting or and acceptable alternative will be provided as a second level of emergency lighting in areas such as nurse units, and mechanical areas.

7.8.11.2(8) Lighting in main lobbies, waiting areas and the main entrances are features of the building and will be designed of high quality products aesthetically pleasing to the public and staff.

7.8.12 Lighting Standards

7.8.12.1 Autopsy Area

7.8.12.1(1) Ceiling mounted fluorescent luminaires using 3-28 watt T8 lamps configuration to provide three levels of illumination by switching.

7.8.12.1(2) Provide K12 acrylic lenses (.125”) mounted in a hinged door.

7.8.12.1(3) Provide clean room luminaires in the “Autopsy Room” with antimicrobial finish.

7.8.12.1(4) Standard luminaires in adjacent areas with latched doors.

7.8.12.2 Offices

7.8.12.2(1) Recessed mounted fluorescent luminaires. Lamps: 3500°K CRI 85.

7.8.12.2(2) Provide uniformly luminous luminaires.

7.8.12.2(3) Lighting levels for general illumination shall be in conjunction with task lights supplied under another division.

7.8.12.2(4) Ideally, the ceiling luminaires shall straddle the work station to avoid reflected glare.

7.8.12.2(5) Controlled by motion detectors.

7.8.12.3 Examination Rooms

7.8.12.3(1) Ceiling mounted fluorescent luminaires. Lamps: 3500°K CRI 85.

7.8.12.3(2) Provide K12 acrylic lenses (.125") mounted in a latched door. Provide general illumination with an exam light mounted on an arm directly mounted over the table.

7.8.12.3(3) Provide switching.

7.8.12.4 Laboratories/Microbiology/Blood Bank

7.8.12.4(1) Suspended or recessed indirect/direct fluorescent luminaires to provide three levels of illumination using 28 watt T8 lamps, 3500°K CRI 85.

7.8.12.4(2) Luminaires to run perpendicular to the benches to eliminate reflected glare.

7.8.12.4(3) Provide zoning for large areas controlled by ceiling motion detectors.

7.8.12.4(4) Task lights "might" be required depending on the shelving.

7.8.12.5 Lounges/Reception Areas

7.8.12.5(1) Downlights/wallwash units using either compact fluorescent or LED's.

7.8.12.5(2) Wall sconces (ADA) used in combination with the above. Fluorescent or LED's.

7.8.12.5(3) Lamps: 3500°K CRI 85.

7.8.12.5(4) Provide switching.

7.8.12.6 Corridors

7.8.12.6(1) In client, public and office corridors provide perimeter cove/recessed linear lighting and wall sconces (ADA).

7.8.12.6(2) Back of house corridors using 1'-0" x 4'-0" fluorescent recessed/suspended luminaires.

7.8.12.6(3) Lamps: 28 watt T8 with a 3500°K CRI 85.

7.8.12.6(4) Provide switching (three-way) wherever possible.

7.8.12.7 Parking Garage

7.8.12.7(1) Provide a metal halide or LED system throughout to achieve the desired results. (Pulse Start for metal halide).

7.8.12.7(2) Provide a higher illuminance at entrance(s).

7.8.12.7(3) Provide controls to reduce lighting intensities at entrance(s) at night.

7.8.12.7(4) Luminaires to have quartz re-strike.

7.8.12.7(5) Standard of Acceptance:

7.8.12.7(5)(a) KIM "PGL Series"

7.8.12.7(5)(b) Lithonia "PGR Series"

7.8.12.8 Exits

7.8.12.8(1) All exit lights shall utilize LED technology.

7.8.12.8(2) Edge lit in finished areas and metal in back of house.

7.8.12.9 Note:

7.8.12.9(1) Allow for daylight harvesting when rooms are adjacent to windows.

7.8.12.9(2) Allow for program start ballasts.

7.8.13 Lighting Control

7.8.13.1 Basic Requirements

7.8.13.1(1) Lighting controls will comprise a significant part both of the energy management of the facilities and of the flexibility required to adjust lighting to suit functions and activities.

7.8.13.1(2) Lighting control will permit simple and integrated control of lighting; controls will be easily operated and conveniently and located for each area and function.

7.8.13.1(3) All of the lighting in a space will be capable of being switched at each entrance to the space.

7.8.13.1(4) The BMS will be used for remote control of the lighting.

7.8.13.1(5) Staff will have the ability to control the lighting in their environment. Area Lighting Control and Lighting Control Interface Table (included in this section) will be followed as a minimum standard for control.

7.8.13.1(6) Occupancy sensors and daylight control systems will be utilized to maintain light levels at levels based upon the occupancy of the room and the quantity of daylight.

7.8.13.2 Performance Criteria

7.8.13.2(1) Where lighting controls are required to be located in areas accessible to the public, they will be protected from unauthorized operation. Corridor lighting controls will be located at the reception desks. Controls will be multilevel and capable of overriding the BMS night setback control.

7.8.13.2(2) All manually operated lighting controls will be of a type, which can be completely cleaned and disinfected without requiring any disassembly. Manually operated controls will not be deteriorated or otherwise adversely affected by frequent cleaning and disinfections.

7.8.13.2(3) Lighting controls in locations where they may be subjected to excessive moisture or to chemicals that might cause deterioration are to be rated specifically for the application.

7.8.13.2(4) Lighting in open areas and common areas will be zoned and subdivided to permit energy management control and variation of light levels.

7.8.13.2(5) Control of lighting in technology conference rooms and in videoconference facilities will be integrated with the equipment controls and control stations in the room so as to permit the conference manager to vary the lighting as required for different activities. All conference and meeting rooms will be

provided with dimming down to 1% for linear fluorescents and 5-10% for all other lamp types. Lighting will have a minimum of 4 levels of control.

7.8.13.2(6) Controls for all corridor, circulation and atrium areas will be interfaced to the BMS system to provide zone control of lighting. Zoning control to include floor by floor and department by department as a minimum and provide automatic night setback with sweep “off” per programmable time (ie. 2 hours) throughout the night to turn off lights that may have been manually turned on by staff via a local light control.

7.8.13.2(7) Lighting control system will be interfaced to the Building Management System to permit override ‘100% on’. Lighting program will be established by IHA and Design-Builder to address different conditions such as power outage and fire alarm.

7.8.13.2(8) Occupancy sensors will be provided in all housekeeping rooms, locker rooms, storage rooms, waiting areas, and washrooms. Occupancy sensors will be automatic on/off type.

7.8.13.2(9) Vacancy sensors, a subset of occupancy sensors, will be provided in all offices, conference rooms, exam rooms, laboratory areas, staff rooms, and work areas. Vacancy sensors will be manual on/off, automatic off type.

7.8.13.2(10) Design-Builder will consider implementation of daylighting controls to meet LEED® requirements.

7.8.13.2(11) Daylighting controls will be provided for all lighting in areas adjacent to exterior glazing and provide dimming to 10% of lamp output. Provide combination daylight harvesting and occupancy control to the rooms requiring occupancy sensors.

7.8.13.2(12) Daylighting will meet the following performance criteria:

7.8.13.2(12)(a) The average illuminance across a representative portion of the task surface will be at least 30% of the target design level for that space type within 5 meters of the daylight source;

7.8.13.2(12)(b) Overhead lights within the space will be dimmed as low as possible (or turned off) while satisfying above criteria (a).

7.8.13.2(13) Occupancy sensors and daylighting controls will be integrated into the lighting control system and located on ceilings to avoid interference with furniture. Occupancy sensors will typically be dual technology type with other types to suit application.

7.8.13.2(14) Exterior lighting will be controlled via BMS and photocell.

7.8.13.2(15) Lighting control schedules will respond to individual departmental requirements and occupancy/use. Design to include a schedule of lighting control and be included in the design specifications.

7.8.13.2(16) Except in conference and meeting rooms, provide 10% lamp output dimming within all rooms designated to have dimming capability.

7.8.13.2(17) Multilevel lighting controls will be provided in all exam rooms, autopsy room and grossing room.

7.8.13.2(18) Each lighting control panel will have programmable switches to allow relays which are 'soft wired' into groups to be controlled while retaining individual relay control. Master switches will be capable of direct on/off control or on/flick-then-off control ('flick-then-off' function is that the lights will flick prior to turning completely off). Any master switch which could cause an occupant to be left in the dark shall have the 'flick-then-off' warning function.

7.8.13.2(19) Area Lighting Control and Lighting Control Interface Table:

Requirements		
Room Type	**Control Type**	**Interface Type**
Autopsy	VS, ML	
Conference Room	VS, DD, DL, ML	BMS
Exam Room	VS, ML	
Exterior Lighting	PC	BMS
Housekeeping	OS	BMS
Laboratory Areas	OS, DL	BMS

Locker Room	OS	BMS
Office	VS, DL, ML	BMS
Parking Garage	OS or HI-LO	BMS
Phlebotomy	OS, DL, MC (MC at Reception Desk)	
Roof level	TS	BMS
Reception	MC, DL	BMS
Service Room (Elec, Comm, etc)	TS	BMS
Staff Room/Lounge	VS, DL	BMS
Storage	OS	BMS
Waiting	OS, DL, MC (MC at Reception Desk)	BMS
Washroom	OS	BMS
Work Area	VS, DL, ML	BMS

Control Type Legend:
DD – Digital Dimming
DL – Daylighting (when room is adjacent to exterior glazing)
HI-LO – High Low Switching (Metal Halides only)
MC – Manual Control
ML – Multilevel Control
OS – Occupancy Sensor
PC – Photocell
TS – Timer Switch
VS – Vacancy Sensor (Occupancy Sensor with Manual 'On/Off' switch)

7.8.14 Major Laboratory Equipment

7.8.14.1 Basic Requirements

7.8.14.1(1) Provide all electrical requirements for connection, operation and monitoring and control of any supplied major laboratory equipment.

7.8.14.2 Performance Criteria

7.8.14.2(1) Each item of equipment will be installed and electrically connected for proper and full operation.

7.8.14.2(2) Electrical characteristics of this equipment, including but not limited to voltage, wattage, phase, demand, inrush, frequency, connection method and control and monitoring requirements will be confirmed by the designer and provided for.

7.8.14.2(3) Space, access and ventilation requirements and other operation critical characteristics of this equipment will be provided for and outlets and connection points will be located correctly for installation and so as to permit proper and safe

isolation for servicing and disconnection for removal or replacement.

7.8.14.2(4) Any motorized equipment is to be equipped with a local lockable disconnect switch.

7.8.14.2(5) Provide three cell steel wireways for duplex receptacles and data jacks on laboratory benches. Lowest cell to be for normal hydro powered duplex receptacles spaced a minimum of 1200mm apart. The second cell to be for generator powered duplex receptacles located on 1200 mm centres. The third cell to accommodate two data jacks on 1200 mm centres. Circuiting to consist of two duplex receptacles per circuit. Mount raceway 100 mm above bench.

7.8.15 Energy Management

7.8.15.1 Basic Requirements

7.8.15.1(1) The integrated energy management system will monitor, record, report on and control energy from all sources which supply energy to the CSB. This system may form part of the building management system.

7.8.15.1(2) The energy management systems and equipment will be flexible, controllable, and will form an integral part of the buildings design and construction.

7.8.15.2 Performance Criteria

7.8.15.2(1) The energy management system will be accessible from any networked computer using required software.

7.8.15.2(2) A minimum of (5) Site software licenses will be provided if licensing is required.

7.8.16 Mechanical Equipment Connections

7.8.16.1 Basic Requirements

7.8.16.1(1) Electrical power control and monitoring connections will be provided to all mechanical equipment as required for proper operation, protection and maintenance of the equipment. Materials and installation methods will result in safe reliable

and serviceable mechanical equipment and systems in the CSB.

7.8.16.2 Performance Criteria

7.8.16.2(1) Cables, connectors, conduit systems, fittings and hardware used to make connection to mechanical equipment will be of institutional or industrial quality, and will be so selected and installed as to provide for high levels of reliability, durability and ease of maintenance of the equipment.

7.8.16.2(2) Connections made to motors and/or motor driven equipment or equipment with noticeable levels of vibration will be of a type specifically designed to accommodate the vibration.

7.8.16.2(3) Connections to mechanical equipment will be designed and installed to easily permit removal and replacement of the equipment and will provide for the eventuality that equipment may be replaced in the future with upgraded and dissimilar equipment types.

7.8.16.2(4) Motor control centres, main feeders to motor control centres, and mechanical distribution centres will be sized to accommodate the current mechanical equipment plus 50% of that amount in additional spare capacity.

7.8.16.2(5) Motor control centres will be used when three (3) 3-phase motors that require a starter and are located within 50m of each other.

7.8.16.2(6) Provide labelling on MCC's to match motors.

7.8.16.2(7) Provide wiring diagrams of each starter type.

7.8.16.2(8) Full size starters to be provided.

7.8.16.2(9) For motors 20 hp and above provide reduced current starters. Provide integral harmonic cancellation devices to limit harmonics to 5% current harmonics (iTHD) of the full load fundamental current if solid-state starters are employed.

7.8.16.2(10) Starters and MCC's to be indoor sprinkler-proof, type 2 enclosures.

7.8.16.2(11) Provide individual control transformers for each starter.

7.8.16.2(12) Provide power factor correction at each motor 10hp and above and at MCC's.

7.8.16.2(13) Starters or MCC's connected to emergency and normal power to be coloured to match the most recent addition, All interiors to be white.

7.8.17 Building Control Systems Interface

7.8.17.1 Basic Requirements

7.8.17.1(1) A fully functional building management system whose primary function will be to control the mechanical systems within the CSB will be provided by the Mechanical Division. The building management will interface with building electrical and communication systems. This system is to be utilized to annunciate security alarms, freezer alarms, laboratory alarms, UPS, generator, and switchgear alarms, and control the building and site lighting (for energy management reasons) via its software program.

7.8.17.1(2) The system is to be used for energy management functions as well as energy related data acquisition and trending. The digital meters monitoring the electrical power systems are to be connected to this system.

7.8.17.2 Performance Criteria

7.8.17.2(1) Refer to Mechanical sections for details of the Building Management System.

7.8.18 Specialty Systems

7.8.18.1 Basic Requirements

7.8.18.1(1) Special electrical and communications systems are required in the CSB and form essential parts of the complete Facility. Power supply, specially conditioned power and communication conduits and other electrical operational support equipment will be supplied and installed in order to provide for all the requirements of permanent installations of these special electrical and electronic systems.

7.8.18.2 Performance Criteria

7.8.18.2(1) Cables, connectors, conduit systems, fittings and hardware used to make connection to special equipment will be of institutional or industrial quality, and will be so selected and installed as to provide for high levels of reliability, durability and ease of maintenance of the equipment.

7.8.18.2(2) Connections to special equipment will be designed and installed to easily permit removal and replacement of the equipment and will provide for the eventuality that equipment may be replaced in the future with upgraded and dissimilar equipment types.

7.8.19 Pneumatic Tube System

7.8.19.1 Basic Requirements

7.8.19.1(1) The pneumatic tube system will be designed to accommodate the requirements / needs of the Clinical Support Building and the KGH hospital campus in a manner which contributes to the overall efficiency and effectiveness of lab/hospital operations.

7.8.19.1(2) Equipment provided will have a proven track record of at least five years field operation in Canada in similar environments and of similar configuration.

7.8.19.1(3) Interconnect the pneumatic tube system in the Clinical Support Building system to the system being installed in the KGH hospital campus Centennial Building addition. A nearby station for interconnection to the existing is the 3rd floor Renal Department Station.

7.8.19.1(4) The system supplier will be Swisslog.

7.8.19.2 Performance Criteria

7.8.19.2(1) The system will be a computer-controlled pneumatic tube materials distribution system, consisting of tubing, stations, transfer units, blower packages, carriers, and a control system with a 150 mm diameter tube and shall match existing in the latest addition to the Hospital.

7.8.19.2(2) The system will be configured in groups of stations (zones) connected together by interzone tubes. Each station will be connected to the system by a single tube to a transfer unit.

7.8.19.2(3) Each zone will contain its own blower and function independently.

7.8.19.2(4) The dispatching, routing and storage of carriers will be directed by a system control centre to provide automatic unattended transmission of carriers between two statio[ns].

7.8.19.2(5) The system will provide shortest route vacuum pressure travel.

7.8.19.2(6) The modular design of the system components will permit changes in the number of stations and/or zones as Authority requirements change.

7.8.19.2(7) Install stations as per the drawings in the 1st floor Outpatient Collection, 3rd floor Blood Bank and 3rd floor Accessioning.

7.8.19.2(8) Provide 12 carriers per station and storage capacity to match.

7.9 COMMUNICATIONS (DIVISION 27)

7.9.1 Basic Requirements

7.9.1.1(1) The latest technology for transferring, securing, and storing information will be utilized by the proponent. The Authority expects to receive the most current technology and systems available at the start of construction.

7.9.1.1(2) Installed structured cabling system solution will meet or exceed the requirements as set forth in the IMIT Cabling Specifications Version IMIT-10-01 4.1.

7.9.1.1(3) A 3rd party commissioning agent will provide a commissioning report to confirm the integration of the communications systems. Commissioning will confirm that systems such as fire alarm, access control, CCTV, duress alarm, all parking lot panic alarm devices, wireless phones and intrusion systems will produce the specified signal on all required output devices. Conversely, commissioning will confirm that each output device can be activated by all specified input devices. A minimum of 5% of input and output devices of each type will be tested except for exterior panic alarm devices of which 100% will be tested.

7.9.1.1(4) Installed solution shall meet or exceed the requirements of IHA's standard "IMIT Telecommunications Cabling spec

version IMIT-10-01 4.1". Where requirements in the RFP and IHA's standard conflict, the more stringent requirement shall apply.

7.9.1.2 Performance Criteria

7.9.1.2(1) The communications systems will be proven technology, effectively used in other health facilities, will be easy to operate, and easy to maintain. Where needed, these systems will integrate readily with the other systems in this Facility and with technology provided in other health facilities to allow Province wide communications.

7.9.1.2(2) The Design-Builder will provide training sessions for clinical/non-clinical staff on the proper use of all systems. Training/education sessions will also be offered to the facility maintenance staff on the proper maintenance of all systems.

7.9.1.2(3) The communications systems will be chosen because they are cost effective, provide efficiencies for staff and clients, perform the necessary tasks sufficiently, are adaptable to change, flexible in implementation and are expandable to accommodate growth.

7.9.2 Communications General

7.9.2.1 Basic Requirements

7.9.2.2 The communications systems in the CSB will be an extension of the hospital's communications systems. Ensure that all new technology systems and equipment are compatible with existing systems and equipment used in the Centennial Building.

7.9.2.2(1) All communications systems infrastructure and equipment provided by the Design-Builder will be the latest proven version of the equipment at the time of construction.

7.9.2.2(2) The communications systems will be easy to operate, easy to maintain and adaptable to change, and expandable to accommodate growth.

7.9.2.2(3) The Design-Builder will be responsible for all physical network design and installation.

7.9.2.2(4) Physical network design and installation will:

7.9.2.2(4)(a) accommodate multiple separate networks and VLANs administered by multiple CSB Users; and

7.9.2.2(4)(b) have high availability and security that meets or exceeds the industry standard for use in and support acute care hospital applications.

7.9.2.2(5) The Authority anticipates that the following networks will be required in the CSB:

7.9.2.2(5)(a) An administrative network for core health users, including the Authority's local area network, which will include the following applications:

7.9.2.2(5)(b) .1 client information systems

7.9.2.2(5)(c) .2 PACS

7.9.2.2(5)(d) .3 financial information systems

7.9.2.2(5)(e) .4 human resource information systems

7.9.2.2(5)(f) .5 electronic communications systems including e-mail, video conferencing and VoIP phones and end-user resources.

7.9.2.2(6) Provide systems which promote operational efficiency and integrate systems where this integration provides efficiency and operational and cost advantages.

7.9.3 Network Equipment

7.9.3.1 Basic Requirements

7.9.3.1(1) Provide supporting infrastructure that will support redundant and secure network design.

7.9.3.1(2) The network equipment will be open architecture.

7.9.3.1(3) Work with the Authority in creating an operational plan for the implementation of network complete with management strategy and resource requirements for maintenance.

7.9.3.1(4) The CSB will include communication rooms as required to service voice/video/data requirements of the CSB.

7.9.3.1(5) The network equipment will be provided by Authority to support the wired and wireless infrastructure and the Authority supplied end-use equipment.

7.9.4 Structured Cabling

7.9.4.1 Basic Requirements

7.9.4.1(1) The cabling infrastructure will not differentiate on the type of end-use device that connects to it. The cabling infrastructure will be universal and allow all currently available forms of end-use devices access to the different system types.

7.9.4.1(2) The cabling infrastructure will be designed by a Registered Certified Data Designer (RCDD) or professional engineer and will be to the latest TIA / EIA solution. The current solution is a category 6 cable infrastructure.

7.9.4.1(3) All cables are to terminate in communication rooms sized in accordance with the TIA / EIA 569 standard. Maximum cable distance from room outlet to communication room will be 70 meters.

7.9.4.1(4) Communication rooms will serve the floor they are on and will be placed to maximize the area they serve.

7.9.4.1(5) Cable types will be unshielded twisted pair and fibre optic multimode and single mode. The bandwidth requirements and distance limitations will determine the type of cable installed.

7.9.4.1(6) The conduits, pathways, room layouts, and design will comply with the TIA / EIA-569 Commercial Building Standard for Telecommunications Pathway and Spaces, latest edition.

7.9.4.1(7) The cabling design and installation will comply with the TIA / EIA – 568B.1, B.2 and B.3 Commercial Building Cabling Standards and Optical Fibre Cabling Standards.

7.9.4.1(8) Testing of the fibre optic cable will meet the TIA / EIA 526-7,and TIA / EIA 526- 14 standards for Optical Power Loss measurement of single mode and multimode fibre cable plant.

7.9.4.1(9) The management and administration of the cabling plant will be done in accordance with the TIA / EIA 606 standard – the Administration Standard for the Telecommunications Infrastructure of Commercial Buildings.

7.9.4.1(10) The grounding of the conduit pathways and components is to meet the TIA / EIA 607 Standard – Commercial Building Grounding and Bonding Requirements for Telecommunication.

7.9.4.1(11) The structured cabling component will be of the same manufacturer and will be supplied by one of the recognized industry leaders. The system will be installed by a data contractor who is certified by one of the industry leaders consistent with the manufacturer's best warranty.

7.9.4.2 Performance Criteria

7.9.4.2(1) Provide and install a complete category 6 structured cabling solution throughout the Facility. A star wired cabling approach will be utilized to wire all outlet locations back to communication rooms and all communication rooms back to the main computer room and main telecommunications room.

7.9.4.2(2) All rooms that have or are anticipated to have data, phone, video, or other end-use Devices will have cable system drops run back to telecommunication rooms.

7.9.4.2(3) All conduit pathways will have maximum 30% fill, all cable trays will have maximum 25% fill.

7.9.4.2(4) All communication rooms will have spare capacity as recommended by TIA / EIA – 568B.1, B.2 and B.3 Commercial Building Cabling Standards and Optical Fibre Cabling Standards. All cabling will be run in conduit or cable tray. J-hooks will not be approved

7.9.4.2(5) Fibre optic cabling will be utilized to connect communication rooms to the main computer room and the core network room. Both multimode and single mode fibre will be provided with type depending on equipment requirements. Fibre optic cabling will also be provided in rooms requiring video streaming, in digital operating rooms and areas where bandwidth requirements necessitate.

7.9.4.2(6) All cable drops will be terminated at both ends. The proper flame spread rating will be provided for the cabling system.

7.9.4.2(7) Patch cables for all end-use devices will be provided in sufficient quantity to make each device operational plus 10% spare. Patch cable will allow complete connection from end to end.

7.9.4.2(8) A cable management labelling software and electronic drawing system will be implemented by the Design-Builder to track and manage the cable plant.

7.9.4.2(9) Self-registration systems, electronic directional systems and patient education kiosks will be provided in reception areas. Provide floor data outlets and floor power to connect these floor mounted systems.

7.9.4.2(10) Specialized systems requiring multiple drops will have sufficient drops at each location to ensure system operation.

7.9.4.2(11) Provide cable for all public phones, Allow for a minimum of (2) per main lobby and (1) per emergency department waiting area.

7.9.5 Wireless Infrastructure

7.9.5.1 Basic Requirements

7.9.5.1(1) The entire CSB will be provided with supporting infrastructure that will allow installation of WLAN wireless end-use devices access to the Authority's network and all its associated applications.

7.9.5.1(2) General

7.9.5.1(2)(a) The structured cabling system will connect the wireless access points to the communication rooms.

7.9.5.1(2)(b) All access points and wireless components will be seismically supported.

7.9.5.1(2)(c) The wireless network equipment will be fed from a UPS power source.

7.9.5.1(3) References

7.9.5.1(3)(a) CSA C22.2 No. 18.

7.9.5.1(3)(b) CSA C22.1 Canadian Electrical Code, Part 1.

7.9.5.1(4) Scope Of Work

7.9.5.1(4)(a) Installation of UTP cables and termination equipment required for the proposed WLAN will be provided by the communications wiring system contractor and will conform to the standards set forth in the specifications. All cables to be tested/certified and will match or exceed industry specs. Results of tests to be submitted to Authority after completion of cable installation.

7.9.5.1(4)(b) Provide supporting infrastructure for WAP that will be installed inside elevator cabs.

7.9.5.1(4)(c) Supporting infrastructure for implementation of wireless local area network shall be provided to accommodate minimum of 100 users connected to the WLAN.

7.9.5.1(4)(d) Typically, five users will be active at any one time simultaneously conducting VoIP calls.

7.9.5.1(4)(e) Users will access a VoIP PBX system, Hospital's databases and check e-mail requiring 11 Mb/s each. Users' applications tolerate retransmitted packets, however system will be provided to accommodate systems that do not tolerates retransmissions, real-time video and wireless voice over Internet protocol (VoIP).

7.9.6 Wireless Staff Communication Systems

7.9.6.1 Basic Requirements

7.9.6.1(1) The wireless staff communication system will function throughout the entire CSB.

7.9.6.1(2) The wireless system will integrate with the main telephone switch, voice mail system, dictation system, and the other data network systems. It will be able to access applications such as Meditech and CAIS applications. Each wireless device will offer the full functionality of a standard hardwired telephone handset.

7.9.6.1(3) The wireless staff communication system will meet the IEEE 802.11a, b, g, and n standards and allow sufficient bandwidth to display clinical data.

7.9.6.1(4) The wireless staff communication system will provide standard telephone features as well as IP addressing and VoIP.

7.9.6.1(5) Wireless data security encryption techniques are to be employed by the system in compliance with 802.11i.

7.9.6.2 Performance Criteria

7.9.6.2(1) Provide a complete supporting infrastructure for Authority's implementation of wireless staff to staff communication system that will allow staff to place calls from wireless handheld devices and initiate a two-way voice conversation.

7.9.6.2(2) Supporting infrastructure shall be provided to accommodate minimum of 100 users connected to the WLAN. Typically, five users will be active at any one time simultaneously conducting VoIP telephone calls. Users will access a VoIP PBX syste, Hospital's databases and check e-mail requiring 11 Mb/s each. Users' applications tolerate retransmitted packets, however system will be provided to accommodate systems that do not tolerates retransmissions, real-time video and wireless voice over Internet protocol (VoIP). Supporting infrastructure will be positioned to accommodate installation of RTLS system (Real Time Locator Solution)

7.9.6.2(3) Handheld devices will be battery powered and come with a charger and an additional battery. Fully charged battery will have a minimum of 8 hours of talk time. Handheld devices will include full keyboard, an LCD 60 character display, IP address, wireless network card, and soft keys. Provide required power sources that will accommodate charging of these devices.

7.9.6.2(4) Locate wireless CPU in main communication room along with applications servers. System will be connected to an uninterruptible power supply providing a minimum of 30 minutes of continuous power.

7.9.6.2(5) The wireless infrastructure active components will be specified by the Authority.

7.9.7 Telephones

7.9.7.1 Basic Requirements

7.9.7.1(1) The telephone system will be specified by the Authority.

7.9.7.1(1)(a) All standard voice mail features will be provided as well as networking and integrating this telephone switch and voice mail system into the Authority's telephone network.

7.9.7.1(2) Pay-telephones will be located in main lobbies.

7.9.7.1(3) Provide a supporting infrastructure for minimum of one (1) desktop telephone(s) in all locations where a telecom port exists. In the case of multiple telecom ports, provide (1) desktop telephones outlet for every workstation.

7.9.7.1(4) An internal only telephone will be located in the elevator lobbies and client waiting areas;

7.9.7.1(5) A pay phone will be located in the Outpatient Collection lobby or waiting area.

7.9.7.2 Performance Criteria

7.9.7.2(1) Provide multi-conductor twisted pair telephone style riser cables as required for telephones equipment.

7.9.7.2(1)(a) Cables will be run from the main telephone room located in the existing building. Provide a minimum 100-pair cable terminated on a demarcation panel that has a minimum100% spare capacity in each communication room.

7.9.7.2(1)(b) The telephone systems will have a full UPS system with enough capacity to operate the entire system for (4) hours and include a disaster recovery option.

7.9.7.2(2) Provide all the necessary telephone interface modules and paging zone modules to integrate with the public address system.

7.9.7.2(2)(a) Design and construct the CSB to support the Authority's IP and TDM phone technology, both wired and wireless.

7.9.7.2(2)(b) Voice equipment will comply with all BICSI/IEEE and EIA/TIA standards.

7.9.7.2(2)(c) Voice equipment will be fully integrated, and will operate seamlessly, with the Authority's existing voice network.

7.9.8 Public Address

7.9.8.1 Basic Requirements

7.9.8.1(1) The paging system will connect to the telephone system allowing any telephone to page in the CSB.

7.9.8.1(2) Integration with the fire alarm system will be acceptable if all requirements of the performance criteria are met.

7.9.8.2 Performance Criteria

7.9.8.2(1) The public address system will consist of amplifiers, mixers, speakers, zone paging modules, telephone interface modules, microphones, and other devices as needed to facilitate overhead paging in the CSB.

7.9.8.2(1)(a) Provide complete speaker coverage of the CSB so that emergency pages can be heard everywhere in the CSB with high intelligibility and low loss of articulation of consonants (%ALCONS).

7.9.8.2(1)(b) The paging system will be a constant voltage system with speakers placed to cover all areas and provide at minimum 60

dB in all areas of the CSB. Amplifiers to be sized to drive all speakers in each zone plus 20% additional spare capacity for future growth. The mixers will accommodate all inputs and provide the required signal to the amplifiers and speakers.

7.9.8.2(2) The system is to be zoned to allow paging into individual departments. It is necessary to drive different inputs into each department. Auxiliary audio inputs will be overridden when paging or a fire alarm signal takes place. Each zone to be accessible by telephone to allow department paging or CSB wide paging. A page in one department will be isolated to that department.

7.9.8.2(3) Speakers will be recessed in ceiling whenever possible and come complete with speaker back box. Minimum sound pressure level for paging will be 60 dB.

7.9.8.2(3)(a) Paging sound levels will be at least 10 dB above ambient noise levels in mechanical rooms and similar locations.

7.9.8.2(4) Amplifiers to be distributed such that the failure of one set of amplifiers does not cause the entire system to malfunction. Other sets of amplifiers to operate properly even if one set malfunctions.

7.9.8.2(5) Telephone access to paging will be nearly instantaneous (less than 1 second) from the time the telephone dials to the time the message is sent over the speakers.

7.9.9 Video Conferencing

7.9.9.1 Basic Requirements

7.9.9.1(1) Provide infrastructure for full video conferencing systems and video conferencing building infrastructure in all rooms requiring audio/video conferencing as identified in the Equipment Schedule.

7.9.9.1(2) The audio / video conferencing systems will comply with the latest IP based video conferencing standards.

7.9.9.1(3) The audio / video conferencing systems will comply with the latest IP based video conferencing standards or the latest high speed common standard.

7.9.9.1(4) The H.323 & H.264 internet video conferencing standard and web broadcasting will allow computers on the network set up for videoconferencing to broadcast internally or externally over the network.

7.9.9.1(5) The location of microphones, video cameras, video monitors, and the design of the lighting systems will be optimize the performance of the video conferencing system.

7.9.9.1(5)(a) Provide RS232 interface for the lighting dimming system and integrate with the AV control system.

7.9.9.1(5)(b) Large meeting rooms shall be provided with dedicated AV control system infrastructure.

7.9.9.2 Performance Criteria

7.9.9.2(1) Video conferencing systems will be supplied and installed by the Authority in locations as per the Equipment Schedule.

7.9.9.2(2) Video conference systems for conference rooms will be complete with monitors, cameras, microphones, automatic microphone controllers, amplifiers, speakers, video controllers, remote controls, and network connections or as per the Equipment Schedule. Wiring infrastructure, connectors and any miscellaneous equipment required to make the video conference system functional not listed in the equipment schedule is the responsibility of the Design-Builder.

7.9.9.2(3) Provide detail drawings showing all supporting infrastructure and components that can be used for implementation of AV systems.

7.9.10 Central Dictation

7.9.10.1 Basic Requirements

7.9.10.1(1) Provide infrastructure to support central dictation system that is CSB-wide and utilizes the structured cabling system for interconnection to the central storage device.

7.9.10.1(2) All telephones in the new CSB will be programmed to access the dictation system.

7.9.10.2 Performance Criteria

7.9.10.2(1) All telephones will allow staff the ability to dictate onto the central dictation systems. An access code will be needed to access the dictation system.

7.9.10.2(2) Additional dictation storage for the central system will be provided by as directed by the Authority.

7.9.11 Intercommunication System

7.9.11.1 Basic Requirements

7.9.11.1(1) Internal communication systems within hospitals are an important part of ensuring clinical staff can deliver and receive timely information. The telephone system will have intercommunication capabilities.

7.9.11.1(2) Local Intercom systems are required at locked entrance doors that delivery personnel or the public will need access through.

7.9.11.1(3) The local intercom systems will be manufactured by recognized industry leaders in the intercom business.

7.9.11.2 Performance Criteria

7.9.11.2(1) Provide local intercom systems at all locations requiring public or delivery access that may be locked. These systems will connect to the nearest manned reception area. The system will be capable of remotely unlocking the door.

7.9.11.2(2) A video intercom system will be provided at all entrance locations needing more security as determined by the Design-Builder security planner. Video output from the camera shall be connected and interfaced with Lenel CCTV and Card Access system installed in Hospital's Data Center.

7.9.11.2(3) The Design-Builder shall provide local intercom systems at all locations requiring delivery access. These systems shall connect to the telephone system to allow the intercom to dial up the telephone at the nearest manned reception area and to switchboard.

Intercom system shall be provided at all main departmental entrance doors. CCTV camera shall view face of anyone using any intercom station.

7.9.11.2(4) Intercommunication shall be provided between elevators and central elevator controller and switchboard/help desk/ call centre.

7.9.11.2(5) Overview

7.9.11.2(5)(a) The system shall consist of intercom stations, central exchange equipment, terminal cabinets and necessary interconnecting cables. System shall be IP based.

7.9.11.2(5)(b) The system shall be designed to provide complete "hands-free" operation for both the calling party and the party receiving the call.

7.9.11.2(6) General Requirements

7.9.11.2(6)(a) Conform to Sections of Division 1 as applicable.

7.9.11.2(6)(b) Conform to Section 7.6.1, Electrical General Requirements.

7.9.11.2(6)(c) The system shall be CSA and/or ULC approved

7.9.11.2(6)(d) Transistors, capacitors, integrated circuits, and other components shall not be operated to exceed their rated values. Design systems for 24-hour continuous operation.

7.9.11.2(7) Shop Drawings and Product Data

7.9.11.2(7)(a) Submit shop drawings and product data in accordance with Section - Shop Drawings, Product Data, Samples and Mock-ups and Section 7.6.1, Electrical General Requirements.

7.9.11.2(7)(b) Upon completion of the installation the supplier shall also provide commercially printed brochures complete with illustrations

and instructions outlining operation of the system for use by the building staff.

7.9.11.2(7)(c) The brochures shall be specifically prepared for the system that will be installed.

7.9.11.2(7)(d) Step by step instructions shall outline the operation of the complete system.

7.9.11.2(7)(e) Submit the proposed brochure as a shop drawing.

7.9.11.2(8) Work Included

7.9.11.2(8)(a) Work to be done under this Section shall include furnishing of labour, materials, and equipment required for installation, testing and putting into proper operation complete systems as shown as specified and as otherwise required.

7.9.11.2(8)(b) System as provided by the manufacturers will include the following:

(b).1 Supply and installation of control equipment including auxiliary power supplies.

(b).2 Supply and installation of all system equipment and devices

(b).3 Supply and installation of all wiring required for complete system operation.

(b).4 All required device set-up and system programming, testing and verification including all user selectable functions set up to Authority's desired settings. Review settings with Authority prior to implementation.

(b).5 Complete layout, wiring and installation diagrams for overall system design, updated to "as built" condition at the Design-Builder's completion and incorporated into maintenance manual.

(b).6 Complete instruction to Authority on system operation.

(b).7 Technical data on each product, including finishes
(b).8 Description of system operation.
(b).9 Riser diagrams and system data.
(b).10 Equipment design considerations for future expansion when indicated.
(b).11 Materials list and backbox schedule (including unique backboxes).
(b).12 Factory prepared operation and service manual for each system, operation details, schematics, wiring diagrams, colour coding, terminal numbers, and component values for printed circuit board

7.9.11.2(9) Operation and Maintenance Data

7.9.11.2(9)(a) Provide operation and maintenance data for incorporation into manual specified in the General Requirements.

7.9.11.2(10) Maintenance Materials

7.9.11.2(10)(a) Provide maintenance materials as required and as specified in the General Requirements.

7.9.11.2(11) Operating and Maintenance Instructions

7.9.11.2(11)(a) Provide operating and maintenance instructions as specified the General Requirements.

7.9.11.2(12) System Verification

7.9.11.2(12)(a) Test and demonstrate the operation of the complete system to the Authority. This shall include, but not be limited to:
(a).1 Detailed test and demonstration of each operable device
(a).2 Detailed test and demonstration of overall system operation
(a).3 Interfacing of various components.

7.9.11.2(12)(b) On completion of the installation the manufacturer/supplier shall supply a certificate, together with detailed inspection record sheets showing location of each device and certifying the test results per unit, confirming that the system is installed and operates in accordance with Specification.

7.9.11.2(13) Operation of the System

7.9.11.2(13)(a) To originate a call, a person shall depress one or more digit buttons.

7.9.11.2(13)(b) This shall automatically and simultaneously cause the following to occur:
(b).1 Visual and audio signals shall be activated at the station called.
(b).2 Visual indication shall be provided at the calling station showing that the call has been placed.
(b).3 Necessary circuitry shall be activated to permit a two-way conversation to take place.
(b).4 Call log shall be generated on Lenel Integrated Security System software.

7.9.11.2(13)(c) When the called station is not in a "private" position, it shall now be possible for both parties to engage in a two-way conversation without the need to operate any buttons or controls. At the end of the conversation, either party shall be able to cancel the call.

7.9.11.2(13)(d) Call cancellation shall be possible in two modes:
(d).1 By pressing a suitable "Cancel" or "Reset" button, or
(d).2 By replacing the handset into its cradle in the case of stations so equipped.

7.9.11.2(13)(e) A called station equipped with a handset shall be able to respond to a call in two modes:
(e).1 By speaking into the built-in speaker microphone, or

(e).2 By lifting the handset from its cradle and conducting a two-way conversation via the handset.

(e).2.1 In this case, the built-in speaker microphone shall be inoperative.

7.9.11.2(13)(f) When the called subscriber is in the "Private" position, this information shall be conveyed to the calling party by means of a distinct audio signal.

(f).1 The called subscriber shall be able to respond to the call in three modes:

- (f).1.1 By releasing the "Privacy" button, or
- (f).1.2 By depressing a "Talk-Listen" button. In this case, however, the system will no longer operate in a "hands-free" manner.
- (f).1.3 By lifting the handset from its cradle and conducting a two-way conversation.

7.9.11.2(13)(g) Subscribers having stations equipped with a "Group calling" feature shall be able to originate calls to the stations shown simultaneously by operating suitable controls.

7.9.11.2(13)(h) It shall be possible to page all stations in the group of stations on a floor.

7.9.11.2(13)(i) Any of the stations so called shall be able to reply to such incoming calls by pressing suitable controls.

7.9.11.2(13)(j) Pressing of the controls at the other stations shall automatically connect the stations and both parties shall now be free to engage in a "hands-free" conversation.

7.9.11.2(13)(k) When a system is activated in a room equipped with a music system, a dry contact shall be activated to mute the music on local speakers.

7.9.11.2(14) PRODUCTS – Stations

7.9.11.2(14)(a) Stations shall be of the following types:
(a).1 Desk mounted with handset,
(a).2 Wall mounted with handset, and
(a).3 Flush mounted.

7.9.11.2(14)(b) Stations shall incorporate the following features and facilities:
(b).1 Sturdy modern style appearance and colour
(b).2 Solid state circuiting10 digits for direct digital dialling
(b).3 Built-in device to provide different tone signals for incoming calls, busy channel, called station on Privacy, speech channel available.
(b).4 Built-in lights to announce incoming calls or busy exchange.
(b).5 Talk-Listen or Press-To-Talk, Release-To~Listen button.

(b).6 High quality microphone housed behind grille enabling person to answer incoming calls from anywhere within the room.
(b).7 High quality speaker or speakers housed behind grille set to an adequate volume level enabling person called to receive voice message anywhere within the room.
(b).8 Cancel or Release button
(b).9 Privacy button
(b).10 Volume control
(b).11 Internal or attached directory card holder provision for call number of station
(b).12 Six foot long cord with cap to plug into suitable receptacle in case of desk mounted stations
(b).13 Wall mounted stations shall have receptacle mounted in suitable back box so that station completely conceals cord and plug.
(b).14 Telephone type floor outlet termination equal to Conduflor No. 196 in case of isolated stations.
(b).15 Stations shall be equipped with a telephone type handset, cradle and attached coil cord for private conversation. Speaker-microphone shall be inactive when handset is in use, and vice versa.
(b).16 Ability to originate power call with reply.

7.9.12 Integration with Health Authorities

7.9.12.1 Basic Requirements

7.9.12.1(1) The Authority has their clinical staff providing comprehensive health services in the CSB. The communications systems and technological systems in the new CSB are to integrate with communication systems and technology in the CSB to enable the efficient, and secure exchange of information between all the various facilities within these entities and the CSB.

7.9.12.1(2) The electronic health record (all client information is stored electronically) is the standard both agencies have adopted. The facilities electronic systems are to allow for the

transmission, storage, and retrieval of the electronic health record within the CSB.

7.9.12.1(3) All IHA standards in effect at the time of installation of the communications and technology systems will be observed. The latest standard: “IMIT Telecommunications Cabling Infrastructure Specification Release Date: May 2010 Version: IMIT-10-01 4.1” should be followed. Where requirements in the RFP and IHA’s standard conflict, the more stringent requirement shall apply.

7.9.12.1(4) All applicable IEEE, CSA, TIA / EIA, and BICSI standards will be complied with.

7.9.12.2 Performance Criteria

7.9.12.2(1) Provide technology and communications systems that integrate with the Health Authority’s existing systems and future new systems to allow seamless communications between other health facilities in the region and this Facility.

7.9.12.2(2) The systems to be integrated include but are not necessarily limited to video conferencing, telephones, all networks, client entertainment, client education, access control, CCTV, timing, intrusion detection, nurse call and specialized clinical equipment such as picture archiving and communication systems (PACS), cancer treatment systems, electronic registration, and dictation systems

7.9.13 TV System

7.9.13.1 Basic Requirements

7.9.13.1(1) Provide TV service in all reception areas.

7.9.13.1(2) The type of service is at the discretion of the Design-Builder and either digital systems with file servers, pre-programmed movies, internet access, games, standard TV, satellite TV, and on-demand access or standard analog television systems with cable service may be utilized. The content of the services and service restrictions is at the sole discretion of the Authority. The Authority will be responsible for on-going contracts with content providers and for any interface with users of the system. Following initial installation, maintenance and refresh of equipment such as replacement televisions will

be the responsibility of the Authority. Maintenance of the wiring infrastructure is the Design-Builder's responsibility with the nominal demarcation point being the face plate on the wall.

7.9.13.1(3) The type of end-use device is dependent upon the type of system the Design-Builder utilizes but clients and staff will be able to change program channels as easy as a standard television via a menu and remote control.

7.9.13.1(4) The system will be manufactured by an industry leader and all components will be of that manufacturer.

7.9.13.1(5) If the system is networked based, it will meet the networking standards outlined earlier in this section.

7.9.13.1(6) If the system is NTSC broadband video, it will meet the CRTC standards and operate in the 8dbmv to 7dbmv range.

7.9.13.2 Performance Criteria

7.9.13.2(1) All waiting areas will be provided with free access to an entertainment display system or TV.

7.9.13.2(2) Public area TVs will require access to client education and local TV channels only.

7.9.13.2(3) Entertainment application servers, web servers, controllers, will be provided by the Design-Builder including all software for a complete operating system. Access to digital radio, standard TV, on demand TV, digital TV, games, Internet, and other entertainment services is encouraged. All content will be reviewed by the Authority and where deemed inappropriate, will be restricted.

7.9.13.2(4) Portable cart based systems with personal computers or TVs and DVD / Blue Ray players will be provided that can connect to this system in the conference room.

7.9.13.2(5) The system will access the network allowing the Authority to display education materials and potentially other clinical applications on the in-room display / computer / TV.

7.9.14 Client/Staff Education System

7.9.14.1 Basic Requirements

7.9.14.1(1) The Authority will provide the application services, programs and electronic educational material that will be displayed on the client/staff education system.

7.9.14.1(2) Provide infrastructure and end-use devices in all rooms as part of TV system that will allow these applications to be displayed to clients.

7.9.14.1(3) Staff education programs will become available on the network that can be accessed via any computer. Rooms with network access like conference rooms will be able to display this information.

7.9.14.2 Performance Criteria

7.9.14.2(1) Provide electronic client education kiosks in all waiting areas in the clinical office area that will consist of a computer with touch screen, network connection and fixed millwork. This system may be wired or wireless.

7.9.15 Time Systems

7.9.15.1 Basic Requirements

7.9.15.1(1) Provide a wireless centralized master clock system that will synchronize all network clocks to matching time, provide automatic correction for daylight savings time and self correct if power fails.

7.9.15.1(2) The master time controllers and all clocks will be provided by a recognized industry leader and all components will be of the same manufacturer.

7.9.15.1(3) Pre-approved manufacturers are:

7.9.15.1(3)(a) Visiplex

7.9.15.1(3)(b) Primex

7.9.15.2 Performance Criteria

7.9.15.2(1) Clocks will be provided in locations as listed in the Room Data Sheets as a minimum. Clocks will be analogue type, at least 14” diameter with 24-hour numbering.

7.9.15.2(2) Clock correction signals will be available throughout the CSB.

7.10 Electronic Safety and Security (Division 28)

7.10.1 Fire Alarm

7.10.1.1 Basic Requirements

7.10.1.1(1) The fire alarm system will be designed, installed and verified to meet the latest applicable versions of the following standards.

7.10.1.1(1)(a) Can / ULC S524 Standard for installation of Fire Alarm Systems

7.10.1.1(1)(b) Can / ULC S537 Standard for Verification of Fire Alarm Systems

7.10.1.1(1)(c) Elevator Code CAN3-B44

7.10.1.1(2) In addition to the building wide audio and visual fire alarm indications, the fire alarm system will annunciate the approximate fire location on the in use wireless staff communications devices and on the building management system.

7.10.1.1(3) The system will utilize the latest proven technology available at the time of installation.

7.10.1.1(4) Pre-approved manufacturers are:

7.10.1.1(4)(a) Simplex

7.10.1.1(4)(b) Submit cost-savings for using products of alternate manufacturers.

7.10.1.2 Performance Criteria

7.10.1.2(1) Provide a fully addressable, two stage computer based fire alarm system throughout the new CSB.

7.10.1.2(2) If the fire alarm system is used for overall building paging, the following conditions will apply:

7.10.1.2(2)(a) The microphone in the fire fighters command centre or the emergency operations centre will override general paging;

7.10.1.2(2)(b) General paging via telephone handsets will not take longer than 2 seconds before paging can begin.

7.10.1.2(3) The fire command centre will include a fire alarm control panel, a fire alarm graphic annunciator panel, a fire alarm colour graphics computer, a building management system computer for fan control, and an elevator status/control panel.

7.10.1.2(4) Smoke and heat detectors will be individually field programmable and include multiple elements for earliest detection, individually adjustable for ambient environmental conditions.

7.10.1.2(5) In addition to sprinklers, provide smoke detector coverage in the following areas, for early detection.

7.10.1.2(5)(a) Lab areas throughout

7.10.1.2(5)(b) Communication rooms

7.10.1.2(5)(c) Electrical equipment rooms

7.10.1.2(6) Audible annunciation will be a zoned overhead fire alarm speaker system that may also form part of the building public address system. Audible alert levels will be 10dBA above ambient with minimum of 75dBA and be audible in every room in the CSB.

7.10.1.2(7) Emergency paging will be accessible via microphone at the fire command centre.

7.10.1.2(8) Train staff on operation of system and incorporate fire plan in training to alert staff to policy and procedures in case of fire alarm and safe gathering points in case of evacuation.

7.10.1.2(9) Visual annunciation will be via building graphic annunciators, a computer workstation, room annunciators provided at all care (nursing) stations (excluding care substations) and main control reception areas.

7.10.1.2(10) All alarms, trouble signals, other information will be enunciated at the CSB call centre location.

7.10.1.2(11) The system will include pre-programmed voice messaging to automatically audibly annunciate the location of the alarm.

7.10.1.2(12) Interface and connections will be provided between the Clinical Support Building fire alarm system and the KGH hospital campus fire alarm system such that a fire alarm at the Clinical Support Building is remotely annunciated at the KGH hospital main fire alarm panel.

7.10.1.2(13) Vestibule separating the Clinical Support Building and the KGH main campus will be provided with pressurization fans which will be activated by the fire alarm system in either building. Fire-Do-Not-Enter signs will be provided at both entrances to the vestibule, and will be activated from the fire alarm system in the opposing building.

7.10.1.2(14) After installation is complete the system will be verified in accordance with CAN/ULC-S537 and report submitted.

7.10.2 Access Control and Panic Duress Systems

7.10.2.1 Basic Requirements

7.10.2.1(1) Provide an access control system, intrusion detection systems, and a CSB wide panic duress system (wired and wireless).

7.10.2.1(2) Determine security needs through a comprehensive threat and risk assessment analysis and consultation with the Authority. Programming of photo ID cards, location of all security devices and monitoring requirements to be identified. All alarm annunciation requirements are to be identified.

7.10.2.1(3) All security systems will connect to the structured cabling system and network devices to allow The Authority the opportunity to review events and monitor the status of these systems from off-site locations.

7.10.2.1(4) All security systems in the Clinical Support Building will be integrated with the existing security systems in the KGH campus. Existing security system in the KGH campus is based on Lenel, so all new systems will be compatible with Lenel.

7.10.2.1(5) All security systems will communicate directly (wired and wirelessly) to the on-site security officers in the Clinical Support Building and in the existing KGH hospital campus.

7.10.2.1(6) The Authority staff is to be fully trained on the use, operation, and location of all security devices.

7.10.2.1(7) All systems to be the latest proven technology supplied by industry leading manufacturers in the security industry at the time of construction.

7.10.2.1(8) Systems will be interconnected to the fire alarm system where required.

7.10.2.2 Performance Criteria

7.10.2.2(1) Design, provide and install the security systems with Authority input to meet the objectives of their security programs.

7.10.2.2(2) Card access control of all staff entrances, staff lounges, the clinical office and exam room suite and all laboratory entrances from the public corridors and elevators will be provided. Card access control of select spaces within department areas will be provided as required for additional tiered security. The Card Assess System will have multiple zones to distinguish access between the many departments.

7.10.2.2(3) The access control system will be PC based, contain an integral photo identification card system, and have sufficient capacity to handle at minimum 10,000 regional employees down to the field panel level, can grant or restrict access to employees via a programmable classification system, and run over a standard TCP / IP Ethernet network.

7.10.2.2(4) The system will utilize a central Authority's existing file server . Allow for a minimum of (5) additional workstation licenses.

7.10.2.2(5) Alarms will be annunciated at the CSB management call centre / alarm management centre location at minimum.

7.10.2.2(6) Location of access control doors and door alarms will be coordinated with the CSB. Areas to be included are:

7.10.2.2(6)(a) Labs

7.10.2.2(6)(b) Autopsy area and Morgue

7.10.2.2(6)(c) Link between buildings

7.10.2.2(6)(d) Elevators

7.10.2.2(6)(e) Stairwells

7.10.2.2(6)(f) Exterior entrances

7.10.2.2(6)(g) Bicycle Storage Area

7.10.2.2(7) Permanent parking lot duress stations will be placed in well lit areas spaced a maximum of 30m apart and 10m from the parking area edge.

7.10.2.2(8) Duress stations shall be equipped with strobe light and pre-recorded digital message system that will provide digital announcement after the alarm activation. This system shall initiate call to the security officer's Radio and paging system. Emergency call buttons shall be mushroom type c/w with conventional red light and manual key for system reset.

7.10.2.2(9) Institute a training program that initially trains all staff, trains new staff and refreshes staff training each year on all aspects of the security systems. Coordinate these efforts with The Authority staff.

7.10.3 Intrusion Detection

7.10.3.1 Basic Requirements

7.10.3.1(1) Intrusion detection systems will be part of the access control system and installed in all areas where protection of physical assets is critical.

7.10.3.2 Performance Criteria

7.10.3.2(1) The intrusion detection system will utilize industry proven devices for intrusion detection. These devices include motion detectors, magnetic door contacts, and glass breakage detectors. If the area is under 24 hour video surveillance, video analytics may be utilized for intrusion detection.

7.10.3.2(2) Intrusion detection will be provided in areas defined by the Authority including laboratory spaces, phlebotomy supply areas, communications rooms, and computer rooms.

7.10.4 CCTV

7.10.4.1 Basic Requirements

7.10.4.1(1) Areas which have CCTV cameras installed will have signage posted at the main entrances to the building. The signage will notify the public that this area is under video surveillance.

7.10.4.1(2) CCTV processes will be governed by the Public Surveillance System Privacy Guidelines for the province of BC as well as the Freedom of Information and Protection of Privacy Act.

7.10.4.1(3) System(s) will be a software-based virtual matrix using the structured cable plant for transmission and recording of images.

7.10.4.1(4) CCTV system will be fully integrated in to existing KGH hospital campus Lenel card access CCTV head end system.

7.10.4.2 Performance Criteria

7.10.4.2(1) The system must be able to record clear images of individuals, which would allow distinction of gender, ethnicity and age category. System will provide recorded images of sufficient quality to be used as court evidence in Canada.

7.10.4.2(2) Cameras will not be placed or reviewed for the purpose of observing work performance of employees.

7.10.4.3 Viewing monitor will have a visible range from 200mm to 450mm, depending on location and application.

7.10.4.3(1) Provide encoding/decoding capability to support 2 way (video and control) communications with any and all CCTV camera, individually and/or in predetermined clusters via the security Ethernet infrastructure.

7.10.4.3(2) Provide CCTV system video monitors for department staff to locally monitor cameras associated with the general activity outside the main entrance to the area and adjoining waiting areas.

7.10.4.3(3) Provide digital PC based video recorder (network video recorder) complete with software that controls all parameters of each individual camera, pan tilt zoom functionality, frame by frame recording, pre and post alarm recording, motion detection, sequence switching, multiplexing, adjustable frame speeds, and will record all cameras 24-hours per day, 7 days a week in real time (30 frames per second). All cameras will

be IP addressable. At a minimum, the system will include super-dynamic digital cameras.

7.10.4.3(4) Provide video storage capacity for minimum of 30 days at 30 frames per second, minimum D1 resolution. Provide NVR's, workstations and connect to network. System will have the ability to choose recording rates and quality for each camera, have activity detection and incorporate smart search capabilities.

7.10.4.3(5) CCTV system will integrate with access control, duress panic stations, intercoms and intrusion detection to allow for higher recording rates during alarm conditions.

7.10.4.3(6) CCTV display and review system will be network based application allowing for authorized users to remotely view, control and manage all aspects of the CCTV system across the network. System will have network and web access for remote monitoring, using predefined user authentification.

7.10.4.3(7) Display and review for all the cameras will be accessible through dual screen workstations located in the security office/kiosk . Provide CCTV workstations with all required operating and application software, monitors, keyboard, mouse with interconnection to security system network.

7.10.4.3(8) Provide color high-resolution, high sensitivity (day/night) fixed smoke dome type with an auto iris fixed dome cameras with auto-iris lens operation.

7.10.4.3(9) Mounting will be unobtrusive, matching colour with hidden cabling. Fixed cameras will be vandal resistant wall mounted and / or mounted at protective locations and heights.

7.10.4.3(10) PTZ color dome cameras will be high resolution, high-speed with low light day/night operation capability with 360 degrees rotation in less than 3 seconds. Domes will mount on poles, parapets and walls located to provide optimum unobstructed viewing of the area under surveillance. PTZ cameras will have the ability to mask portions of view through software and remote programming.

7.10.4.3(11) Outdoor cameras will be complete with weatherproof housing and internal heater/ defroster/blower/wiper as required for suitable operation under varying environmental conditions.

7.10.4.3(12) Cameras will not be set up in private areas such as client rooms, treatment rooms or clinical areas (unless specifically identified for use by clinical department staff), locker rooms or washrooms. Cameras will not be placed or reviewed for the purpose of observing work performance of employees.

PART 8. SITE AND INFRASTRUCTURE SUBGROUP SPECIFICATIONS

8.1 Earthwork (Division 31)

8.1.1 Clearing and Grubbing

8.1.1.1 Performance Criteria

8.1.1.1(1) Prevent damage to trees, benchmarks, existing curbs and subsurface utilities to remain. Remove cleared and grubbed materials off-site to disposal area as directed by Authority.

8.1.1.1(2) Remove cleared and grubbed materials off-site to disposal area as per City of Kelowna Soil Deposit Bylaw requirements.

8.2 Exterior Improvements Division (32)

8.2.1 Aggregate Base Courses

8.2.1.1 Basic Requirements

8.2.1.1(1) Granular sub-base will be utilized for stability of surface treatment through freeze thaw cycles and for its ability to store rainwater

8.2.1.2 Performance Criteria

8.2.1.2(1) The depth of aggregate base courses will be designed to exceed limits defined by regional average freeze thaw cycles averaged over a twenty year period.

8.2.2 Asphalt Paving

8.2.2.1 Basic Requirements

8.2.2.1(1) Asphalt paving will be utilized in areas where vehicle traffic and snow clearing equipment require a smooth surface for travel.

8.2.2.2 Performance Criteria

8.2.2.2(1) Asphalt mix will be designed for use in climatic conditions found on Project Site.

8.2.3 Unit Paving on Sand Bed

8.2.3.1 Basic Requirements

8.2.3.1(1) Unit pavers will be utilized in areas where a high level of finish is desired and/or a requirement for removal and replacement of paved surface in the future.

8.2.4 Concrete Paving

8.2.4.1 Basic Requirements

8.2.4.1(1) Concrete paving will be utilized in areas that require firm, long lasting hard surfaces for activities such as pedestrian pathways, loading docks and building entrances.

8.2.5 Fences and Gates

8.2.5.1 Performance Criteria

8.2.5.1(1) Fence materials will be designed and fabricated to guarantee a minimum 5-year lifetime.

8.2.5.1(2) Fences will be installed as per manufacturer's directions, or custom designed with footings to withstand freeze thaw cycles in the region averaged over the last twenty years.

8.2.6 Exterior Site Furnishings

8.2.6.1 Basic Requirements

8.2.6.1(1) Site Furnishings will consist of benches, garbage containers, tables and chairs, and umbrellas, to provide seating for a minimum of eight (8) people in any outdoor area adjacent to the CSB for staff, clients and visitors. Products will be selected on the basis of safety, comfort, design and materials that relate to the building architecture and landscape design, durability and required maintenance.

8.2.6.2 Performance Criteria

8.2.6.2(1) Products will be selected for their suitability and durability for the Okanagan climate.

8.2.7 Growing Medium

8.2.7.1 Basic Requirements

8.2.7.1(1) Growing medium will be a mixture of mineral particulates, micro organisms and organic matter which will provide a suitable medium for supporting plant growth.

8.2.8 Sodding

8.2.8.1 Basic requirements

8.2.8.1(1) Sod will be located in areas near building entrances, and outdoor patio spaces to provide a usable surface for staff breaks, visiting, passive recreation and occupational therapy.

8.2.8.2 Performance criteria

8.2.8.2(1) Number One Turf Grass Nursery Sod that has been sown and cultivated in nursery fields as turf grass crop in climatic zone comparable to the Site of the work.

8.2.9 Trees, Shrubs and Ground Cover Planting

8.2.9.1 Basic requirements

8.2.9.1(1) Planting will support the landscape design by reinforcing spatial relationships and way-finding. The plant selection and placement will address micro-climates surrounding the CSB, and will mitigate heating and cooling loads as well as providing a comfortable exterior environment for clients, staff and visitors. The planting design will respond to program requirements for therapeutic outdoor spaces.

8.2.9.2 Performance criteria

8.2.9.2(1) Planting design will emphasize species indicative of the Okanagan Climatic Zone.

8.2.9.2(2) Trees, shrubs and ground covers will be selected and placed to mitigate temperature fluctuations and winds.

8.2.9.2(3) Trees, shrubs and ground covers will be selected from species and varieties that are either indigenous or adapted to the region.

8.2.9.2(4) Plants will comply with the current edition of the BC Landscape Standard, published by the BC Society of Landscape Architects and the BC Landscape and Nursery Association.

8.2.9.2(5) Plant material will be grown in Zone 2B in accordance with Plant Hardiness Zones in Canada.

8.3 Utilities (Division 33)

The Utility works must service the CSB and the expected land use with a reliable infrastructure that must be maintainable without disrupting the effective operation of the hospital and related land uses. Materials will conform to the City of Kelowna Approved Products List.

8.3.1 Manholes and Catch Basins

8.3.1.1 Basic requirements

8.3.1.1(1) Section Includes

8.3.1.1(1)(a) Monolithic concrete manholes with transition to lid frame, covers, anchorage, and accessories.

8.3.1.1(1)(b) Modular precast concrete manhole sections with tongue and groove joints with masonry transition to lid frame, covers, anchorage, and accessories.

8.3.1.2 Performance criteria

8.3.1.2(1) Work of this section will be carried out in accordance with the Master Municipal Construction Document (MMCD) Latest Edition.

8.3.2 Site Water Utility Distribution Piping

8.3.2.1 Basic requirements

8.3.2.1(1) Section Includes

8.3.2.1(1)(a) Pipe and fittings for Site water line including domestic water line and fire water line.

8.3.2.1(1)(b) Valves, fire hydrants and domestic water hydrants.

8.3.2.2 Performance criteria

8.3.2.2(1) Work of this section will be carried out in accordance with the Master Municipal Construction Document (MMCD) Latest Edition.

8.3.3 Site Sanitary Sewerage Piping

8.3.3.1 Basic requirements

8.3.3.1(1) Section includes

8.3.3.1(1)(a) Sanitary sewerage drainage piping, fittings, accessories, and bedding.

8.3.3.1(1)(b) Connection of building sanitary drainage system to municipal sewers.

8.3.3.1(1)(c) Clean out access.

8.3.3.2 Performance criteria

8.3.3.2(1) Work of this section will be carried out in accordance with the Master Municipal Construction Document (MMCD) Latest Edition.

8.3.4 Storm Sewer Water Drains

8.3.4.1 Basic requirements

8.3.4.1(1) Section includes

8.3.4.1(1)(a) Site storm sewerage drainage piping, fittings and accessories, and bedding.

8.3.4.1(1)(b) Connection of drainage system and stormwater retention facility.

8.3.4.1(1)(c) Catch basins, plant area drains, paved area drainage, and Site surface drainage.

8.3.4.2 Performance Criteria

8.3.4.2(1) Work of this section will be carried out in accordance with the Master Municipal Construction Document (MMCD) Latest Edition.

8.3.4.2(2) Design the onsite storm water retention to hold storm runoff in accordance with rainfall predicted by the BC Building Code but at a minimum, the amount of retained water will be not less than that shown in the indicative design prepared by the Authority unless it can be demonstrated that other site features or strategies will account for the full volume.

8.3.5 Foundation Drainage

8.3.5.1 Basic requirements

8.3.5.1(1) Section includes

8.3.5.1(1)(a) Building perimeter, retaining wall and under slab on fill weep drainage system.

8.3.5.1(1)(b) Filter aggregate, fabric and bedding.

8.3.5.1(2) Pipe materials will be

8.3.5.1(2)(a) Polyvinyl Chloride pipe: to ASTM D2729, with required fittings or;

8.3.5.1(2)(b) Concrete pipe: to ASTM C412, with required fittings.

8.3.5.1(3) Accessories will be

8.3.5.1(3)(a) Pipe coupling: solid.

8.3.5.1(3)(b) Joint cover: No. 15 or 30 asphalt saturated roofing felt or polyethylene.

8.3.5.1(3)(c) Filter Fabric: Water pervious type, black polyolefin or polyester.

8.3.5.2 Performance criteria

8.3.5.2(1) Foundation drainage will carry all sub-surface ground water away from footings and foundation walls and into the onsite storm drainage system.

8.3.5.2(2) Installation will meet the requirements of the B.C. Building Code, and all applicable municipal codes and bylaws.

8.3.6 Natural Gas Site Piping

8.3.6.1 Basic requirements

8.3.6.1(1) Section includes

8.3.6.1(1)(a) Pipe and fittings for Site utility natural and propane gas distribution.

8.3.6.1(1)(b) Propane storage tanks.

8.3.6.1(2) Quality Requirements

8.3.6.1(2)(a) ANSI B31.2 Fuel Gas Piping

8.3.6.1(2)(b) NFPA 54 National Fuel Gas Code

8.3.6.1(2)(c) NFPA 58 Liquefied Petroleum Gas Code

8.3.6.2 Performance Criteria

8.3.6.2(1) Perform work in accordance with the requirements of the gas transmission utility, and all local governing codes and bylaws.

8.3.6.2(2) Welding Materials and procedures: Conform to ASME Boiler and Pressure Vessel Code and applicable provincial regulations.

8.3.6.2(3) Welders Certification: In accordance with ASME SEC IX.

8.3.6.2(4) Conform to NFPA 54, NFPA 58, ANSI B31.2, ANSI B31.8.

8.4 Transportation (Division 34) – NOT USED

APPENDIX 1A: ENERGY MODEL

Basic Requirements:

- The Project will be designed to achieve minimum six (6) points for Credit EAc1: Optimize Energy Performance.
- Compliance will be demonstrated through whole building energy simulation using one of the eligible energy modelling software.
- The building energy performance will be compared to either of the two following building standards: MNECB/CBIP or ASHRAE/IESNA 90.1-1999.

Performance Criteria:

- A single energy modelling software will be used at all stages of design and certification process.
- Additional supplementary software tools such as Retscreen can be used in conjunction with one of the eligible softwares.
- Eligible energy modelling software shall be EE4.
- It is the Authority's intent that the Proponents provide a summary of their building's performance, as determined by the energy model, using the LEED NC v1 letter template for energy and atmosphere credit 1. This template provides a breakdown of the building's energy performance by end use and also identifies the non-regulated loads. The energy model is to include a non-regulated plug load as per the default assumptions detailed in Table 4.3.2B, pages 4-8 of the National Research Council – Performance Compliance for Buildings.
- As per LEED Canada NC Reference guide (page 209) other non-regulated plug loads should be included in the simulation model on an hourly basis to better predict the building internal gains and their interactions with the building systems. The energy use for non-regulated process loads should be removed from the proposed and reference buildings for the purposes of calculating percentage energy savings and percentage cost of energy savings. The magnitude of the annual energy use associated with non-regulated loads is to be the same for the proposed and reference buildings.
- The energy management plan will be developed using the results of the energy model. Non-regulated loads are to be identified and included in the building energy target. The magnitude of the non-regulated process loads will be determined through the building energy monitoring system and the measured results will be used to calibrate the energy model. Discrepancies between the calibrated energy model and the measured building performance will be explained or resolved as part of the continuing energy management plan for the building.

APPENDIX 1B: ELECTRICAL

Communication Systems Responsibility Matrix

Mandatory Communications Requirements:

All rooms except washrooms, vestibules, and housekeeping rooms: A minimum of one (1) data outlet and one (1) voice outlet. Data and voice outlets will be provided for all equipment requiring access to those services.

Ceiling spaces: provide sufficient cable system drops for wireless network access points, information display systems and other ceiling mounted digital devices.

Lobby area: provide cable for all public phones, minimum one (1) per lobby area.

Meeting rooms, group rooms, conference rooms: Two (2) data outlets for every five seating positions.

Laboratory Benches: Two data (2) outlets for 1.2 meters of bench.

Every data, voice and video outlet that is connected to end use equipment will be connected to network equipment plus 25% spare.

APPENDIX 1C: ELECTRICAL

Receptacle Requirements

Mandatory Receptacle Requirements:

Laboratory benches: Two (2) duplex receptacles (one circuited from normal power and one circuited from emergency power) for 1.2 meters of bench.

One-person offices: Three (3) duplex receptacles.

Multiple person offices: Two (2) duplex receptacles at each desk or workstation plus one duplex receptacle at the wall for each 3 meters of linear wall.

Meeting rooms, group rooms, conference rooms: One (1) duplex receptacle for 2 meters of linear wall and a minimum of one (1) duplex receptacle over each counter.

Defined function areas such as laboratories: Sufficient duplex receptacles located to meet the identified program requirements, plus receptacles located to facilitate regular maintenance and cleaning.

In service rooms, housekeeping closets, small storage rooms: One (1) duplex receptacle for each 3 meters of linear wall. (Minimum one (1) duplex receptacle). Storage rooms for equipment will have one (1) duplex receptacle located each meter of wall length.

In all other areas, hallways, common areas, multi-purpose rooms: One (1) duplex receptacle for each 15 meters of linear wall.

Building exterior: One (1) duplex receptacle fed from GFI breakers at 50 meter intervals along the exterior for maintenance.

Cleaning: All corridors (every 15 meters), stairwells, washrooms, locker rooms, rooms larger than 15sm, autopsy, and laboratories will have sufficient duplex receptacles to meet cleaning requirements.

APPENDIX 1D: SOUND TRANSMISSION RATINGS

Adjacency between spaces	**STC[1] Class - Walls**	**STC[1] Class - Floors**
Between client rooms	45	50
Between exam rooms	45	50
Between client rooms and public spaces i.e. lobby, staff room, activity room (excludes corridor serving exam room)	45	50
Between exam rooms and adjacent corridor	45	50
Between exam rooms and service areas i.e. elevator and elevator machine room, mechanical rooms on the same floor or above client rooms, offices, care stations	50	50
Between toilet rooms and public space	45	-
Between exam rooms and conference rooms	50	-
Between conference rooms and public space	45	-
Between exam rooms and staff lounges	45	-
Between public space and staff lounges	40	-

The above noted STC ratings are minimum requirements for the specified separations.

SCHEDULE 2

REVIEW PROCEDURE

1. SUBMITTAL SCHEDULE

1.1 The parties agree that the preliminary schedule for Submittals (the "Submittal Schedule") is attached as Schedule 7 – Submittal Schedule. The Submittal Schedule may be amended by agreement of the parties in accordance with the terms of this Section 1. Any amendment to the Submittal Schedule will provide for a progressive and orderly flow of Submittals from the Design-Builder to the Authority as appropriate to allow sufficient time for review of each Submittal by the Authority, taking into account both the resources necessary to be available to the Authority to conduct such review and any user group consultations.

1.2 Unless a longer period is required by this Agreement or is otherwise reasonably required by the Authority, the Submittal Schedule will allow a minimum of:

(a) 10 Business Days for review of Submittals submitted in relation to schematic design referred to in Section 17.2(a), or

(b) 7 Business Days for other Submittals,

from the date of receipt for review of and response to each Submittal, provided that if the Design-Builder has made major changes to the grouping and volume of Submittals, such period of time will be adjusted, acting reasonably, taking into account the factors set forth in this Section 1.

1.3 The Design-Builder will in scheduling Submittals and in the performance of the Design and the Construction, allow adequate time prior to performing the Design and the Construction that are the subject of the Submittals, for review of the Submittals and for the Design-Builder to make changes to the Submittals, the Design and the Construction that may be required if comments are received on the Submittals.

1.4 If the Submittal Schedule indicates that a large number of Submittals will be made at one time, the Authority may, acting reasonably, request a longer period for review or a staggering of the Submittals, and the Design-Builder will revise the Submittal Schedule accordingly, taking into account both the availability of resources required by the Authority to conduct such review and whether delay in the review of the subject matter of the Submittal will have a material impact on the Design-Builder's ability to progress future anticipated Submittals and the Design or Construction in accordance with the Time Schedule.

1.5 The Design-Builder will submit the current Submittal Schedule, including amendments, to the Authority on a monthly basis until the Substantial Completion Date.

1.6 All amended Submittal Schedules will be required to meet all the requirements of this Section 1.

1.7 The Design-Builder will submit all Submittals to the Authority in accordance with the current amended Submittal Schedule.

1.8 The Design-Builder will bear the risk of delays and additional costs caused as a result of the late submission of Submittals to the Authority, by Submittals which are rejected and required to be re-submitted in accordance with Section 3.5 of this Schedule 2 – Review Procedure, or by changes in the Design and Construction required as a result of comments made in accordance with Sections Section 3.4 or 3.5 of this Schedule 2 – Review Procedure.

2. GENERAL REQUIREMENTS FOR SUBMITTALS

2.1 Unless otherwise specified by this Agreement or by the Authority, the Design-Builder will issue 5 printed copies of all Submittals to the Authority, together with an electronic copy in a format agreed by the parties acting reasonably.

2.2 The Design-Builder will compile and maintain a register of the date, contents and status of the submission of all Submittals, including the date of receipt and content of all returned Submittals and comments thereon.

2.3 All Submittals will be in English.

2.4 All Submittals required by this Agreement or by applicable Law to be signed or sealed by persons with professional designations (including where applicable by registered professional architects or engineers) will be so signed and, where applicable, sealed.

2.5 All Submittals will include all documents to be reviewed and will clearly identify the purpose of the Submittal, the Design-Builder's proposed course of action relating to the Submittal and the Design and the Construction that are the subject of the Submittal.

2.6 All Submittals will refer to the relevant provisions of Schedule 1 – Statement of Requirements and to any matter that has previously been subject to review.

2.7 All Submittals will be clearly identified as a Submittal and will be delivered with appropriate covering documentation, which will include a list of all attached Submittals and for each Submittal: the document number(s) or drawing number(s); revision numbers (if applicable); document or drawing title(s); name of entity that prepared the Submittal; the Submittal history showing date and delivery information and/or log number of all previous submissions of that Submittal; identification of any previous Submittal superseded by the current Submittal; and a description of the portions of the Submittal that are the subject of review.

3. COMMENTS

3.1 The Authority will review and respond to each Submittal in accordance with the applicable time periods for the Submittal.

3.2 The Authority will return Submittals to the Design-Builder and assign one of the following 3 comments:

(a) "REVIEWED";

(b) "CORRECT DEFICIENCIES"; or

(c) "REJECTED".

3.3 The comment "REVIEWED" will be assigned to those Submittals that, in the opinion of the Authority, acting reasonably, conform to the requirements of this Agreement. The Design-Builder will comply with and implement such Submittals.

3.4 The comment "CORRECT DEFICIENCIES" will be assigned to those Submittals that, in the opinion of the Authority, acting reasonably, generally conform to the requirements of this Agreement, but in which minor deficiencies have been found and identified by the Authority's review. The Design-Builder will to the extent necessary correct these Submittals and provide a copy of such Submittals to the Authority before the Design-Builder implements the portions of such Submittals that have received comments, but may proceed on the portions of such

Submittals that have not received comments. The Design-Builder will comply with and implement such corrected Submittals. If at any time it is discovered that the Design-Builder has not corrected the deficiencies on Submittals that were correctly stamped "CORRECT DEFICIENCIES", then the Design-Builder will be required to modify the Submittals and the relevant Design and the Construction as required to correct the deficiencies and the Design-Builder may be required, at the Authority's discretion, acting reasonably, to resubmit relevant Submittals.

3.5 The comment "REJECTED" will be assigned to those Submittals that, in the opinion of the Authority, acting reasonably, contain material deficiencies or do not conform with the requirements of this Agreement, including this Schedule 2 – Review Procedure. The Design-Builder will correct and re-submit these Submittals within 10 Business Days after the comment has been provided to the Design-Builder. The Authority will then review such corrected Submittals and assign a comment to the corrected Submittal. The Submittals will be corrected, revised and resubmitted as often as may be required to obtain a comment that permits the Design-Builder to proceed. Except with the written consent of the Authority, the Design-Builder will not proceed with any Construction to which such Submittals receiving the comment "REJECTED" relate until the Design-Builder obtains a comment that permits the Design-Builder to proceed.

3.6 The Authority may request additional time for the review of any Submittal, including where the Submittal is voluminous or requires extensive review by representatives (including consultants) of the Authority, and the Design-Builder will extend such time for any reasonable requests by the Authority.

3.7 If the Authority does not respond to a Submittal within the applicable time periods for the Submittal, the Submittal will be deemed "REVIEWED" and the Design-Builder may proceed with and implement the Design and the Construction on the basis set forth in the applicable Submittal without any further action or documentation required.

3.8 Where the Authority issues the comment "CORRECT DEFICIENCIES" or "REJECTED", the Authority will provide reasons for the comment, referencing the particulars of the Section(s) of the Agreement (including the Statement of Requirements) that the Submittal fails to satisfy, and if requested by the Design-Builder, the Authority will meet with the Design-Builder to discuss the reasons for the comment.

3.9 For the purpose of facilitating and expediting the review and correction of Submittals, the Authority's Representative and the Design-Builder's Representative will meet as may be mutually agreed to discuss and review any outstanding Submittals and any comments thereon.

3.10 In lieu of returning a Submittal, the Authority may by letter notify the Design-Builder of the comment assigned to the Submittal and if such comment is "CORRECT DEFICIENCIES" or "REJECTED" the letter will contain comments in sufficient detail for the Design-Builder to identify the correction sought.

4. DISPUTES

4.1 If the Design-Builder disputes any comment issued by the Authority in respect of a Submittal, including on the basis that the comment is or would result in a Change, the Design-Builder will promptly notify the Authority of the details of such Dispute and will submit the reasons why the Design-Builder believes a different comment should be assigned, together with appropriate supporting documentation. The Authority will review the Submittal, the reasons and supporting documentation and within 7 Business Days after receipt thereof will either confirm the original comment or notify the Design-Builder of a revised comment. Nothing in this Section 4 will limit either party's right to refer a Dispute for resolution in the first instance to the Authority's Consultant under Section 61 (Dispute Resolution).

5. EFFECT OF REVIEW

5.1 Any review of and comment by the Authority on any Submittals are for general conformity to the obligations and requirements of this Agreement, and any such review and comment will not relieve the Design-Builder of the risk and responsibility for the Design and the Construction and for meeting all of its obligations and requirements of this Agreement, and will not create any new or additional obligations or liabilities for the Authority. Without limiting the generality of the foregoing any and all errors or omissions in Submittals or of any review and comment will not exclude or limit the Design-Builder's obligations or liabilities in respect of the Design or the Construction under this Agreement or exclude or limit the Authority's rights in respect of the Design and the Construction under this Agreement.

6. SUBMITTAL EXPLANATION

6.1 At any time, the Authority may, acting reasonably, require the Design-Builder, including the Design-Builder's Consultant, Subcontractors and any other relevant personnel, at no additional cost to the Authority, to explain to the Authority and the Authority's advisors the intent of the Design-Builder's Submittals, including in relation to any design and any associated documentation and as to its satisfaction of the Statement of Requirements.

7. REVISIONS

7.1 The Design-Builder will ensure that Submittals keep the same, unique reference number throughout the review process, and that all subsequent revisions of the same Submittal are identified by a sequential revision number. Correspondence related to such Submittal will reference the reference number and revision number.

7.2 Re-submittals will clearly show all revisions from the previous Submittal. Bound documents, including reports and manuals, will contain a preface that clearly states how revisions are marked and the previous revision number against which the revisions have been marked. A consistent format for mark-ups of documents will be used (e.g. deletions struck out and additions underscored). Revised portions of drawings will be clearly marked (with appropriate means to visually distinguish between the parts of the drawing that are revised and the parts that are not revised) and the revision number and description of the revision will be included on the drawing.

7.3 All revisions on print media will be initialled by hand by the individual designer, design checker and, where applicable, by the drafter and the drafting checker and will identify the persons who initialled the Submittal. Electronic versions of the Submittal will identify the persons who initialled the revisions to the printed version of the Submittal.

7.4 The Design-Builder will keep all Drawings and Specifications current. If any Drawings and Specifications are revised as part of a Submittal, all other Drawings and Specifications relying on or based on those Drawings and Specifications will also be revised accordingly. All such revised Drawings and Specifications will also be submitted with the Submittal to which it relates.

8. AUDIT BY THE AUTHORITY

8.1 Without limiting any other right under the Agreement, the Authority will have the right to audit all Submittals, including comparing all Submittals to previous Submittals.

8.2 If during an audit or at any other time it is discovered by the Authority or the Design-Builder that any Submittals were not correctly implemented, the Design-Builder will at its sole cost immediately take all necessary steps to correct and modify the applicable Submittals and the Design and Construction to which they relate and will advise the Authority of all such corrections and modifications.

SCHEDULE 3

INSURANCE CONDITIONS

Without restricting the generality of the indemnification provisions in Section 56 (Indemnification), insurance and coverage will be arranged and paid for as follows:

1. WRAP-UP LIABILITY INSURANCE

1.1 The Authority will provide, maintain and pay for Wrap-up Liability Insurance with a limit of [redacted], inclusive per occurrence, [redacted] general aggregate for bodily injury, death, and damage to property including loss of use thereof, product/completed operations liability with a limit of [redacted] aggregate.

1.2 This insurance will cover the Authority, Design-Builder & Subcontractors, Architects, Engineers, Consultants and anyone employed by them to perform a part or parts of the Work (includes both Construction and Design services, but excludes all professional services, under this Agreement) but excluding suppliers whose only function is to supply and/or transport products to the project site or security protection persons or organizations providing site protection on or at the insured project. The insurance does not extend to any activities, works, jobs or undertakings of the insureds other than those directly related to the Work of this Agreement.

1.3 The insurance will preclude subrogation claims by the insurer against anyone insured hereunder.

1.4 The insurance will include coverage for:

(a) Products or Completed Operations Liability;

(b) Blanket Contractual Liability;

(c) Cross Liability;

(d) Contingent Employer's Liability;

(e) Personal Injury Liability;

(f) Shoring, Blasting, Excavating, Underpinning, Demolition, Piledriving and Caisson Work, Work Below Ground Surface, Tunneling and Grading, as applicable;

(g) Liability with respect to Non-Owned Licensed Vehicles [redacted];

(h) Broad Form Property Damage;

(i) Broad Form Completed Operations;

(j) Limited Pollution Liability [redacted]

(k) Employees as Additional Insureds;

(l) Broad Form Tenants Legal Liability [redacted];

(m) Operation of Attached Machinery; and

(n) Forest Fire Fighting Expenses [redacted]

1.5 Any applicable deductibles will not exceed [redacted] except with respect to loss or damage arising from hot roofing operations where the deductible will not exceed [redacted]

1.6 This insurance will be maintained continuously from commencement of the Work until the Substantial Completion Date, plus with respect to completed operations cover a further period of [redacted]

2. PROFESSIONAL LIABILITY INSURANCE

2.1 The Design-Builder or the Design-Builder's Consultant during the term of this Agreement will provide and maintain continuously from the commencement of the Work, until 2 years after the Substantial Completion Date, the following insurance which will be placed with such company or companies and in such form and amounts and with such deductibles as may be acceptable to the Authority:

(a) Professional Errors and Omissions Liability Insurance protecting the Design-Builder or the Design-Builder's Consultant, sub-consultant(s) and their respective servant(s), agent(s) or employee(s) against any loss or damage arising out of the Design under this Agreement. Such insurance will be for the adequate amount acceptable to the Authority and will in any event be not less than:

(i) For construction valued at $0.00 to $2.5 million: [redacted] per claim;

(ii) For construction valued at $2.5 million to $7.5 million: [redacted] per claim;

(iii) For construction valued at $7.5 million to $15.0 million: [redacted] per claim;

(iv) For construction valued over $15.0 million to $30.0 million: [redacted] per claim; and

(v) For construction valued over $30.0 million to $75.0 million: [redacted] per claim.

The amount of insurance coverage to be carried by structural, mechanical, electrical and civil sub-consultants is to be based on the value of their scope of work. All other specialty Consultants to carry a minimum [redacted] Errors and Omissions Insurance despite the value of their scope of work.

2.2 If coverage is provided by the Design-Builder's Consultant, then such Professional Errors and Omissions Liability Insurance will not contain a "Design-Build" exclusion.

3. PROPERTY COVERAGE INSURANCE

3.1 The Authority will provide, maintain and pay for Course of Construction coverage, against "All Risks" of direct physical loss or damage including flood and earthquake, and will cover all materials, property, structures and equipment purchased for, entering into, or forming part of the Work whilst located anywhere within Canada and continental United States of America during construction, erection, installation and testing, but such coverage will not include coverage for Design-Builder's and Subcontractors' equipment of any description. Such coverage will be maintained until the Substantial Completion Date. There will be a deductible of [redacted] for each and every occurrence except for the peril of earthquake which will have a [redacted] (subject to minimum [redacted] deductible based upon the total project value insured. A 1 day waiting period for

each month of the project duration subject to a minimum waiting period of 30 days will apply with respect to soft costs.

3.2 The coverage will include as a protected entity, each Design-Builder, Subcontractor, Architect or Engineer who is engaged in the Project.

3.3 The coverage will contain a waiver of the Authority's rights of subrogation against all protected entities except where a loss is deemed to have been caused by or resulting from any error in design or any other professional error or omission, or manufacturers (not employees of the insured).

3.4 The Design-Builder will, at his own expense, take special precaution to prevent fires occurring in or about the Work and will observe, and comply with, all insurance policy warranties and all laws and regulations in force respecting fires.

4. AUTOMOBILE LIABILITY INSURANCE

4.1 The Design-Builder will provide, maintain and pay for, and require all Subcontractors to provide, maintain and pay for Automobile Liability Insurance in respect of all owned or leased vehicles, subject to limits of not less than [redacted] inclusive per occurrence. The insurance will be placed with such company or companies and in such form and deductibles as may be acceptable to Authority.

5. AIRCRAFT AND/OR WATERCRAFT LIABILITY INSURANCE

5.1 The Design-Builder will provide, maintain and pay for liability insurance with respect to owned or non-owned aircraft and watercraft if used directly or indirectly in the performance of the Work, subject to limits of not less than [redacted] inclusive per occurrence for bodily injury, death, and damage to property including loss of use thereof and including Aircraft Passenger Hazard where applicable. The insurance will name the Authority as an additional insured, include a cross liability clause, be endorsed to provide the Authority with 30 days' advance written notice of cancellation and be placed with such company or companies and in such form and deductibles as may be acceptable to Authority.

6. CONTRACTORS POLLUTION LIABILITY INSURANCE

6.1 When applicable, the Design-Builder (or Design-Builder's Subcontractors) will require all Subcontractors to provide, maintain and pay for:

(a) Contractors Pollution Liability insurance with limits no less than [redacted] per occurrence for bodily injury, death, and damage to property including loss of use thereof. Such insurance will include all operations associated with hazardous materials clean-up, removal and/or containment, transit and disposal; or

(b) Asbestos Abatement Liability coverage stated under the Design-Builder's or Subcontractor's Commercial General Liability insurance coverage with limits no less than [redacted] per occurrence for bodily injury, death, and damage to property including loss of use thereof. Such insurance will include all operations associated with hazardous materials clean-up, removal and/or containment, transit and disposal.

6.2 Any insurance required under this Section 6 must name the Authority as an additional insured, include a cross liability clause and be endorsed to provide the Authority with 30 days' advance written notice of cancellation. If any such insurance is provided on a claims-made basis and that insurance is cancelled or not renewed, such policy must provide a 24 month extended reporting period. The Design-Builder must cause all Subcontractors to provide to the Authority a Certificate

of Insurance confirming all policies and endorsements necessary to comply with the insurance requirements outlined herein, or upon request, a certified copy of the required insurance policy.

7. GENERAL

7.1 The description of the Authority arranged insurance described herein is provided on a summary basis only and is not a statement of the actual policy terms and conditions. The Authority does not represent or warrant that the Authority arranged insurance contains insurance for any and all losses. It is the Design-Builder's responsibility to ascertain the exact nature and extent of coverage provided by the Authority arranged insurance, to review all policies pertaining thereto and to obtain any other insurance that it may be prudent for the Design-Builder to obtain.

7.2 The Design-Builder will also provide, maintain and pay for any other insurance that the Design-Builder is required by law to carry, or which the Design-Builder considers necessary.

7.3 Unless specified otherwise, the duration of each coverage and insurance policy will be from the date of commencement of the Work until the date of final certificate for payment.

7.4 The Authority will, upon request, provide the Design-Builder with proof of insurance of those coverages and insurances required to be provided by the Authority prior to commencement of the Work and subsequent certified copy of policies within a reasonable time period thereafter.

7.5 The Design-Builder and/or its Subcontractors, Design-Builder's Consultants and sub-consultants as may be applicable, will be responsible for any deductible amounts under the policies of coverage and insurance except for perils of flood and earthquake.

7.6 The Design-Builder will provide the Authority with proof of insurance for those insurances required to be provided by the Design-Builder (or Design-Builder's Consultant) prior to the commencement of the Work in the form of a completed Certificate of Insurance and will also provide a certified copy of any required policies upon request.

7.7 The Authority will not be responsible for injury to the Design-Builder's employees or for loss or damage to the Design-Builder's or to the Design-Builder's employees' machinery, equipment, tools or supplies which may be temporarily used or stored in, on or about the premises during construction and which may, from time to time, or at the termination of this Agreement, be removed from the premises. The Design-Builder hereby waives all rights of recourse against the Authority or any other contractor with regard to damage to the Design-Builder's property.

SCHEDULE 4

EQUIPMENT

1. DEFINITIONS

1.1 In this Schedule:

(a) "Acceptance Protocol" has the meaning set out in Section 7.10 of this Schedule;

(b) "Category 1 Equipment" means the equipment described and listed as "Category 1" in the Equipment List (or similar equipment);

(c) "Category 2 Equipment" means the equipment described and listed as "Category 2" in the Equipment List (or similar equipment);

(d) "Category 3 Equipment" means the equipment described and listed as "Category 3" in the Equipment List (or similar equipment);

(e) "Category 4 Equipment" means the equipment described and listed as "Category 4" in the Equipment List (or similar equipment);

(f) "Category 5 Equipment" means the equipment described and listed as "Category 5" in the Equipment List (or similar equipment);

(g) "Commission" means to test and commission the equipment or system in accordance with any commissioning requirements set out in this Agreement, and applicable standards and good industry practice, including to ensure that the Equipment is operating in accordance with the manufacturer's requirements and specifications, and "Commissioned" and "Commissioning" have a corresponding meaning;

(h) "Deliver" means to deliver Equipment to the Facility, and "Delivered" and "Delivery" have corresponding meanings;

(i) "Equipment" means the Category 1 Equipment, the Category 2 Equipment, the Category 3 Equipment, the Category 4 Equipment and the Category 5 Equipment;

(j) "Equipment Committee" means the committee established pursuant to Section 7.7 of this Schedule;

(k) "Equipment Data Sheets" means the equipment data sheets set out in the Equipment List containing specifications for items of equipment on the Equipment List, as those data sheets may be updated in accordance with this Agreement;

(l) "Equipment List" means Appendix 4A [Equipment List] attached to this Schedule 4 – Equipment;

(m) "Equipment Logistics Schedule" has the meaning set out in Section 7.11 of this Schedule;

(n) "Install" means to install in the Facility, including making connections to necessary building services (including plumbing, heating, cooling, ventilation and electricity) and connections to necessary communication or network interfaces or devices, and "Installed" and "Installation" have corresponding meanings;

(o) "Receive" means the provision of equipment and staff to accept Delivery and provide an appropriate and secure staging and storage area to be used prior to Setup, and "Received" and "Receiving" have corresponding meanings;

(p) "Setup" includes:

(i) transportation and movement within the Facility from the Delivery or storage location to the final installation location;

(ii) placement in the final location within the Facility;

(iii) any necessary unwrapping, unpacking and assembly; and

(q) "Supply" means the management and completion of procurement processes, up to and including Delivery, for Equipment, including the payment to vendors, and "Supplied" has a corresponding meaning.

2. CATEGORY 1 EQUIPMENT (AUTHORITY SUPPLIED, DESIGN-BUILDER INSTALLED)

2.1 Responsibilities For Category 1 Equipment

The Authority intends to, but is not obligated to, Supply the Category 1 Equipment.

The Design-Builder will Receive, Setup, Install and Commission all Category 1 Equipment.

The Design-Builder will be responsible for notifying the Authority of any Category 1 Equipment that is Delivered damaged or short of the complete quantities on the weigh bill/bill of lading. Such discrepancy will be noted on the weigh bill/bill of lading provided to the shipper.

2.2 Timing of Delivery and Installation of Category 1 Equipment

The Design-Builder will:

(a) as early as practicable provide on the Equipment Logistics Schedule the dates by which each item of Category 1 Equipment must be Delivered, Installed and Commissioned so as not to delay the Design, the Construction, Substantial Completion or the Authority's use and occupation of the Facility; and

(b) as required from time to time until Substantial Completion, but no less than once per calendar month, update the information in Section 2.2(a) above so that at all times it is an accurate, reasonable and realistic representation of the Design-Builder's plans for the completion of the Design and Construction of the Facility.

The Authority will cause each item of Category 1 Equipment to be Delivered by the date specified by the Design-Builder under Section 2.2(a) above.

3. CATEGORY 2 EQUIPMENT (AUTHORITY SUPPLIED, AUTHORITY INSTALLED)

3.1 Responsibilities For Category 2 Equipment

The Authority intends to, but is not obligated to, Supply, Receive, Setup, Install and Commission the Category 2 Equipment.

3.2 **Timing of Delivery and Installation of Category 2 Equipment**

The Design-Builder will:

(a) as early as practicable:

(i) for each item of Category 2 Equipment, provide on the Equipment Logistics Schedule the earliest date when the Facility will be available to the Authority to Install such item, which date must, for all Category 2 Equipment and any required Setup or Installation equipment that will not fit through the constructed doorways and other physical constraints on access, be a reasonable period in advance of the construction of such doorways and other physical constraints on access; and

(ii) identify to the Authority the date by which each item of Category 2 Equipment must be Delivered, Installed and Commissioned so as not to delay the Design, the Construction, Substantial Completion or the Authority's use and occupation of the Facility; and

(b) as required from time to time until Substantial Completion, but no less than once per calendar month, update the information in Section 3.2(a) above so that at all times it is an accurate, reasonable and realistic representation of the Design-Builder's plans for the completion of the Design and Construction of the Facility.

The Authority will cause the relevant item of Category 2 Equipment the Authority wishes to have Installed in the Facility to be Delivered by the date specified by the Design-Builder under Section 3.2(a) above.

3.3 **Timing of Delivery and Installation of Category 2 Equipment**

Subject to Section 3.2(a)(i) above and unless otherwise noted on the Equipment List or the Equipment Logistics Schedule, no Category 2 Equipment will be Delivered prior to Substantial Completion. Delivery after Substantial Completion will not relieve the Design-Builder of its obligations under Section 14 (Equipment) to complete the Design and Construction to accommodate the Equipment in the Facility and the obligations under this Schedule.

4. CATEGORY 3 EQUIPMENT (DESIGN-BUILDER SUPPLIED, DESIGN-BUILDER INSTALLED)

4.1 **Responsibilities for Category 3 Equipment**

The Design-Builder will Supply, Deliver, Receive, Setup, Install and Commission all Category 3 Equipment.

4.2 **Standards for Equipment**

The Design-Builder will cause all Category 3 Equipment to be:

(a) new;

(b) of good quality and in a safe, serviceable and clean condition in accordance with the Equipment List;

(c) of the type specified in the Statement of Requirements, if applicable;

(d) in compliance with all Laws; and

(e) in compliance with all certifications or standards that would be reasonable for similar equipment in a similar application if Supplied and Installed by the Authority.

The Design-Builder will, as soon as practicable after receiving a request from the Authority, supply to the Authority evidence demonstrating its compliance with this Section 4.2.

4.3 **Warranties**

The Design-Builder will ensure that all manufacturer's and vendor's warranties for all Category 3 Equipment:

(a) commence no earlier than the date of first clinical use of the relevant item of Category 3 Equipment; and

(b) are in the Authority's name.

4.4 **Training**

The Design-Builder will include the Authority staff and other representatives to be notified and included in all stages of the Receiving, Setup, Installation and Commissioning to ensure there is a comprehensive overview of the Equipment, including its features, calibration and interfaces.

The Design-Builder will be knowledgeable on the proper use and maintenance of all Category 3 Equipment and will provide sufficient training and education of the Authority and persons designated by the Authority to enable proper use and maintenance of the Category 3 Equipment. The Design-Builder will not be responsible for providing the Authority with training and education in respect of Category 1 Equipment, Category 2 Equipment, Category 4 Equipment and Category 5 Equipment.

On or before the Substantial Completion Date, the Design-Builder will transfer and deliver to the Authority all guidance material and manuals relating to Category 3 Equipment items as produced and provided by the manufacturer or the vendor of such items.

5. CATEGORY 4 EQUIPMENT (AUTHORITY SUPPLIED, VENDOR INSTALLED)

5.1 **Responsibilities for Category 4 Equipment**

The Authority intends to, but is not obligated to, Supply and Receive the Category 4 Equipment and contract its Equipment vendor to Setup, Install and Commission the Equipment.

5.2 **Timing of Delivery and Installation of Category 4 Equipment**

The Design-Builder will:

(a) as early as practicable:

(i) for each item of Category 4 Equipment, provide on the Equipment Logistics Schedule the earliest date when the Facility will be available to the Authority for its Equipment vendor to Install such item, which date must, for all Category 4 Equipment and any required Setup or Installation equipment that will not fit through the constructed doorways and other physical constraints on access, be a reasonable period in advance of the construction of such doorways and other physical constraints on access;

(ii) identify to the Authority the date by which each item of Category 4 Equipment must be Delivered, Installed and Commissioned so as not to delay the Design,

the Construction, Substantial Completion or the Authority's use and occupation of the Facility; and

(b) as required from time to time until Substantial Completion, but no less than once per calendar month, update the information in Section 5.2(a) above so that at all times it is an accurate, reasonable and realistic representation of the Design-Builder's plans for the completion of the Design and Construction of the Facility.

5.3 The Authority will cause the relevant item of Category 4 Equipment to be Delivered by the date specified by the Design-Builder under Section 5.2(a) above.

5.4 **Timing of Delivery and Installation of Category 4 Equipment**

Subject to Section 5.2(a)(i) above and unless otherwise noted on the Equipment List or the Equipment Logistics Schedule, no Category 4 Equipment will be Delivered prior to Substantial Completion. Delivery after Substantial Completion will not relieve the Design-Builder of its obligations under Section 14 (Equipment) to complete the Design and Construction to accommodate the Equipment in the Facility and the obligations under this Schedule.

6. CATEGORY 5 EQUIPMENT (AUTHORITY RELOCATED)

6.1 **Responsibilities for Category 5 Equipment**

The Authority intends to, but is not obligated to, relocate the Category 5 Equipment from its existing location to the new Facility. The Authority may, at its discretion, Supply new Category 5 Equipment in lieu of relocating existing Category 5 Equipment and may designate it for purposes of this Schedule 4 – Equipment as Category 5 Equipment or alternatively as Category 1 Equipment, Category 2 Equipment, Category 3 Equipment or Category 4 Equipment. A change to the Design-Builder's obligations by a re-designation as Category 1 Equipment or Category 3 Equipment will be implemented as a Change.

6.2 **Timing of Delivery and Installation of Category 5 Equipment**

Unless otherwise noted on the Equipment List or the Equipment Logistics Schedule, no Category 5 Equipment will be Delivered prior to Substantial Completion. Delivery after Substantial Completion will not relieve the Design-Builder of its obligations under Section 14 (Equipment) to complete the Design and Construction to accommodate the Equipment in the Facility and the obligations under this Schedule.

7. GENERAL

7.1 **Integration of Equipment with Design of Facility**

The Design-Builder will ensure that all Equipment is integrated with the overall Design of the Facility and will include such Equipment as part of the development of Design under this Agreement. To the extent practicable, any required changes to the Design of the Facility as a result of changes to Equipment requirements will be resolved as part of the Design development process.

7.2 **Changes affecting Design or Construction**

If the Authority increases or decreases the quantities of Equipment, procures other items in substitution for those identified on the Equipment List or otherwise changes the items to be procured and there is an effect on the Design or Construction, such increase, decrease, procurement or change, and the effect thereof, will constitute a Change. The parties will endeavour to agree to an expedited Change process to deal with Equipment changes.

7.3 **Staging and Storage**

The Design-Builder will:

(a) provide a secure, dry space to accommodate staging and storage of Equipment;

(b) allow Authority representatives to access and work within the space;

(c) will ensure that the space is able to maintain a reasonable temperature to store and work in; and

(d) provide power to the space and will notify the Authority, in advance, of any power interruptions.

7.4 **Storage Costs**

The Authority will reimburse the Design-Builder for any incremental out of pocket storage costs for any item of Category 1 Equipment or Category 2 Equipment if such item is Delivered materially in advance of the earliest delivery date for such item as identified by the Design-Builder under Section 2.2(a), 3.2(a) or 5.2(a) of this Schedule in the Equipment Logistics Schedule.

Any storage costs incurred by the Design-Builder due to Equipment being Delivered by the delivery date as set out in the Equipment Logistics Schedule delivery date, but not ready for Setup, will be borne by the Design-Builder.

7.5 **Equipment Commissioning**

The Design-Builder will incorporate its Commissioning responsibilities under this Schedule into its commissioning activities for the Facility as contemplated in this Agreement.

All Category 1 and Category 3 Equipment must be Commissioned, and the Acceptance Protocol completed where applicable, prior to Substantial Completion.

7.6 **Addition of Additional Equipment or Replacement of Existing Equipment**

If the Authority identifies Equipment that is in addition to, or in replacement of certain items of, the Equipment, the Authority may in its discretion:

(a) elect to have the Design-Builder Supply, Deliver, Receive, Setup, Install and/or Commission such additional Equipment, in accordance with and subject to the procedures for Changes; or

(b) itself perform any of such activities.

7.7 **Equipment Committee**

The parties will establish an Equipment Committee composed of 2 (or any other number agreed between the parties) representatives of each party. The Equipment Committee will meet regularly (and not less than once per month) to review the status of, and to provide advice to the parties with respect to the Equipment Supply, Delivery, Receiving, Setup, Installation and Commissioning.

7.8 **Title**

The Design-Builder will cause the procurement arrangements for Category 3 Equipment to provide for a direct transfer of title to such Equipment from the vendors to the Authority. Title to Category 3 Equipment may be reserved by third party unpaid vendors until the earlier of the date of payment and the Substantial

Completion Date. The Design-Builder will pay all such unpaid vendors prior to the Substantial Completion Date for amounts owing on outstanding invoices.

7.9 **Damage and Loss**

Any damage or loss occurring prior to the Substantial Completion Date to:

(a) Category 1 Equipment or Category 3 Equipment after it has been Received; or

(b) Category 2 Equipment, Category 4 Equipment or Category 5 Equipment after it is Installed if it is installed prior to the Substantial Completion Date,

is the responsibility of the Design-Builder.

7.10 **Acceptance Protocol**

A document will be provided by the Design-Builder to the Authority for each Category 1 and Category 3 item that certifies all testing of the relevant Equipment has been completed to demonstrate that it has been installed in accordance with the manufacturer's requirements and is functioning in accordance with the specifications included in the relevant equipment purchase contract or purchase order (the "Acceptance Protocol").

Without limiting the Design-Builder's obligation to Commission the relevant Equipment, the Design-Builder will, to the Authority's reasonable satisfaction, complete all of the aspects of the Acceptance Protocol for each item of Category 1 and Category 3 Equipment.

If:

(a) prior to the Substantial Completion Date, the Design-Builder fails to complete any aspect of an Acceptance Protocol for any item of Category 1 or Category 3 Equipment; and

(b) the Authority waives the requirement for the Design-Builder to complete the relevant Acceptance Protocol prior to the Substantial Completion Date,

then subject to meeting the other requirements for Substantial Completion each such failure will be a deficiency and the Authority may make the withholding described in Section 42.4(b).

7.11 **Equipment Logistics Schedule**

The Design-Builder will propose a draft schedule (the "Equipment Logistics Schedule") within 30 days after the Effective Date and the parties will seek to finalize the Equipment Logistics Schedule, each party acting reasonably, within 90 days after the Effective Date, in accordance with the following principles:

(a) in order to take advantage of the most recent technological advances, final decisions on the selection of Equipment sensitive to or anticipated to be revised with newer technology prior to the Target Substantial Completion Date, together with any training or service requirements, will not be made by the Authority until as late as possible in the period for Construction;

(b) the Design-Builder will require adequate time to issue competitive bidding documents, receive proposals, clarify aspects of proposals, and Receive, Install and Commission the Equipment;

(c) the Authority will require the ability to take advantage of bulk or other purchase opportunities advantageous to it; and

(d) the Design-Builder will undertake the precautions set out by Equipment vendors to protect any Equipment that is required to be Delivered or Installed while construction is still underway; however, as an additional precaution some sensitive Equipment (such as medical devices and equipment with electronic components) may require Delivery, Installation and Commissioning dates that are late in the period for Construction.

The parties may modify the Equipment Logistics Schedule by mutual agreement, each acting reasonably.

APPENDIX 4A

EQUIPMENT LIST

INTERIOR HEALTH

OPINION OF POSSIBLE LABORATORY EQUIPMENT - FOR PLANNING PURPOSES ONLY

KELOWNA GENERAL HOSPITAL - new laboratory

A revised Indicative Equipment List, which includes additional equipment information such as equipment vender, dimensions, weight and power requirements where this information is known, is available in the Data Room.

The Authority makes no representation as to the accuracy or completeness of any aspect of this list. Design-Builders must confirm the accuracy of any and all information

Room Abreviation	Level	Room Number	Space	General Description		Item comments	site comments	Equipment Number	2010 to be relocated	2014 new equipment requirements	2014 Total Equipment	2024 new equipment requirements	2024 total equipment	Category 1 (Authority Supplied and Design Builder Installed)	Category 2 (Authority Supplied and Authority Installed)	Category 3 (Design-Builder Supplied and Design-Builder Installed)	Category 4 (Authority Supplied and Vendor Installed)	Category 5 (Authority Relocated)	Weight (lbs)	Mounting (c=counter, f=floor, w=wall)	width x depth x height (Inches)	volts	Amps	Phase	VA	Watts	Modeml Network\Telephone Line	Alarm	Dedicated Circuit	UPS	Emergency Circuit	Special Plug	BTU's	Vent to outside	Air	Gas - type	Vacuum	Floor Drain	Stand Pipe	Trap Primer	Sink (S=single bowl, C=cup)	DI Water - Type	Tap Water
Accessioning																																									
Acc	3	130 138 151	Accessioning	Printer		label Datamax I4208		470	3	1	4	2	6		x			3	45	c	18x13x13	120					x															
Acc	3	130 138	Accessioning	Refridgerator		28x25x67	GE	31	1		1		1					1		f	28x25x67	115						x			x									
Acc	3	130 138	Accessioning	container	sharp			66		1	1				x																								
Acc	3	130 138	Accessioning	dispenser	glove					1	1				x																								
Acc	3	130 138	Accessioning	tackboard				178		1	1				x																								
Acc	3	130 138	Accessioning	Computer terminal		19 screen		142	3		3	3	6					3		c	8x7x18	120					x													
Acc	3	151	Accessioning	container	garbage	large		79		2	2		2																										
Acc	2	151 130	Accessioning	Computer terminal		19 screen		142	2		2		2					2	33	c	7x18x18	120				365	x												
Acc	2	151	Accessioning	Printer			HP	160	1		1	1	2					1	45	c	18x13x13	120					x												
Acc	2	130 138	Accessioning	tackboard				178		2	2				x																								
Acc	3	130 138	Accessioning	whiteboard				185		2	2				x																								
Acc	3	130 138	Accessioning	dispenser	soap			113		2	2				x																								
Acc	3	130 138	Accessioning	dispenser	glove					2	2				x																								
Acc	2	130 138	Accessioning	container	sharp					2	2				x																								
Acc	2	138	Accessioning	container	garbage	large		79		1	1				x																								
Acc	2	130	Accessioning	Refridgerator		33x32x65	Fridgidaire	31	1		1		1					1		f	33x34x72	115	5					x			x		1,967						
Acc	3	130	Accessioning	Centrifuge	Refrigerated		Heraeus Megafuse 1.0R	280	1		1		1					1	115	c	19x22x17(34)	120	8			700						3,146							
Acc	3	130	Accessioning	container	garbage	large		79		2	2				x																								
Acc	2	130	Accessioning	Centrifuge			Heraeus Megafuse 1.0	280	1		1		1					1	230	c	27x22x15	120				1100						5,000							
Core lab																																									
Core lab	3	132 133 134 135	Corelab	Computer terminal		19 screen		142	12		12		12					12		c	8x7x18	120					x												
Core lab	3	132 133 134 135	Corelab	Computer terminal		19 screen		142	8		8	1	9					8		c	8x7x18	120					x												
Core lab	3	132 133 134 135	Corelab	Printer				160	2		2		2					2		c	16x17x12	120																	
Core lab	3	132 133 134 135	Corelab	Freezer			Frigidaire FRT18 DRH		2	1	3		3		x			2		f	33x34x72	115	5					x			x		1,967						
Core lab	3	132 133 134 135	Corelab	Fume hood			Fisher/Conserv-air			1	1		1			x																							
Core lab	3	132 133 134 135	Corelab	Rotator			Spectroderm		1		1		1					1		c																			
Core lab	3	132 133 134 135	Corelab	Immuno Analyzer			Bayer Advia Centaur		2		2		2					2	1310	f	73x42x52	208	8	1			x						10,000				x			II	
Core lab	3	132 133 134 135	Corelab	Computer terminal	for Immuno Analyzer		Bayer Advia Centaur		2		2		2					2		c	18x21x22	120					x												
Core lab	3	132 133 134 135	Corelab	printer	for Immuno Analyzer		Bayer/ Advia Centaur		2		2		2					2		c	21x16x12	120																	
Core lab	3	132 133 134 135	Corelab	Meter			4000L Blood Gas\Gem	211	1		1		1					1	66	c	28x20x18	120			250					x										
Core lab	3	132 133 134 135	Corelab	Osmometer			Advanced 3320		1		1		1					1	14	c	14x15x14	120				60														
Core lab	3	132 133 134 135	Corelab	Chemistry analyzer	Chemistry		Adeza TLiQ		1		1		1					1		c	12x10x6	120										30							
Core lab	3	132 133 134 135	Corelab	printer	for chemistry analyzer				1		1		1					1		c	9x4x7																		
Core lab	3	132 133 134 135	Corelab	UPS	Not on drawings		Powerware Pretige 9120		1		1		1					1		f	7x17x10	120																	
Core lab	3	132 133 134 135	Corelab	UPS	Not on drawings		Powerware 9125		1		1		1					1		f	7x17x10	120																	
Core lab	3	132 133 134 135	Corelab	Triage Meter Plus			Bios te		1		1		1					1	1.5	c	7x9x3	6V DC				15	x					25							

Core lab	3	132 133 134 135	Corelab	Hotplate stirrer			Corning PC320		1		1		1					1	14	c	14x15x14	120				60																	
Core lab	3	132 133 134 135	Corelab	pH meter			Corning PC125		1		1		1					1	10	c	10x8x13	115	0.1																				
Core lab	3	132 133 134 135	Corelab	Scale			Mars MS-6		1		1		1					1	5	c	7x6x2	9V DC																					
Core lab	3	132 133 134 135	Corelab	Refridgerator			Kenmore Series 21	31	1		1	1	2					1		f	32x32x68	115						x			x		3,700										
Core lab	3	132 133 134 135	Corelab	Centrifuge			Heraeus Megafuse	280	3		3	1	4					3	115	c	19x22x17(34)	120	8			700							3,146										
Core lab	3	132 133 134 135	Corelab	Centrifuge			Heraeus Megafuse 1.0	280	1		1		1					1	115	c	19x22x17(34)	120	8			700							3,146										
Core lab	3	132 133 134 135	Corelab	Refridgerator		triple door	Jordan FT-3-TR		1	1	2		2		x			1	1200	f	85x34x82(88)	115	12.00	1				x			x												
Core lab	3	132 133 134 135	Corelab	Refridgerator			Frigidaire FRT18	31	1	1	2		2		x			1	250	f	30x32x65	115						x			x		3,700										
Core lab	3	132 133 134 135	Corelab	Oven			Lab-Line		1		1		1					1	650	c	16x18x22	120																					
Core lab	3	132 133 134 135	Corelab	Microscope			Leitz	412	1		1		1					1	22	c	8x9x16	115	0.2																				
Core lab	3	132 133 134 135	Corelab	Chemistry analyzer	Chemistry		Ortho J&J Fusion 5.1			2	2	1	3		x																												
Core lab	3	132 133 134 135	Corelab	printer	for chemistry analyzer		tally and stand			2	2	1	3		x																												
Core lab	3	132 133 134 135	Corelab	Workstation	for chemistry analyzer		PC			2	2	1	3		x																												
Core lab	3	132 133 134 135	Corelab	Spectrophotometer			Pharmacia U trospec 3000		1		1		1					1	28	c	20x14x7	120	4																				
Core lab	3	132 133 134 135	Corelab	Power supply	Not on drawings		Powervar ABCE600		1		1		1					1	45	f	6x15x11	115	5.3									5-20P	1,360										
Core lab	3	132 133 134 135	Corelab	UPS	Not on drawings		Powerware 9120		1		1		1					1		f	7x17x10	120																					
Core lab	3	132 133 134 135	Corelab	Refridgerator			triple door Revco		1	1	2		2		x			1	650	f	86x35x76	115	15.00					x			x		5,900										
Core lab	3	132 133 134 135	Corelab	Heat block	Not on drawings		VWR 3 dri-bath DB16525		2		2		2					2	10	c	15x16x8	120																					
Core lab	3	132 133 134 135	Corelab	Sweat test	to include mon tor		Wescor Sweat-Chek 3100		1		1		1					1	3	c	4x8x7	115				10																	
Core lab	3	132 133 134 135	Corelab	Electrophoresis	Electrophoresis					1	1		1		x																												
Core lab	3	132 133 134 135	Corelab	Computer terminal	for Electrophoresis					1	1		1		x																												
Core lab	3	132 133 134 135	Corelab	printer	for Electrophoresis					1	1		1		x																												
Core lab	3	132 133 134 135	Corelab	UPS	for Electrophoresis					1	1		1		x																												
Core lab	3	132 133 134 135	Corelab	printer			HP	470	1		1		1					1	66	c	17x21x20	120					x																
Core lab	3	132 133 134 135	Corelab	printer			HP	160	1		1		1					1	66	c	17x21x20	120					x																
Core lab	3	132 133 134 135	Corelab	ANA analyzer	to include PC printer monitor					1	1		1		x																												
Core lab	3	132 133 134 135	Corelab	refridgerator		UC	LG GR-151R	31	1	2	3		3		x			1	66	f	19x22x33.5	120																					
Core lab	3	132 133 134 135	Corelab	Dishwasher			FlaskScrubber 44203-00	30		1	1		1			x																											
Core lab	3	132 133 134 135	Corelab	Freezer		-30	Revco UFP3030-A		1		1		1					1	580	f	34x36x78	115	16					x			x												
Core lab	3	132 133 134 135	Corelab	Cellovision		48x60	must use a more generic name.			1	1		1		x																												
Core lab	3	132 133 134 135	Corelab	Bioplex		48x72	must use a more generic name.			1	1		1		x																												
Core lab	3	132 133 134 135	Corelab	tackboard				178		1	1				x																												
Core lab	3	132 133 134 135	Corelab	whiteboard				185		1	1				x																												
Core lab	3	132 133 134 135	Corelab	Urine analyzer		New cat #AUW- UF 1000 is part of the AUW	Sysmex UF-100			1	1		1		x																												
Core lab	3	132 133 134 135	Corelab	samples	for Urine Analyzer					1	1		1		x																												
Core lab	3	132 133 134 135	Corelab	laser	for Urine Analyzer	amp ifer				1	1		1		x																												
Core lab	3	132 133 134 135	Corelab	laser	for Urine Analyzer	transformer				1	1		1		x																												

Core lab	3	132 133 134 13 5	Corelab	pneumatic un t	for Urine Analyzer					1	1		1		x																													
Core lab	3	132 133 134 13 5	Corelab	printer	for Urine Analyzer	report				1	1		1		x																													
Core lab	3	132 133 134 13 5	Corelab	Urine analyzer			Sysmex UF-100		1		1		1					1	150	c	24x24x28	220			500								2,362					x						
Core lab	3	132 133 134 13 5	Corelab	Centrifuge			IEC Centra CL2	280	1		1	1	2					1	24	c	13x16x11(24)	120				175							600											
Core lab	3	132 133 134 13 5	Corelab	Slide	Not on drawings		Bayer Hemo-Tek 2000		1		1		1					1		c	19x17x9(16)	120	0.75										100											
Core lab	3	132 133 134 13 5	Corelab	Hemotology analyzer			Beckman LH780		2		2		2					2	205	c	40x24x35	120	20	1		2080	x		x	x		x	5,500					x		x				
Core lab	3	132 133 134 13 5	Corelab	Power supply	for Hemotology Analyzer				2		2		2					2	125	f	14x24x24	120																						
Core lab	3	132 133 134 13 5	Corelab	monitor	for Hemotology Analyzer				2		2		2					2		c	17x7x18	120																						
Core lab	3	132 133 134 13 5	Corelab	printer	for Hemotology Analyzer				2		2		2					2	25	c	16x19x13	120																						
Core lab	3	132 133 134 13 5	Corelab	Centrifuge			Baxter Seperion Stat-60	280	1		1		1					1	12	c	11x16x7	110	1																					
Core lab	3	132 133 134 13 5	Corelab	Microscope			Nikon Eclipse 50I	412	1	1	2		2		x			1		c	10x14x21	120	0.8										100											
Core lab	3	132 133 134 13 5	Corelab	Centrifuge			Shandon Cytospin 3	280	1		1		1					1	40	c	16x23x12(22)	115	5		150								511											
Core lab	3	132 133 134 13 5	Corelab	Coagula ion analyzer		may need Meditech interface $3000	Beckman ACL TOP 500		2		2		2					2	312	c	43x35x29	120					x				x													
Core lab	3	132 133 134 13 5	Corelab	Computer terminal	for Coagula ion Analyzer	19 screen		142	2		2		2					2		c	8x7x18	120					x																	
Core lab	3	132 133 134 13 5	Corelab	Printer	for Coagula ion Analyzer			160	2		2		2					2	16	c	16x14x5	120									x													
Core lab	3	132 133 134 13 5	Corelab	UPS	for Coagula ion Analyzer				2		2		2					2		c	9x19x15	120									x													
Core lab	3	132 133 134 13 5	Corelab	Stainer	cytocentrifuge		Wescor Aerospray 7150		1		1		1					1	37	c	16x20x23	120				75																		
Core lab	3	132 133 134 13 5	Corelab	Waterbath	Not on drawings		VWR 1201		1		1		1					1	9	c	10x8x9	120				250							2,560											
Core lab	3	132 133 134 13 5	Corelab	Microscope			Zeis Axioskop 40		2	1	3		3		x			2		c	11x22x29	115																						
Core lab	3	132 133 134 13 5	Corelab	d ff counter	Not on drawings		Tek-Pro Tektally II		1		1		1					1																										
Core lab	3	132 133 134 13 5	Corelab	Statspin	Not on drawings				6		6		6					6																										
Core lab	3	132 133 134 13 5	Corelab	dispenser	soap					1	1			x																														
Core lab	3	132 133 134 13 5	Core lab	dispenser	paper towel					1	1			x																														
Core lab	3	132 133 134 13 5	Corelab	dispenser	glove					1	1				x																													
Core lab	3	132 133 134 13 5	Core lab	container	sharp					1	1				x																													
Core lab	3	132	Core lab	Sta ion	pneumatic		Swiss Log			1	1					x																												
Core lab	3	132 133 134 13 5	Core lab	container	garbage	large		79		8	8				x																													
Core lab	3	160	Transfusion Medicine	Refridgerator	Walk-in					1	1		1			x																												
Core lab	3	111	Corelab	workstation	office	A2		186		1	1		1				x																											
Core lab	3	111	Corelab	Computer terminal				142		1	1		1		x																													
Core lab	3	111	Corelab	chair	task	80% sitting		45		1	1		1				x																											
Core lab	3	111	Corelab	keyboard tray				151		1	1		1				x																											
Core lab	3	111	Corelab	container	garbage	sma l		78		1	1		1		x																													
Core lab	3	111	Corelab	container	recyc ing			78		1	1		1		x																													
Core lab	3	133	Core lab	cart						1	1		1		x																													
Core lab	3	133	Core lab	coat hooks						20	20		20			x																												
Core lab	3	131	Courier Drop-off/pick up								0		0																															
Core lab	3	128	Workstation IATRICS	workstation	office	A2		186		1	1		1				x																											
Core lab	3	128	Workstation IATRICS	Computer terminal				142		1	1		1		x																													
Core lab	3	128	Workstation IATRICS	chair	task	80% sitting		45		1	1		1				x																											
Core lab	3	128	Workstation IATRICS	keyboard tray				151		1	1		1				x																											
Core lab	3	128	Workstation IATRICS	container	garbage	sma l		78		1	1		1		x																													
Core lab	3	128	Workstation IATRICS	container	recyc ing			78		1	1		1		x																													

Transfusion Medicine																																												
Trans Med	3	136	Transfusion Medicine	Computer terminal		19 screen		142	7		7		7					7		c	8x7x18	120				x																		
Trans Med	3	136	Transfusion Medicine	Printer			HP 4100	160	1		1		1					1		c	16x17x12	120																						
Trans Med	3	136	Transfusion Medicine	Printer			HP 2430dtn	160	2		2		2					2	49	c	17x16x16					x																		
Trans Med	3	136	Transfusion Medicine	Printer	label		Datamax I4208		1		1		1					1	45	c	18x13x13	120				x																		
Trans Med	3	136	Transfusion Medicine	Centrifuge			Dade Baxter Immufuge I B50553	280	1		1		1					1	17	c	10x12x9(21)	115	3								1,232														
Trans Med	3	136	Transfusion Medicine	Plasma Thawer						1	1	1	2		x																													
Trans Med	3	136	Transfusion Medicine	Platelet	flatbed aggitator		Helmer PF84		1		1		1					1		c	33x14x14	115																						
Trans Med	3	136	Transfusion Medicine	Platelet	incubator		Helmer PC1200i		1		1		1					1	208	c	42x29x31	115	9																					
Trans Med	3	136	Transfusion Medicine	Centrifuge			Baxter Immufuge ii B50553	280	3		3		3					3	17	c	10x12x9(21)	115	3								1,232														
Trans Med	3	136	Transfusion Medicine	Incubator	Dry bath		Fisher Isotemp 145D		3		3		3					3	12	c	14x8x5	115	4		460					5-15p														
Trans Med	3	136	Transfusion Medicine	Cell Washer			Helmor U tra CW		2		2		2					2	52	c	13x16x11(23)	115	2.5																					
Trans Med	3	136	Transfusion Medicine	Cell Washer			Helmer U tra CW		1		1		1					1	52	c	13x16x11(23)	115	2.5																					
Trans Med	3	136	Transfusion Medicine	Heat Block			Labnet D1100		1		1		1					1	6	c	8x11x4	120																					
Trans Med	3	136	Transfusion Medicine	Microscope			Leitz	412	2		2		2					2	22	c	8x9x16	115	0.2																					
Trans Med	3	136	Transfusion Medicine	Microscope			Leitz	412	1		1		1					1	22	c	8x9x16	115	0.2																					
Trans Med	3	136	Transfusion Medicine	Automated Gel System		40x23x24	Ortho ProVue		1	1	2		2		x			1	233	c	40x23x24	120	9		300					5-15R	1,110													
Trans Med	3	136	Transfusion Medicine	Computer terminal	for Automated Gel System		Ortho ProVue		1	1	2		2		x			1		c	24x17x17	120								5-15R														
Trans Med	3	136	Transfusion Medicine	printer	for Automated Gel System		Ortho ProVue		1	1	2		2		x			1	16	c	16x19x10	120								5-15R														
Trans Med	3	136	Transfusion Medicine	UPS	for Automated Gel System		Ortho ProVue		1	1	2		2		x			1	24	f	17x8x7	120								5-15R														
Trans Med	3	136	Transfusion Medicine	centr fuge	Gel		Ortho MRS 5150-60		1	1	2		2		x			1	14	c	20x14x7	120	3																					
Trans Med	3	136	Transfusion Medicine	Incubator	Gel		Ortho MTS DG-225		1	1	2		2		x			1	11	c	13x11x5	110	1		110																		
Trans Med	3	136	Transfusion Medicine	Freezer		30x36x80	Helmer I-series PF 125-8		1	1	2		2		x			1	300	f	30x36x80	230	8				x		x		6,384														
Trans Med	3	136	Transfusion Medicine	Refridgerator		59x36x83	Jewett T100 double door		1	1	2		2		x			1	950	f	59x36x83	115	9.3				x		x																
Trans Med	3	136	Transfusion Medicine	Refridgerator	US FUNDS	59x36x80	Helmer iB256		1	1	2		2		x			1	800	f	59x36x80	230					x		x		6,000														
Trans Med	3	136	Transfusion Medicine	Biological Safety Cabinet			Baker class I B2 Sterigard III Advance SG603A	20			1		1			x																													
Trans Med	3	136	Transfusion Medicine	Blood	Cell Processor						1		1		x																													
Trans Med	3	136	Transfusion Medicine	Tube sealer	Not on drawings						1		1		x																													
Trans Med	3	136	Transfusion Medicine	Ster le connector	Not on drawings		DuPont 312				1		1		x																													
Trans Med	3	136	Transfusion Medicine	rack			Lab coats				1		1		x																													
Trans Med	3	136	Transfusion Medicine	dispenser	glove						1		1		x																													
Trans Med	3	136	Transfusion Medicine	dispenser	paper towel			82			1		1	x																														
Trans Med	3	136	Transfusion Medicine	dispenser	soap			113			1		1	x																														
Trans Med	3	136	Transfusion Medicine	container	sharp						1		1		x																													
Trans Med	3	136	Transfusion Medicine	station	pneumatic		Swiss log				1		1			x																												
Trans Med	3	136	Transfusion Medicine	container	garbage	large		79			6		6		x																													
Trans Med	3	115	WKSTN Transfusion Medicine	workstation	office	A2		186			1		1				x																											
Trans Med	3	115	WKSTN Transfusion Medicine	Computer terminal				142			1		1		x																													
Trans Med	3	115	WKSTN Transfusion Medicine	chair	task	80% sitting		45			1		1				x																											
Trans Med	3	115	WKSTN Transfusion Medicine	keyboard tray				151			1		1				x																											
Trans Med	3	115	WKSTN Transfusion Medicine	container	garbage	sma l		78			1		1		x																													
Trans Med	3	115	WKSTN Transfusion Medicine	container	recyc ing			78			1		1		x																													
Trans Med	3	167A	Storage Bulk	Balance	wet store		Sartorius		2		2		2					2																										
Trans Med	3	167A	Storage Bulk	Balance	wet store		AND		1		1		1					1																										
Microbiology																																												
Micro	3	137 139	Microbiology	Computer terminal		19 screen		142	7	2	9		9		x			7		c	8x7x18	120				x																		
Micro	3	137	Microbiology	Printer			label Datamax I4208	470	1		1		1					1	45	c	18x13x13	120				x																		
Micro	3	137	Microbiology	Printer			HP 4000N	160	1		1		1					1	40	c	16x20x14	120				x																		
Micro	3	137	Microbiology	Printer			HP 4100N	160	1		1		1					1		c	16x17x12	120																						
Micro	3	137	Microbiology	Refridgerator			Concept II CRTW1800VR-		1		1		1					1																										
Micro	3	137	Microbiology	Anaerobic System			Spiral Biotech Anoxomat		1		1		1					1	33	c	13x21x11	120																				ana		
Micro	3	137	Microbiology	printer	for Anaerobic System		Spiral Biotech Anoxomat		1		1		1					1	5	c	6x10x7	120																						
Micro	3	137	Microbiology	Blood Cu ture System			Biomerieux BacT Alert 3D controller				1		1		x																													
Micro	3	137	Microbiology	Incubator	for Blood Cu ture system	module					2		2		x																													
Micro	3	137	Microbiology	UPS	for Blood Cu ture system						1		1		x																													
Micro	3	137	Microbiology	Computer terminal	for Blood Cu ture system	19 screen		142			1		1		x																													
Micro	3	137	Microbiology	printer	for Blood Cu ture system			160			1		1		x																													
Micro	3	137	Microbiology	AST system	Antibiotic Susceptib lity Testing	V tek 2	BioMerieux		1		1		1					1	240	c	40x28x27	120	4		150.0					512														
Micro	3	137	Microbiology	carrier	for ATS system		BioMerieux smart		1		1		1					1	6	c	12x7x11	120	2		10.0					34														
Micro	3	137	Microbiology	Computer terminal	for ATS system		BioMerieux		1		1		1					1	37	c	17x23x15	120				x																		
Micro	3	137	Microbiology	printer	for ATS system		BioMerieux		1		1		1					1			15x12x9	110																						
Micro	3	137	Microbiology	sealer incubator	for ATS system		BioMerieuxfl ier		1		1		1					1		stack	67x30x16	115																						

Micro	3	137	Microbiology	Densi-cheks	for ATS system		BioMerieux Densi-cheks		1		1		1					1		c	8x6x8	115	0.2																						
Micro	3	137	Microbiology	bar code reader	for ATS system		BioMerieux		1		1		1					1		c	6x8x9	115																							
Micro	3	137	Microbiology	cond tioner	for ATS system		BioMerieux Power		1		1		1					1	25	c	7x11x6	120	6.25		750							255												
Micro	3	night drop	Microbiology	Refridgerator	night drop			31	1		1		1					1																									
Micro	3	137	Microbiology	Incubator		CO2	water jacketed/ Fisher/ 55D		1		1		1					1		c	26x25x30	115	7.5				x		x					CO2									
Micro	3	137	Microbiology	Incubator			VWR Precision 818		1		1		1					1	335	f	29x32x75	115			860		x		x														
Micro	3	137	Microbiology	Incubator		CO2	Forma 3956		1		1		1					1	800	f	38x31x88	115	15	1	850		x		x		1,450		CO2		x				x			
Micro	3	137	Microbiology	Centrifuge			Heraeus Megafuse 2.0	280	1		1		1					1	132	c	18x20x15	120			700						2,387												
Micro	3	137	Microbiology	Centrifuge			IEC Centra-8	280	1		1		1					1	164	c	23x23x16(34)	120	12		700						2,150												
Micro	3	137 139	Microbiology	Biological Safety Cabinet			Microzone/ Bioklone 2	20		2	2	1	3			x																											
Micro	3	137	Microbiology	Slide	Stainer	EM Diagnostic System				1	1		1		x																											
Micro	3	137	Microbiology	F ltered Enclosure			These are stand alone units. Labconco Paramount 6910100		1		1		1					1		f	36x28x59	115	3				x		x															
Micro	3	137	Microbiology	Microscope			Nikon Eclipse 50i	412	2		2		2					2	c	10x14x21	120	0.8							100														
Micro	3	137	Microbiology	Microscope			Leitz Laborlux S	412	1		1		1					1		c	10x16x18	120																						
Micro	3	137	Microbiology	Microscope			Nikon Eclipse E400	412	1		1		1					1		c	10x14x21	110	0.8																					
Micro	3	137	Microbiology	Freezer		-80	Fisher/Revco		1		1		1					1		f	33x30x79	115	25	1			x		x														
Micro	3	137	Microbiology	Centrifuge			Shandon-Cytospin 3	280	1		1		1					1	40	c	16x23x12(22)	115	5		150						511												
Micro	3	137	Microbiology	Refridgerator	triple door		VWR True GDM-72		1		1		1					1		f	79x30x80	115	15	1		600		x	x		x	5-15R	2,040									
Micro	3	137	Microbiology	Heat block	Not on drawings		VWR MV1		1		1		1					1		c	5x10x3	115				31																
Micro	3	137	Microbiology	Hot plate	Not on drawings		stirrer VWR 500		1		1		1					1		c	16x12x4	120	2			240																
Micro	3	137	Microbiology	Incubator		diurnal low temp BOD	Precision 818		1		1		1					1	335	f	29x32x75	115			860		x		x														
Micro	3	137	Microbiology	Mixer	Not on drawings		Vortex mini		2		2		2					2		c	5x10x3	115				31																
Micro	3	137	Microbiology	Fume Hood			Laminar Nuaire clean bench 301-630			1	1		1			x																											
Micro	3	139	Microbiology	Thermocycler			Cepheid GeneXpert processing unit GX4			1	1	1	2		x																											
Micro	3	139	Microbiology	processing block	for Thermocycler					1	1	1	2		x																											
Micro	3	139	Microbiology	Computer terminal	for Thermocycler	19 screen		142		1	1		1		x																											
Micro	3	137	Microbiology	rack			Lab coats			1	1		1		x																											
Micro	3	137	Microbiology	dispenser	paper towel			82			0			x																												
Micro	3	137	Microbiology	dispenser	glove					1	1				x																											
Micro	3	137	Microbiology	dispenser	soap			113			0			x																												
Micro	3	137	Microbiology	container	garbage	large		79		9	9				x																											
Micro	3	167 B	Bulk RGT. storage								0		0																													
Micro	3	161	Walk in Fridge Media	Refridgerator	Walk-in					1	1		1			x																											
Micro	3	140	Development/Teaching								0		0																													
Micro	3	141	Flouscent Scope	coat hooks							0		0			x																											
Micro	3	114	WKSTN Micro	workstation	office	A2		186		1	1		1				x																									
Micro	3	114	WKSTN Micro	Computer terminal				142		1	1		1		x																											
Micro	3	114	WKSTN Micro	chair	task	80% sitting		45		1	1		1				x																									
Micro	3	114	WKSTN Micro	keyboard tray				151		1	1		1				x																									
Micro	3	114	WKSTN Micro	container	garbage	sma l		78		1	1		1		x																											
Micro	3	114	WKSTN Micro	container	recyc ing			78		1	1		1		x																											
Micro	3	174.2	Wash-up								0		0																													
Anatomic Pathology																																											
Ana Path	2	152	Anatomic Pathology	Grossing Station	Elevating		Mopec MB600			2	2		2			x																											
Ana Path	2	150	Anatomic Pathology	Cryostat				643		1	1		1		x																											
Ana Path	2	150	Anatomic Pathology	Cryostat			Reichert Jung Frigocut 1800	643	1		1		1					1		f	27x30x46	120						x		x														
Ana Path	2	153	Anatomic Pathology	Biological Safety Cabinet			Microzone/ Bioklone 2	20		1	1		1			x																											
Ana Path	2	150	Anatomic Pathology	Microscope			Leitz	412	1	1	2		2		x			1	22	c	8x9x16	115	0.2																				
Ana Path	2	150	Anatomic Pathology	Printer	Not on drawings	S ide			1		1	1	2					1																									
Ana Path	2	151	Anatomic Pathology	Printer	Cassette				1		1	1	2					1		c	22x25x40	120					x																
Ana Path	2	151	Anatomic Pathology	Printer	label		Datamax I4208		2		2		2					2	45	c	18x13x13	120					x																
Ana Path	2	150	Anatomic Pathology	Printer			HP 2430dtn	160	1		1		1					1	49	c	17x16x16						x																
Ana Path	2	157	Anatomic Pathology	Tissue Processor		new version VIP6	Miles Sakura V P6		1		1		1					1		f	20x24x50	115			1340				x														
Ana Path	2	157	Anatomic Pathology	Tissue Processor		Floor			1	1	2		2		x			1		f	20x24x50	115			1340				x														
Ana Path	2	157	Anatomic Pathology	UPS	for Tissue Processor				1	1	2		2		x			1		f	8x20x17	115							x														
Ana Path	2	158	Anatomic Pathology	Embedder			Sakura 4586 Tissue Tek		2		2		2					2	55	c	16x21x11	115	10								1573			x									
Ana Path	2	158	Anatomic Pathology	Dispensing	for Embedder				2		2		2					2	30	c	9x21x11	115	4											x									

Ana Path	2	158	Anatomic Pathology	Thermal console	for Embedder				2		2		2					2	18	c	9x21x11	115	3.6														x							
Ana Path	2	155	Anatomic Pathology	Stainer	Coverslipper		Tissue Tek 3 Cryo		1		1		1					1	165	c	29x24x27	115																							
Ana Path	2	155	Anatomic Pathology	stainer	for Stainer				1		1		1					1	330	c	50x28x25	115																							
Ana Path	2	155	Anatomic Pathology	monitor	for Stainer				1		1		1					1		c		115																							
Ana Path	2	158	Anatomic Pathology	Microtome			Microm HM355S		6		6		6					6	77	c	17x21x11	120																							
Ana Path	2	158	Anatomic Pathology	Microtome			Microm HM355S		3		3		3					3	77	c	17x21x11	120																							
Ana Path	2	158	Anatomic Pathology	Bath	Tissue	floatation	TBS H-TFB		3	2	5		5		x			3	5	c	12x18x7	115	3.3																							
Ana Path	2	158	Anatomic Pathology	Bath					3		3		3					3																											
Ana Path	2	158	Anatomic Pathology	Fume Hood			Thermo Hami ton Safeaire Hm54L6000B			1	1		1			x																													
Ana Path	2	154	Anatomic Pathology	Refridgerator			Frigidaire commercial	31	1		1		1					1																											
Ana Path	2	153	Anatomic Pathology	Microscope	pricing is in US do lars	Tri occular (camera ready) cat# MMZ-8TR stand PPH. LED top and bottom	Nikon Op iphot -2	414	1		1		1					1		c	10x14x16	120	1		43																				
Ana Path	2	150	Anatomic Pathology	Scale	Not on drawings		Scale Chati lion		1		1		1					1	5	c	7x6x2	9V DC																							
Ana Path	2	158	Anatomic Pathology	Slide scanner			Aperio ScanScope CS		1		1		1					1	55	c	13x19x21	120				x																			
Ana Path	2	158	Anatomic Pathology	monitor	for Slide Scanner		Aperio ScanScope CS		1		1		1					1		c	22x7x18	120																							
Ana Path	2	150	Anatomic Pathology	Balance	Not on drawings	VWR cat #11379-246	Denver MXX-5		1		1		1					1	7	c	9x13x4	115																							
Ana Path	2	150	Anatomic Pathology	Scale	Not on drawings					1	1		1		x																													
Ana Path	2	154	Anatomic Pathology	Refridgerator			Isotemp Lab		1		1		1					1		f	54x36x78	120	11.5				x		x																
Ana Path	2	154	Anatomic Pathology	Refridgerator			Frigidaire FRT18	31	1		1		1					1	250	f	30x32x65	115					x		x		3,700													
Ana Path	2	150	Anatomic Pathology	F ltered Enclosure	Not on drawings		These are stand alone units. Labconco Paramount 6910100		1		1		1					1		f	36x28x59	115	3				x		x																
Ana Path	2	150	Anatomic Pathology	Balance	Not on drawings		Mettler PN163		1		1		1					1		c	10x12x11	110			15																			
Ana Path	2	150	Anatomic Pathology	Microscope	Not on drawings		Meji Sterioscopic ENZ	412	1		1		1					1																											
Ana Path	2	150	Anatomic Pathology	Dryer	Slide		Biocare 10 AF-CCS		1		1		1					1		c	16x22x12	115																							
Ana Path	2	150 158	Anatomic Pathology	Trimmer	Para					3	3		3		x																													
Ana Path	2	150	Anatomic Pathology	Saw	Cast		Stryker 910	505	1		1		1					1		c	5x12x5	115	1																						
Ana Path	2	150	Anatomic Pathology	Saw	Autopsy		Stryker 910		2		2		2					2		c	5x12x5	115																							
Ana Path	2	150	Anatomic Pathology	dispenser	Paraffin		TBS H-PD		1		1		1					1	45	c	16x19x25	115	4.5																							
Ana Path	2	150	Anatomic Pathology	Hotplate stirrer	Not on drawings		Thermo Nuova II		1		1		1					1		c	11x9x4	110	7.3		876						2,991													
Ana Path	2	150	Anatomic Pathology	Autostainer	countertop		Ventana Nexes staining		1		1		1					1	40	c	16x20x14	115	6																							
Ana Path	2	150	Anatomic Pathology	stainer	for Autostainer		Ventana Nexes staining fluid module		1		1		1					1	30	f	14x15x14	115	3																							
Ana Path	2	150	Anatomic Pathology	monitor	for Autostainer		Ventana Nexes staining		1		1		1					1		c	14x15x15	115																							
Ana Path	2	150	Anatomic Pathology	Computer terminal	for Autostainer		Ventana Nexes staining		1		1		1					1	15	c	8x16x17	115	2																							
Ana Path	2	150	Anatomic Pathology	printer	for Autostainer		Ventana Nexes staining		1		1		1					1	10	c	14x12x15	115	0.3																							
Ana Path	2	150	Anatomic Pathology	UPS	for Autostainer		Ventana Nexes staining		1		1		1					1		f	10x17x7	115																							
Ana Path	2	154	Anatomic Pathology	Autostainer			Ventana Benchmark Ultra			1	1	1	2		x																													
Ana Path	2	154	Anatomic Pathology	monitor	for Autostainer		Ventana Benchmark Ultra			1	1	1	2		x																													
Ana Path	2	154	Anatomic Pathology	Staining System			Ventana Benchmark		2		2		2					2	55	c	16x22x14(29)	115								x	x		1,200											
Ana Path	2	154	Anatomic Pathology	fluid module	for Staining system		Ventana Benchmark		2		2		2					2	58	c	20x22x15	115								x	x													
Ana Path	2	154	Anatomic Pathology	cabinet module	for Staining system		Ventana Benchmark		2		2		2					2	30	f	20x22x21	na																							
Ana Path	2	154	Anatomic Pathology	Computer terminal	for Staining system		Ventana Benchmark		2		2		2					2	10	c	14x12x15	115	0.3				x			x	x													
Ana Path	2	154	Anatomic Pathology	Printer	for Staining system		Ventana Benchmark		2		2		2					2	10	c	14x12x15	115								x	x													
Ana Path	2	150	Anatomic Pathology	Oven	Not on drawings		forced air VWR		1		1		1					1	155	c	21x21x25	110	6.6																							
Ana Path	2	155	Anatomic Pathology	Biological Safety Cabinet			Labconco/Purifier 36214-00 B2	20		1	1		1			x																												
Ana Path	2	150	Anatomic Pathology	Autostainer						1	1		1		x																												
Ana Path	2	150	Anatomic Pathology	Covers ipper						2	2		2		x																												
Ana Path	2	150	Anatomic Pathology	Refridgerator	Not on drawings			31		1	1		1		x																												
Ana Path	2	155	Anatomic Pathology	Slide Processor			Thin prep 2000		1		1		1					1	41	c	18(21)x15(18)x2	120	2		200																			
Ana Path	2	155	Anatomic Pathology	waste bottle	for slide processor		Thin prep 2000		1		1		1					1		c	6x6x17	na																							
Ana Path	2	155	Anatomic Pathology	Centrifuge			Aperio ScanScope CS	280	1		1		1					1	196	c	22x27x15	120			900						3,060													
Ana Path	2	150	Anatomic Pathology	Mixer		Vortex	IKA Vibrax VXR Vorlexor		1		1		1					1		c	7x10x4	115																							
Ana Path	2	150	Anatomic Pathology	Mixer	mixer	Vortex	VWR		1		1		1					1	10	c	10x5x7	115																							
Ana Path	2	150	Anatomic Pathology	Microscope			Nikon Eckipse E400	412	2		2		2					2		c	10x14x21	110	0.8																							
Ana Path	2	150 159 153	Anatomic Pathology	Computer terminal		19 screen		142	8		8		8					8		c	8x7x18	120				x																		
Ana Path	2	150	Anatomic Pathology	Stainer		28.5x28x34.5				1	1		1		x																												
Ana Path	2	150	Anatomic Pathology	Stainer		30x23			1		1		1					1		c	30x23																							
Ana Path	2	150	Anatomic Pathology	cart						2	2		2		x																												
Ana Path	2	157	Anatomic Pathology	cabinet			flammable			1	1		1		x																												

Ana Path	2	157	Anatomic Pathology	recycler			xylene			1	1		1		x												
Ana Path	2	157	Anatomic Pathology	container	garbage	large		79		9	9				x												
Ana Path	2	156	Development/Teaching	Printer			HP 2430dtn	160	1		1		1					1	49	c	17x16x16						x
Ana Path	2	156	Development/Teaching	Computer terminal		19 screen		142	3		3		3					3		c	8x7x18	120					x
Ana Path	2	156	Development/Teaching	Visual presenter			Elmo P10s		1		1		1					1	10	c	15x19x23	12v					x
Ana Path	2	103	WKSTN POC	workstation	office	A2		186		1	1		1				x										
Ana Path	2	103	WKSTN POC	Computer terminal				142		1	1		1		x												
Ana Path	2	103	WKSTN POC	tackboard	3x4			178		1	1		1		x												
Ana Path	2	103	WKSTN POC	whiteboard	3x4			185		1	1		1		x												
Ana Path	2	103	WKSTN POC	chair	task	80% sitting		45		1	1		1				x										
Ana Path	2	103	WKSTN POC	keyboard tray				151		1	1		1				x										
Ana Path	2	103	WKSTN POC	container	garbage	sma l		78		1	1		1		x												
Ana Path	2	103	WKSTN POC	container	recycling			78		1	1		1		x												
Ana Path	2	110	WKSTN Histo	workstation	office	A2		186		1	1		1				x										
Ana Path	2	110	WKSTN Histo	Computer terminal				142		1	1		1		x												
Ana Path	2	110	WKSTN Histo	tackboard	3x4			178		1	1		1		x												
Ana Path	2	110	WKSTN Histo	whiteboard	3x4			185		1	1		1		x												
Ana Path	2	110	WKSTN Histo	chair	task	80% sitting		45		1	1		1				x										
Ana Path	2	110	WKSTN Histo	keyboard tray				151		1	1		1				x										
Ana Path	2	110	WKSTN Histo	container	garbage	sma l		78		1	1		1		x												
Ana Path	2	110	WKSTN Histo	container	recyc ing			78		1	1		1		x												
Ana Path	2	102	WKSTN Path Student	workstation	office	A2		186		1	1		1				x										
Ana Path	2	102	WKSTN Path Student	Computer terminal				142		1	1		1		x												
Ana Path	2	102	WKSTN Path Student	tackboard	3x4			178		1	1		1		x												
Ana Path	2	102	WKSTN Path Student	whiteboard	3x4			185		1	1		1		x												
Ana Path	2	102	WKSTN Path Student	chair	task	80% sitting		45		1	1		1				x										
Ana Path	2	102	WKSTN Path Student	keyboard tray				151		1	1		1				x										
Ana Path	2	102	WKSTN Path Student	container	garbage	sma l		78		1	1		1		x												
Ana Path	2	102	WKSTN Path Student	container	recyc ing			78		1	1		1		x												
Ana Path	2	167C	Bulk RGT. storage								0		0														
Ana Path	2	173	Wet tissue storage								0		0														
Ana Path	2	181.1	Washroom	dispenser	paper towel			82		1	1		1	x													
Ana Path	2	181.1	Washroom	dispenser	soap			113		1	1		0	x													
Ana Path	2	181.1	Washroom	dispenser	toilet paper			112		1	1		0	x													
Ana Path	2	181.1	Washroom	coat hook						1	1		0	x													
Ana Path	2	181.1	Washroom	container	garbage	large		79		1	1		0		x												
													0														
Ana Path	2	181.2	Washroom	container	garbage	large		79		1	1		1		x												
Ana Path	2	181.1	Washroom	dispenser	paper towel			82		1	1		1	x													
Ana Path	2	181.1	Washroom	dispenser	soap			113		1	1		0	x													
Ana Path	2	181.1	Washroom	dispenser	toilet paper			112		1	1		0	x													
Ana Path	2	181.1	Washroom	coat hook						1	1		0	x													
Ana Path	2	172	Block and Slide storage								0		0														
Ana Path	2	162	RO water								0		0														
Ana Path	2	174 1	Wash-up Room	dispenser	soap	does not im t responsibil ties in schedule 1		113		1	1		0	x													
Ana Path	2	174.1	Wash-up Room	dispenser	paper towel	does not im t responsibil ties in schedule 1		82		1	1			x													
											0																
Ana Path	2	175.1 110	HSKG	houskeeping equipment	vacuum			55		1	1		1		x												
Ana Path	2	175.1 110	HSKG	houskeeping equipment	swing buffer	20		56		1	1		1		x												
Ana Path	2	175.1 110	HSKG	tackboard	2x4			178		1	1		1		x												
Ana Path	2	175.1 110	HSKG	cart	housekeeping			57		3	3		3		x												
Ana Path	2	175.1 110	HSKG	hanger	mop			149		1	1		1			x											
Ana Path	2	175.1 110	HSKG	dispenser	paper towel			82		1	1			x													
Ana Path	2	175.1 110	HSKG	dispenser	soap			113		1	1			x													
Ana Path	2	175.1 110	HSKG	ladder	wooden			152		1	1		1		x												
ana path	2	150	In-use lab coat storage	coat hooks		in addition to mandatory accessories				12	12		12			x											
Autopsy																											

Autopsy	1	190	Autopsy	Refridgerator			double door/ Lab-Line/ 3784	31		1	1		1		x																												
Autopsy	1	190	Autopsy	Autopsy table	Downdraft	elevating rota ing	Mopec CE210			2	2		2			x																											
Autopsy	1	190	Autopsy	Hopper	Flush					2	2		2			x																											
Autopsy	1	190	Autopsy	Hopper	Flush pedestal					2	2		2			x																											
Autopsy	1	190	Autopsy	Bench	Downdraft dissection					2	2		2			x																											
Autopsy	1	190	Autopsy	Scale	Hanging weight					2	2		2		x																												
Autopsy	1	190	Autopsy	Cadaver ift		power	Mopec JD105			1	1		1			x																											
Autopsy	1	191	Autopsy	Refridgerator	AFOS body storage	8 body changed to 2 body 07-10				1	1		1		x																												
Autopsy	1	190A 190B	Autopsy	Computer terminal		19 monitor		142		4	4		4		x																												
Autopsy	1	190A 190B	Autopsy	ight w th camera mount		Overhead OR	Paragon Medical Trio			2	2		2				x																										
Autopsy	1	190A 190B	Autopsy	Dictaphone		Transcriber				2	2		2			x																											
Autopsy	1	190A 190B	Autopsy	Beam		Balance				2	2		2		x																												
Autopsy	1	190A 190B	Autopsy	Camera		Digital				1	1		1		x																												
Autopsy	1	190A 190B	Autopsy	Saw	Clean-cut autopsy					2	2		2		x																												
Autopsy	1	190A 190B	Autopsy	Locker							0		0			x																											
Autopsy	1	190A 190B	Autopsy	dispenser	glove					1	1				x																												
Autopsy	1	190A 190B	Autopsy	dispenser	soap	does not im t responsibil ties in schedule 1		113		2	2			x																													
Autopsy	1	190A 190B	Autopsy	dispenser	paper towel	does not im t responsibil ties in schedule 1		82		2	2			x																													
Autopsy	1	190A 190B	Autopsy	container	garbage	large		79		4	4		4		x																												
Autopsy	1	195	Workstation Autopsy prep	computer terminal				142		1	1		1		x																												
Autopsy	1	195	washroom	container	garbage	large		79		1	1		1		x																												
Autopsy	1	192	Shower	locker				155		1	1		1			x																											
Autopsy	1	192	Shower	inen hamper				105		1	1		1		x																												
Autopsy	1	192	Shower	towel bar				182		1	1		1			x																											
Loading Dock																																											
Autopsy	1	193	Dock loading								0		0																														
Autopsy		166	Storage shred bin								0		0																														
Autopsy		194	Room HSKG Supply	houskeeping equipment	vacuum			55		1	1		1		x																												
Autopsy		194	Room HSKG Supply	houskeeping equipment	swing buffer			56		1	1		1		x																												
Autopsy		194	Room HSKG Supply	tackboard	2x4			178		1	1		1		x																												
Autopsy		194	Room HSKG Supply	cart	housekeeping			57		1	1		1		x																												
Autopsy		194	Room HSKG Supply	hanger	mop			149		1	1		1			x																											
Autopsy		194	Room HSKG Supply	ladder	wooden			152		1	1		1		x																												
Autopsy		203A 203B	Waiting area	chair	waiting	gang sea ing	15 people	139		2	2		2				x																										
Autopsy		203A 203B	Waiting area	bracket	television	32 LCD		144		1	1		1		x																												
Autopsy		203A 203B	Waiting area	rack	brochure			162		2	2		2		x																												
Autopsy		203A 203B	Waiting area	tackboard	4x8			178		2	2		2		x																												
Autopsy		203A 203B	Waiting area	table	end	gang sea ing		175		3	3		3				x																										
Autopsy		203A 203B	Waiting area	container	garbage	sma l		78		2	2		2		x																												
Autopsy		203A 203B	Waiting area	rack	magazine			163		2	2		2		x																												
Autopsy		203A 203B	Waiting area	dispenser	soap	does not im t responsibil ties in schedule 1		113		2	2		2	x																													
Phlebotomy																																											
Phlebotomy	1	204	Cubicles	Computer terminal				142	4		4		4					4		c	8x7x18	120					x																
Phlebotomy	1	204	Cubicles	chair		80% sitting		45	4		4		4					4																									
Phlebotomy	1	202	Recep ion	Computer terminal				142	1		1		1					1		c	8x7x18	120					x																
Phlebotomy	1	202	Recep ion	Printer		label	Datamax I4208		1		1		1					1	45	c	18x13x13	120					x																
Phlebotomy	1	202	Recep ion	Fax machine				345	1		1		1					1																									
Phlebotomy	1	202	Recep ion	soap				113		1	1																																
Phlebotomy	1	207	washroom	container	garbage	large		79	1		1		1					1																									
Phlebotomy	1	207	washroom	dispenser	paper towel	does not im t responsibil ties in schedule 1		82		1	1			x																													
Phlebotomy	1	207	washroom	dispenser	soap	does not im t responsibil ties in schedule 1		113		1	1			x																													
Phlebotomy	1	207	washroom	dispenser	toilet paper	does not im t responsibil ties in schedule 1		112		1	1			x																													

Phlebotomy	1	206	Area work	Computer terminal				142	1		1		1					1		c	8x7x18	120					x
Phlebotomy	1	206	Area work	Sta ion	pneumatic		Swiss Log			1	1		1			x											
Phlebotomy	1	205	Room Phleb/ECG/small procced	dispenser	glove					1	1				x												
Phlebotomy	1	205	Room Phleb/ECG/small procced	container	garbage	large		79	1		1		1					1									
Phlebotomy	1	205	Room Phleb/ECG/small procced	coat hooks							0		0			x											
Phlebotomy	1	205	Room Phleb/ECG/small procced	dispenser	paper towel			82		1	1			x													
Phlebotomy	1	205	Room Phleb/ECG/small procced	container	sharp					1					x												
Phlebotomy	1	205	Room Phleb/ECG/small procced	dispenser	soap			113		1	1			x													
Phlebotomy	1	205	Room Phleb/ECG/small procced	dispenser	soap	does not im t responsibil ties in schedule 1		113		1	1			x													
Office Call center																											
Staff	3	125	Call center	workstation	office	A3a		186		4	4		4				x										
Staff	3	125	Call center	Computer terminal				142		4	4		4		x												
Staff	3	125	Call center	tackboard	3x4			178		4	4		4		x												
Staff	3	125	Call center	whiteboard	3x4			185		4	4		4		x												
Staff	3	125	Call center	bookcase	tall			46		2	2		2				x										
Staff	3	125	Call center	chair	task	80% sitting		45		4	4		4				x										
Staff	3	125	Call center	f ling cabinet	4 drawer	lateral		47		2	2		2				x										
Staff	3	125	Call center	keyboard tray				151		4	4		4				x										
Staff	3	125	Call center	container	garbage	sma l		78		4	4		4		x												
Staff	3	125	Call center	tackboard				178		1	1		1		x												
Staff	3	125	Call center	whiteboard				185		1	1		1		x												
Staff	3	125	Call center	container	recyc ing			78		4	4		4		x												
Office Point of Care																											
Hema	3	119.1	WKSTN Point of Care	workstation	office	A2		186		1	1		1				x										
Hema	3	119.1	WKSTN Point of Care	Computer terminal				142		1	1		1		x												
Hema	3	119.1	WKSTN Point of Care	tackboard	3x4			178		1	1		1		x												
Hema	3	119.1	WKSTN Point of Care	whiteboard	3x4			185		1	1		1		x												
Hema	3	119.1	WKSTN Point of Care	chair	task	80% sitting		45		1	1		1				x										
Hema	3	119.1	WKSTN Point of Care	keyboard tray				151		1	1		1				x										
Hema	3	119.1	WKSTN Point of Care	container	garbage	sma l		78		1	1		1		x												
Hema	3	119.1	WKSTN Point of Care	container	recyc ing			78		1	1		1		x												
Office Point of Care																											
Hema	3	119.2	WKSTN POC	workstation	office	A2		186		1	1		1				x										
Hema	3	119.2	WKSTN POC	Computer terminal				142		1	1		1		x												
Hema	3	119.2	WKSTN POC	tackboard	3x4			178		1	1		1		x												
Hema	3	119.2	WKSTN POC	whiteboard	3x4			185		1	1		1		x												
Hema	3	119.2	WKSTN POC	bookcase	tall			46		1	1		1				x										
Hema	3	119.2	WKSTN POC	chair	task	80% sitting		45		1	1		1				x										
Hema	3	119.2	WKSTN POC	f ling cabinet	4 drawer	lateral		47		1	1		1				x										
Hema	3	119.2	WKSTN POC	keyboard tray				151		1	1		1				x										
Hema	3	119.2	WKSTN POC	container	garbage	sma l		78		1	1		1		x												
Hema	3	119.2	WKSTN POC	container	recyc ing			78		1	1		1		x												
Office Pathologist																											
ana path	2	101.1	Office Pathologist	workstation	office	A4		186		1	1		1				x										
ana path	2	101.1	Office Pathologist	Computer terminal				142		1	1		1		x												
ana path	2	101.1	Office Pathologist	tackboard	3x4			178		1	1		1		x												
ana path	2	101.1	Office Pathologist	whiteboard	3x4			185		1	1		1		x												
ana path	2	101.1	Office Pathologist	bookcase	tall			46		1	1		1				x										
ana path	2	101.1	Office Pathologist	chair	task	80% sitting		45		1	1		1				x										
ana path	2	101.1	Office Pathologist	chair	visitor			44		1	1		1				x										
ana path	2	101.1	Office Pathologist	f ling cabinet	4 drawer	lateral		47		1	1		1				x										
ana path	2	101.1	Office Pathologist	keyboard tray				151		1	1		1				x										
ana path	2	101.1	Office Pathologist	container	garbage	sma l		78		1	1		1		x												
ana path	2	101.1	Office Pathologist	container	recyc ing			78		1	1		1		x												
ana path	2	101.1	Office Pathologist	microscope				412		1	1		1		x												
Office Pathologist																											
ana path	2	101.2	Office Pathologist	workstation	office	A4		186		1	1		1				x										
ana path	2	101.2	Office Pathologist	Computer terminal				142		1	1		1		x												
ana path	2	101.2	Office Pathologist	tackboard	3x4			178		1	1		1		x												
ana path	2	101.2	Office Pathologist	whiteboard	3x4			185		1	1		1		x												
ana path	2	101.2	Office Pathologist	bookcase	tall			46		1	1		1				x										
ana path	2	101.2	Office Pathologist	chair	task	80% sitting		45		1	1		1				x										
ana path	2	101.2	Office Pathologist	chair	visitor			44		1	1		1				x										
ana path	2	101.2	Office Pathologist	f ling cabinet	4 drawer	lateral		47		1	1		1				x										
ana path	2	101.2	Office Pathologist	keyboard tray				151		1	1		1				x										
ana path	2	101.2	Office Pathologist	container	garbage	sma l		78		1	1		1		x												
ana path	2	101.2	Office Pathologist	container	recyc ing			78		1	1		1		x												
ana path	2	101.2	Office Pathologist	microscope				412		1	1		1		x												
Office Pathologist																											
ana path	2	101.3	Office Pathologist	workstation	office	A4		186		1	1		1				x										
ana path	2	101.3	Office Pathologist	Computer terminal				142		1	1		1		x												

ana path	2	101.3	Office Pathologist	tackboard	3x4			178		1	1		1		x			
ana path	2	101.3	Office Pathologist	whiteboard	3x4			185		1	1		1		x			
ana path	2	101.3	Office Pathologist	bookcase	tall			46		1	1		1				x	
ana path	2	101.3	Office Pathologist	chair	task	80% sitting		45		1	1		1				x	
ana path	2	101.3	Office Pathologist	chair	visitor			44		1	1		1				x	
ana path	2	101.3	Office Pathologist	f ling cabinet	4 drawer	lateral		47		1	1		1				x	
ana path	2	101.3	Office Pathologist	keyboard tray				151		1	1		1				x	
ana path	2	101.3	Office Pathologist	container	garbage	sma l		78		1	1		1		x			
ana path	2	101.3	Office Pathologist	container	recyc ing			78		1	1		1		x			
ana path	2	101.3	Office Pathologist	microscope				412		1	1		1		x			
Office Pathologist																		
ana path	2	101.4	Office Pathologist	workstation	office	A4		186		1	1		1				x	
ana path	2	101.4	Office Pathologist	Computer terminal				142		1	1		1		x			
ana path	2	101.4	Office Pathologist	tackboard	3x4			178		1	1		1		x			
ana path	2	101.4	Office Pathologist	whiteboard	3x4			185		1	1		1		x			
ana path	2	101.4	Office Pathologist	bookcase	tall			46		1	1		1				x	
ana path	2	101.4	Office Pathologist	chair	task	80% sitting		45		1	1		1				x	
ana path	2	101.4	Office Pathologist	chair	visitor			44		1	1		1				x	
ana path	2	101.4	Office Pathologist	f ling cabinet	4 drawer	lateral		47		1	1		1				x	
ana path	2	101.4	Office Pathologist	keyboard tray				151		1	1		1				x	
ana path	2	101.4	Office Pathologist	container	garbage	sma l		78		1	1		1		x			
ana path	2	101.4	Office Pathologist	container	recyc ing			78		1	1		1		x			
ana path	2	101.4	Office Pathologist	microscope				412		1	1		1		x			
Office Pathologist																		
ana path	2	101.5	Office Pathologist	workstation	office	A4		186		1	1		1				x	
ana path	2	101.5	Office Pathologist	Computer terminal				142		1	1		1		x			
ana path	2	101.5	Office Pathologist	tackboard	3x4			178		1	1		1		x			
ana path	2	101.5	Office Pathologist	whiteboard	3x4			185		1	1		1		x			
ana path	2	101.5	Office Pathologist	bookcase	tall			46		1	1		1				x	
ana path	2	101.5	Office Pathologist	chair	task	80% sitting		45		1	1		1				x	
ana path	2	101.5	Office Pathologist	chair	visitor			44		1	1		1				x	
ana path	2	101.5	Office Pathologist	f ling cabinet	4 drawer	lateral		47		1	1		1				x	
ana path	2	101.5	Office Pathologist	keyboard tray				151		1	1		1				x	
ana path	2	101.5	Office Pathologist	container	garbage	sma l		78		1	1		1		x			
ana path	2	101.5	Office Pathologist	container	recyc ing			78		1	1		1		x			
ana path	2	101.5	Office Pathologist	microscope				412		1	1		1		x			
Office Pathologist																		
ana path	2	101.6	Office Pathologist	workstation	office	A4		186		1	1		1				x	
ana path	2	101.6	Office Pathologist	Computer terminal				142		1	1		1		x			
ana path	2	101.6	Office Pathologist	tackboard	3x4			178		1	1		1		x			
ana path	2	101.6	Office Pathologist	whiteboard	3x4			185		1	1		1		x			
ana path	2	101.6	Office Pathologist	bookcase	tall			46		1	1		1				x	
ana path	2	101.6	Office Pathologist	chair	task	80% sitting		45		1	1		1				x	
ana path	2	101.6	Office Pathologist	chair	visitor			44		1	1		1				x	
ana path	2	101.6	Office Pathologist	f ling cabinet	4 drawer	lateral		47		1	1		1				x	
ana path	2	101.6	Office Pathologist	keyboard tray				151		1	1		1				x	
ana path	2	101.6	Office Pathologist	container	garbage	sma l		78		1	1		1		x			
ana path	2	101.6	Office Pathologist	container	recyc ing			78		1	1		1		x			
ana path	2	101.6	Office Pathologist	microscope				412		1	1		1		x			
Office Pathologist																		
ana path	2	101.7 to 101.17	Office Pathologist	workstation	office	A4		186		1	1		1				x	
ana path	2	101.7 to 101.17	Office Pathologist	Computer terminal				142		1	1		1		x			
ana path	2	101.7 to 101.17	Office Pathologist	tackboard	3x4			178		1	1		1		x			
ana path	2	101.7 to 101.17	Office Pathologist	whiteboard	3x4			185		1	1		1		x			
ana path	2	101.7 to 101.17	Office Pathologist	bookcase	tall			46		1	1		1				x	
ana path	2	101.7 to 101.17	Office Pathologist	chair	task	80% sitting		45		1	1		1				x	
ana path	2	101.7 to 101.17	Office Pathologist	chair	visitor			44		1	1		1				x	
ana path	2	101.7 to 101.17	Office Pathologist	f ling cabinet	4 drawer	lateral		47		1	1		1				x	
ana path	2	101.7 to 101.17	Office Pathologist	keyboard tray				151		1	1		1				x	
ana path	2	101.7 to 101.17	Office Pathologist	container	garbage	sma l		78		1	1		1		x			
ana path	2	101.7 to 101.17	Office Pathologist	container	recyc ing			78		1	1		1		x			
ana path	2	101.7 to 101.17	Office Pathologist	microscope				412		1	1		1		x			

Office Pathology Student Coordinator																		
Of ice	3	118	Office Student Coordinator	workstation	office	A2		186		1	1		1				x	
Of ice	3	118	Office Student Coordinator	Computer terminal				142		1	1		1		x			
Of ice	3	118	Office Student Coordinator	chair	task	80% sitting		45		1	1		1				x	
Of ice	3	118	Office Student Coordinator	chair	visitor			44		1	1		1				x	
Of ice	3	118	Office Student Coordinator	keyboard tray				151		1	1		1				x	
Of ice	3	118	Office Student Coordinator	container	garbage	sma l		79		1	1		1		x			
Of ice	3	118	Office Student Coordinator	container	recyc ing			78		1	1		1		x			
Of ice	3	127	Room Conference	chair	visitor			44		16	16		16				x	
Of ice	3	127	Room Conference	table	conference			173		1	1		1				x	
Of ice	3	127	Room Conference	video conferencing (large)	projector and screen			184		1	1		1		x			
Of ice	3	127	Room Conference	whiteboard	3x4			185		2	2		2		x			
Of ice	3	127	Room Conference	tackboard	3x4			178		2	2		2		x			
Of ice	3	127	Room Conference	container	garbage	sma l		79		2	2		2		x			
Of ice	3	127	Room Conference	container	recyc ing			78		2	2		2		x			
Of ice	3	127	Room Conference	workstation	office	A2		186		1	1		1				x	
Of ice	3	127	Room Conference	Computer terminal				142		1	1		1		x			
Of ice	3	127	Room Conference	chair	task	80% sitting		45		1	1		1				x	
Of ice	3	127	Room Conference	chair	visitor			44		1	1		1				x	
Of ice	3	127	Room Conference	keyboard tray				151		1	1		1				x	
Of ice	3	127	Room Conference	container	garbage	sma l		79		1	1		1		x			
Of ice	3	127	Room Conference	container	recyc ing			78		1	1		1		x			
Of ice	3	127	Room Conference	dispenser	paper towel			82		1	1		1	x				
Of ice	3	127	Room Conference	dispenser	glove					1	1		1		x			
Of ice	3	127	Room Conference	container	sharp					1	1		1		x			
Of ice	3	127	Room Conference	coat hooks		In addition to mandatory accessories				12	12		12			x		
Office QA Coordinator																		
office	3	124	Office QA Coordinator	workstation	office	A2		186		1	1		1				x	
office	3	124	Office QA Coordinator	Computer terminal		19 screen		142		1	1		1		x			
office	3	124	Office QA Coordinator	whiteboard	3x4			185		1	1		1		x			
office	3	124	Office QA Coordinator	chair	task	80% sitting		45		1	1		1				x	
office	3	124	Office QA Coordinator	f ling cabinet	4 drawer	lateral		47		1	1		1				x	
office	3	124	Office QA Coordinator	keyboard tray				151		1	1		1				x	
office	3	124	Office QA Coordinator	container	garbage	sma l		78		1	1		1		x			
office	3	124	Office QA Coordinator	container	recyc ing			78		1	1		1		x			
HSKG Room																		
Staff	3	175.2	Room HSKG Supply	houskeeping equipment	vacuum			55		1	1		1		x			
Staff	3	175.2	Room HSKG Supply	houskeeping equipment	swing buffer			56		1	1		1		x			
Staff	3	175.2	Room HSKG Supply	tackboard	3x4			178		1	1		1		x			
Staff	3	175 2	Room HSKG Supply	cart	housekeeping			57		1	1		1		x			
Staff	3	175.2	Room HSKG Supply	hanger	mop			149		1	1		1			x		
Staff	3	175.2	Room HSKG Supply	ladder	wooden			152		1	1		1		x			
RESPITE ROOM																		
Staff	3	180	Room Sleep								0		0					
Staff	3	180	Room Sleep	coat hooks		In addition to mandatory accessories				12	12		12			x		
LOCKER ROOMS																		
Staff	3	184.1	Room Male locker	locker	1/2 size			155		38	38		38			x		
Staff	3	184.1	Room Male locker	locker	full			155		1	1		1			x		
Staff	3	184.1	Room Male locker	tackboard	3x4			178		1	1		1		x			
Staff	3	184.1	Room Male locker	mirror		In addition to mandatory accessories		187		1	1		1			x		
Staff	3	184.1	Room Male locker	bench				132		1	1		1				x	
Staff	3	184.1	Room Male locker	towel bar				182		1	1		1			x		
Staff	3	184.1	Room Male locker	container	garbage	large		79		1	1		1		x			
Staff	3	184.1	Room Male locker	coat hooks		In addition to mandatory accessories				12	12		12			x		
Staff	3	184.1	Room Male locker	dispenser	paper towel	does not im t responsibil ties in schedule 1		82		1	1		1	x				
Staff	3	184.1	Room Male locker	dispenser	soap	does not im t responsibil ties in schedule 1		113		1	1		1	x				
Staff	3	182.2	Shower	locker				155		1	1		1			x		
Staff	3	182.2	Shower	inen hamper				105		1	1		1		x			
Staff	3	182.2	Shower	towel bar				182		1	1		1			x		

Staff	3	n\a	washroom	container	garbage	sma l		78		1	1		1		x			
Staff	3	n\a	washroom	inen hamper						1	1		1		x			
Staff	3	n\a	washroom	towel bar						1	1		1			x		
Staff	3	n\a	washroom	locker	full					1	1		1			x		
Staff	3	n\a	washroom	dispenser	paper towel	does not im t responsibil ties in schedule 1		82		1	1			x				
Staff	3	n\a	washroom	dispenser	soap	does not im t responsibil ties in schedule 1		113		1	1			x				
Staff	3	n\a	washroom	dispenser	toilet paper	does not im t responsibil ties in schedule 1		112		1	1			x				
Staff	3	n\a	washroom	container	garbage	sma l		78		2	2		2		x			
Staff	3	n\a	washroom	inen hamper				105		2	2		2		x			
Staff	3	n\a	washroom	towel bar						2	2		2			x		
Staff	3	n\a	washroom	locker	full			155		2	2		2			x		
Staff	3	n\a	washroom	dispenser	paper towel	does not im t responsibil ties in schedule 1		82		1	1			x				
Staff	3	n\a	washroom	dispenser	soap	does not im t responsibil ties in schedule 1		113		1	1			x				
Staff	3	n\a	washroom	dispenser	toilet paper	does not im t responsibil ties in schedule 1		112		1	1			x				
Staff	3	185	Room Womens locker	locker	1/2 size			155		74	74		74			x		
Staff	3	185	Room Womens locker	bench				132		1	1		1				x	
Staff	3	185	Room Womens locker	container	garbage	large		79		1	1		1		x			
Staff	3	185	Room Womens locker	mirror		In addition to mandatory accessories		187		1	1		1			x		
Staff	3	185	Room Womens locker	inen hamper				105		1	1		1		x			
Staff	3	185	Room Womens locker	towel bar				182		1	1		1			x		
Staff	3	185	Room Womens locker	coat hooks		In addition to mandatory accessories				12	12		12			x		
Staff	3	185	Room Womens locker	dispenser	paper towel	does not im t responsibil ties in schedule 1		82		1	1			x				
Staff	3	185	Room Womens locker	dispenser	soap	does not im t responsibil ties in schedule 1		113		1	1			x				
Staff	3	182.1	Shower	locker				155		1	1		1			x		
Staff	3	182.1	Shower	inen hamper				105		1	1		1		x			
Staff	3	182.1	Shower	towel bar				182		1	1		1			x		
Staff	3	182.1	Shower	coat hooks		in addition to mandatory accessories				2	2		2			x		
LAB COAT STORAGE																		
Staff	3	170B	Clean lab coat storage	exchange carts						2	2		2		x			
PUBLIC WASHROOMS (S.WC)																		
office	3	181.3	washroom	container	garbage			79		1	1		1		x			
office	3	181.3	washroom	dispenser	paper towel	does not im t responsibil ties in schedule 1		82		1	1			x				
office	3	181.3	washroom	dispenser	soap	does not im t responsibil ties in schedule 1		113		1	1			x				
office	3	181.3	washroom	dispenser	toilet paper	does not im t responsibil ties in schedule 1		112		1	1			x				
office	3	181.4	washroom	container	garbage	large		79		1	1		1		x			
office	3	181.4	washroom	dispenser	paper towel	does not im t responsibil ties in schedule 1		82		1	1			x				
office	3	181.4	washroom	dispenser	soap	does not im t responsibil ties in schedule 1		113		1	1			x				

office	3	181.4	washroom	dispenser	toilet paper	does not im t responsibil ties in schedule 1		112		1	1			x				
office	3	181.5	washroom	container	garbage			79		1	1		1		x			
office	3	181.5	washroom	dispenser	paper towel	does not im t responsibil ties in schedule 1		82		1	1			x				
office	3	181.5	washroom	dispenser	soap	does not im t responsibil ties in schedule 1		113		1	1			x				
office	3	181.5	washroom	dispenser	toilet paper	does not im t responsibil ties in schedule 1		112		1	1			x				
office	3	181.8	washroom	baby change table				200		1	1		1			x		
office	3	181.8	washroom	container	garbage	large		79		1	1		1		x			
office	3	181.8	washroom	dispenser	paper towel	does not im t responsibil ties in schedule 1		82		1	1			x				
office	3	181.8	washroom	dispenser	soap	does not im t responsibil ties in schedule 1		113		1	1			x				
office	3	181.8	washroom	dispenser	toilet paper	does not im t responsibil ties in schedule 1		112		1	1			x				
office	3	181.6	washroom	container	garbage			79		1	1		1		x			
office	3	181.6	washroom	dispenser	paper towel	does not im t responsibil ties in schedule 1		82		1	1			x				
office	3	181.6	washroom	dispenser	soap	does not im t responsibil ties in schedule 1		113		1	1			x				
office	3	181.6	washroom	dispenser	toilet paper	does not im t responsibil ties in schedule 1		112		1	1			x				
office	3	181.7	washroom	container	garbage	large		79		1	1		1		x			
office	3	181.7	washroom	dispenser	paper towel	does not im t responsibil ties in schedule 1		82		1	1			x				
office	3	181.7	washroom	dispenser	soap	does not im t responsibil ties in schedule 1		113		1	1			x				
office	3	181.7	washroom	dispenser	toilet paper	does not im t responsibil ties in schedule 1		112		1	1			x				
Lobby																		
office	3	n\a	Lobby								0		0					
office	3	n\a	Lobby	dispenser	soap	does not im t responsibil ties in schedule 1		113		1	1			x				
Waiting area																		
office	3	200	waiting area	chair	waiting			139		5	5		5				x	
office	3	200	waiting area	container	garbage	sma l		78		1	1		1		x			
office	3	200	waiting area	table	end			175		2	2		2				x	
office	3	200	waiting area	dispenser	soap	does not im t responsibil ties in schedule 1		113		1	1			x				
Phlebotomy Supplies																		
office	3	201	Phlebotomy supp ies	Cot						1	1		1				x	
office	3	201	Phlebotomy supp ies	Computer terminal				142		1	1		1		x			
office	3	201	Phlebotomy supp ies	workstation		A1		186		1	1		1				x	
office	3	201	Phlebotomy supp ies	chair	visitor			44			0		0				x	
Mail/Copy Room																		
office	3	126	MAIL\COPY ROOM								0		0					
Chief Tech Office																		
office	3	117	Office Chief Tech	workstation	office	A4		186		1	1		1				x	
office	3	117	Office Chief Tech	Computer terminal				142		1	1		1		x			
office	3	117	Office Chief Tech	tackboard	3x4			178		1	1		1		x			
office	3	117	Office Chief Tech	whiteboard	3x4			185		1	1		1		x			
office	3	117	Office Chief Tech	bookcase	tall			46		1	1		1				x	
office	3	117	Office Chief Tech	chair	task			45		1	1		1				x	

office	3	117	Office Chief Tech	chair	visitor			44		1	1		1				x	
office	3	117	Office Chief Tech	f ling cabinet	4 drawer			47		1	1		1				x	
office	3	117	Office Chief Tech	keyboard tray				151		1	1		1				x	
office	3	117	Office Chief Tech	container	garbage			79		1	1		1		x			
office	3	117	Office Chief Tech	container	recyc ing			78		1	1		1		x			
Lab Manager Office																		
office	3	122	Office Lab Manager	workstation	office	B1		186		1	1		1				x	
office	3	122	Office Lab Manager	Computer terminal				142		1	1		1		x			
office	3	122	Office Lab Manager	tackboard	3x4			178		1	1		1		x			
office	3	122	Office Lab Manager	whiteboard	3x4			185		1	1		1		x			
office	3	122	Office Lab Manager	bookcase	tall			46		1	1		1				x	
office	3	122	Office Lab Manager	chair	task			45		1	1		1				x	
office	3	122	Office Lab Manager	chair	visitor			45		1	1		1				x	
office	3	122	Office Lab Manager	f ling cabinet	4 drawer			47		1	1		1				x	
office	3	122	Office Lab Manager	keyboard tray				151		1	1		1				x	
office	3	122	Office Lab Manager	container	garbage			79		1	1		1		x			
office	3	122	Office Lab Manager	container	recyc ing			78		1	1		1		x			
Clinical Director Office																		
office	3	100	Office C incal Director	workstation	office	B1		186		1	1		1				x	
office	3	100	Office C incal Director	Computer terminal				142		1	1		1		x			
office	3	100	Office C incal Director	tackboard	3x4			178		1	1		1		x			
office	3	100	Office C incal Director	whiteboard	3x4			185		1	1		1		x			
office	3	100	Office C incal Director	bookcase	tall			46		1	1		1				x	
office	3	100	Office C incal Director	chair	task			45		1	1		1				x	
office	3	100	Office C incal Director	chair	visitor			45		1	1		1				x	
office	3	100	Office C incal Director	f ling cabinet	4 drawer			47		1	1		1				x	
office	3	100	Office C incal Director	keyboard tray				151		1	1		1				x	
office	3	100	Office C incal Director	container	garbage			79		1	1		1		x			
office	3	100	Office C incal Director	container	recyc ing			78		1	1		1		x			
Admin Asst Office																		
office	3	120	Office admin	workstation	office	A1		186		1	1		1				x	
office	3	120	Office admin	Computer terminal				142		1	1		1		x			
office	3	120	Office admin	tackboard	3x4			178		1	1		1		x			
office	3	120	Office admin	whiteboard	3x4			185		1	1		1		x			
office	3	120	Office admin	chair	task			45		1	1		1				x	
office	3	120	Office admin	keyboard tray				151		1	1		1				x	
office	3	120	Office admin	container	garbage			79		1	1		1		x			
office	3	120	Office admin	container	recyc ing			78		1	1		1		x			
Secretary																		
office	3	121	secretary	workstation	office	A2		186		1	1		1				x	
office	3	121	secretary	Computer terminal				142		1	1		1		x			
office	3	121	secretary	tackboard	3x4			178		1	1		1		x			
office	3	121	secretary	whiteboard	3x4			185		1	1		1		x			
office	3	121	secretary	bookcase	tall			46		1	1		1				x	
office	3	121	secretary	chair	task			45		1	1		1				x	
office	3	121	secretary	f ling cabinet	4 drawer			47		1	1		1				x	
office	3	121	secretary	keyboard tray				151		1	1		1				x	
office	3	121	secretary	container	garbage			79		1	1		1		x			
office	3	121	secretary	container	recyc ing			78		1	1		1		x			
Pathology Resident Office																		
ana path	2	105	Office Pathology Resident	workstation	office	A4		186		1	1		1				x	
ana path	2	105	Office Pathology Resident	Computer terminal		dual mon tor		142		1	1		1		x			
ana path	2	105	Office Pathology Resident	tackboard	3x4			178		1	1		1		x			
ana path	2	105	Office Pathology Resident	whiteboard	3x4			185		1	1		1		x			
ana path	2	105	Office Pathology Resident	bookcase	tall			46		1	1		1				x	
ana path	2	105	Office Pathology Resident	chair	task	80% sitting		45		1	1		1				x	
ana path	2	105	Office Pathology Resident	chair	visitor			44		1	1		1				x	
ana path	2	105	Office Pathology Resident	f ling cabinet	4 drawer	lateral		47		1	1		1				x	
ana path	2	105	Office Pathology Resident	keyboard tray				151		1	1		1					
ana path	2	105	Office Pathology Resident	container	garbage	sma l		79		1	1		1		x			
ana path	2	105	Office Pathology Resident	container	recyc ing			78		1	1		1		x			
ana path	2	104	Room Multi-head scope telemedicine	tackboard				178		1	1		1		x			
ana path	2	104	Room Multi-head scope telemedicine	whiteboard				185		1	1		1		x			
ana path	2	104	Room Multi-head scope telemedicine															
Admin Director Office																		
office	3	123	Office Admin Director	workstation	office	B1		186		1	1		1				x	
office	3	123	Office Admin Director	Computer terminal				142		1	1		1		x			
office	3	123	Office Admin Director	tackboard	3x4			178		1	1		1		x			
office	3	123	Office Admin Director	whiteboard	3x4			185		1	1		1		x			
office	3	123	Office Admin Director	bookcase	tall			46		1	1		1				x	

office	3	123	Office Admin Director	chair	task			45		1	1		1				x	
office	3	123	Office Admin Director	chair	visitor			44		1	1		1				x	
office	3	123	Office Admin Director	f ling cabinet	4 drawer			47		1	1		1				x	
office	3	123	Office Admin Director	keyboard tray				151		1	1		1				x	
office	3	123	Office Admin Director	container	garbage			79		1	1		1		x			
office	3	123	Office Admin Director	container	recyc ing			78		1	1		1		x			
Staff Lounge																		
Staff Lounge	3	183	Lounge 3rd Floor	refridgerator	domestic	18 cuft with freezer		31		1	1		1		x			
Staff Lounge	3	183	Lounge 3rd Floor	microwave		1.6cuft		156		1	1		1		x			
Staff Lounge	3	183	Lounge 3rd Floor	computer terminal				142		1	1		1		x			
Staff Lounge	3	183	Lounge 3rd Floor	coffee machine	w th hot water			17		1	1		1		x			
Staff Lounge	3	183	Lounge 3rd Floor	tackboard	3x4			178		1	1		1		x			
Staff Lounge	3	183	Lounge 3rd Floor	whiteboard	3x4			185		1	1		1		x			
Staff Lounge	3	183	Lounge 3rd Floor	bookcase	tall			46		1	1		1				x	
Staff Lounge	3	183	Lounge 3rd Floor	chair	hea thcare seating			52		15	15		15				x	
Staff Lounge	3	183	Lounge 3rd Floor	lamp	table			153		1	1		1		x			
Staff Lounge	3	183	Lounge 3rd Floor	sofa	hea thcare seating			53		1	1		1				x	
Staff Lounge	3	183	Lounge 3rd Floor	table	end			175		1	1		1				x	
Staff Lounge	3	183	Lounge 3rd Floor	table	co fee			172		1	1		1				x	
Staff Lounge	3	183	Lounge 3rd Floor	table	round	48		586		1	1		1				x	
Staff Lounge	3	183	Lounge 3rd Floor	bracket	television	32 LCD		144		1	1		1		x			
Staff Lounge	3	183	Lounge 3rd Floor	television	32 lcd			131		1	1		1		x			
Staff Lounge	3	183	Lounge 3rd Floor	container	garbage	large		79		1	1		1		x			
Staff Lounge	3	183	Lounge 3rd Floor	container	recyc ing			78		1	1		1		x			
Staff Lounge	3	183	Lounge 3rd Floor	dishwasher				30		1	1		1			x		
Staff Lounge	3	183	Lounge 3rd Floor	coat hooks	in addi ion to mandatory accessories					12	12		12			x		
Hemo Workstation																		
Hemo	3	113	WKSTN Chemistry	workstation	office	A2	office	186		1	1		1				x	
Hemo	3	113	WKSTN Chemistry	Computer terminal				142		1	1		1		x			
Hemo	3	113	WKSTN Chemistry	tackboard	3x4			178		1	1		1		x			
Hemo	3	113	WKSTN Chemistry	whiteboard	3x4			185		1	1		1		x			
Hemo	3	113	WKSTN Chemistry	chair	task	80% sitting		45		1	1		1				x	
Hemo	3	113	WKSTN Chemistry	f ling cabinet	4 drawer	lateral		47		1	1		1				x	
Hemo	3	113	WKSTN Chemistry	keyboard tray				151		1	1		1				x	
Hemo	3	113	WKSTN Chemistry	container	garbage	sma l		78		1	1		1		x			
Hemo	3	113	WKSTN Chemistry	container	recyc ing			78		1	1		1		x			
Chemistry Workstation																		
Chemistry	3	112	WKSTN Chemistry	workstation	office	A2	office	186		1	1		1				x	
Chemistry	3	112	WKSTN Chemistry	Computer terminal				142		1	1		1		x			
Chemistry	3	112	WKSTN Chemistry	tackboard	3x4			178		1	1		1		x			
Chemistry	3	112	WKSTN Chemistry	whiteboard	3x4			185		1	1		1		x			
Chemistry	3	112	WKSTN Chemistry	chair	task	80% sitting		45		1	1		1				x	
Chemistry	3	112	WKSTN Chemistry	f ling cabinet	4 drawer	lateral		47		1	1		1				x	
Chemistry	3	112	WKSTN Chemistry	keyboard tray				151		1	1		1				x	
Chemistry	3	112	WKSTN Chemistry	container	garbage	sma l		78		1	1		1		x			
Chemistry	3	112	WKSTN Chemistry	container	recyc ing			78		1	1		1		x			
POC Workstation																		
POC	3	176	WKSTN POC	workstation	office	A2	office	186		2	2		2				x	
POC	3	176	WKSTN POC	Computer terminal				142		2	2		2		x			
POC	3	176	WKSTN POC	tackboard	3x4			178		2	2		2		x			
POC	3	176	WKSTN POC	whiteboard	3x4			185		2	2		2		x			
POC	3	176	WKSTN POC	chair	task	80% sitting		45		2	2		2				x	
POC	3	176	WKSTN POC	f ling cabinet	4 drawer	lateral		47		2	2		2				x	
POC	3	176	WKSTN POC	keyboard tray				151		2	2		2				x	
POC	3	176	WKSTN POC	container	garbage	sma l		78		2	2		2		x			

POC	3	176	WKSTN POC	container	recycling			78		2	2		2		x			
Transcription Office																		
ana path	2	116.1	Office Transcription	workstation	office	A4		186		1	1		1				x	
ana path	2	116 1	Office Transcription	tackboard	3x4			178		2	2		2		x			
ana path	2	116.2	Office Transcription	workstation	office	A4		186		1	1		1				x	
ana path	2	116.2	Office Transcription	tackboard	3x4			178		2	2		2		x			
ana path	2	116.3	Office Transcription	workstation	office	A4		186		1	1		1				x	
ana path	2	116.3	Office Transcription	tackboard	3x4			178		2	2		2		x			
ana path	2	116.4	Office Transcription	workstation	office	A4		186		1	1		1				x	
ana path	2	116.4	Office Transcription	tackboard	3x4			178		2	2		2		x			
ana path	2	170A	Clean lab coats	exchange carts						2	2		2		x			
Lab Reception																		
ana path	2	106	Recep ion Lab assist	computer terminal				142		1	1		1		x			
ana path	2	106	Recep ion Lab assist	chair	task	80% sitting		45		1	1		1				x	
ana path	2	106	Recep ion Lab assist	dispenser	soap	does not im t responsibil ties in schedule 1		113		1	1			x				
Social Work Office																		
office	2	210.1	Office	computer terminal				142		1	1		1		x			
office	2	210.1	Office	container	garbage	sma l		78		1	1		1		x			
office	2	210.1	Office	tackboard	3x4			178		1	1		1		x			
office	2	210.1	Office	whiteboard	3x4			185		1	1		1		x			
office	2	210.1	Office	bookcase	tall			46		1	1		1				x	
office	2	210.1	Office	chair	task	80% sitting		45		1	1		1				x	
office	2	210.1	Office	chair	visitor			44		2	2		2				x	
office	2	210.1	Office	workstation	office	A3a		186		1	1		1				x	
office	2	210.1	Office	f ling cabinet	four drawer			47		1	1		1				x	
office	2	210.2	Office	computer terminal				142		1	1		1		x			
office	2	210.2	Office	container	garbage	sma l		78		1	1		1		x			
office	2	210.2	Office	tackboard	3x4			178		1	1		1		x			
office	2	210.2	Office	whiteboard	3x4			185		1	1		1		x			
office	2	210.2	Office	bookcase	tall			46		1	1		1				x	
office	2	210.2	Office	chair	task	80% sitting		45		1	1		1				x	
office	2	210.2	Office	chair	visitor			44		2	2		2				x	
office	2	210.2	Office	workstation	office	A3a		186		1	1		1				x	
office	2	210.2	Office	f ling cabinet	four drawer			47		1	1		1				x	
office	2	210.3	Office	computer terminal				142		1	1		1		x			
office	2	210.3	Office	container	garbage	sma l		78		1	1		1		x			
office	2	210.3	Office	tackboard	3x4			178		1	1		1		x			
office	2	210.3	Office	whiteboard	3x4			185		1	1		1		x			
office	2	210.3	Office	bookcase	tall			46		1	1		1				x	
office	2	210.3	Office	chair	task	80% sitting		45		1	1		1				x	
office	2	210.3	Office	chair	visitor			44		2	2		2				x	
office	2	210.3	Office	workstation	office	A3a		186		1	1		1				x	
office	2	210.3	Office	f ling cabinet	four drawer			47		1	1		1				x	
office	2	210.4	Office	computer terminal				142		1	1		1		x			
office	2	210.4	Office	container	garbage	sma l		78		1	1		1		x			
office	2	210.4	Office	tackboard	3x4			178		1	1		1		x			
office	2	210.4	Office	whiteboard	3x4			185		1	1		1		x			
office	2	210 4	Office	bookcase	tall			46		1	1		1				x	
office	2	210.4	Office	chair	task	80% sitting		45		1	1		1				x	
office	2	210.4	Office	chair	visitor			44		2	2		2				x	
office	2	210.4	Office	workstation	office	A3a		186		1	1		1				x	
office	2	210.4	Office	f ling cabinet	four drawer			47		1	1		1				x	
office	2	210.5	Office	computer terminal				142		1	1		1		x			
office	2	210.5	Office	container	garbage	sma l		78		1	1		1		x			
office	2	210.5	Office	tackboard	3x4			178		1	1		1		x			
office	2	210.5	Office	whiteboard	3x4			185		1	1		1		x			
office	2	210.5	Office	bookcase	tall			46		1	1		1				x	
office	2	210.5	Office	chair	task	80% sitting		45		1	1		1				x	
office	2	210.5	Office	chair	visitor			44		2	2		2				x	
office	2	210.5	Office	workstation	office	A3a		186		1	1		1				x	
office	2	210.5	Office	f ling cabinet	four drawer			47		1	1		1				x	
office	2	210.6	Office	computer terminal				142		1	1		1		x			
office	2	210.6	Office	container	garbage	sma l		78		1	1		1		x			
office	2	210.6	Office	tackboard	3x4			178		1	1		1		x			
office	2	210.6	Office	whiteboard	3x4			185		1	1		1		x			
office	2	210.6	Office	bookcase	tall			46		1	1		1				x	

office	2	210.6	Office	chair	task	80% sitting		45		1	1		1				x	
office	2	210.6	Office	chair	visitor			44		2	2		2				x	
office	2	210.6	Office	workstation	office	A3a		186		1	1		1				x	
office	2	210 6	Office	f ling cabinet	four drawer			47		1	1		1				x	
office	2	210.7	Office	computer terminal				142		1	1		1		x			
office	2	210.7	Office	container	garbage	sma l		78		1	1		1		x			
office	2	210.7	Office	tackboard	3x4			178		1	1		1		x			
office	2	210.7	Office	whiteboard	3x4			185		1	1		1		x			
office	2	210.7	Office	bookcase	tall			46		1	1		1				x	
office	2	210.7	Office	chair	task	80% sitting		45		1	1		1				x	
office	2	210.7	Office	chair	visitor			44		2	2		2				x	
office	2	210.7	Office	workstation	office	A3a		186		1	1		1				x	
office	2	210.7	Office	f ling cabinet	four drawer			47		1	1		1				x	
office	2	210.8	Office	computer terminal				142		1	1		1		x			
office	2	210.8	Office	container	garbage	sma l		78		1	1		1		x			
office	2	210.8	Office	tackboard	3x4			178		1	1		1		x			
office	2	210.8	Office	whiteboard	3x4			185		1	1		1		x			
office	2	210.8	Office	bookcase	tall			46		1	1		1				x	
office	2	210.8	Office	chair	task	80% sitting		45		1	1		1				x	
office	2	210.8	Office	chair	visitor			44		2	2		2				x	
office	2	210.8	Office	workstation	office	A3a		186		1	1		1				x	
office	2	210.8	Office	f ling cabinet	four drawer			47		1	1		1				x	
office	2	210.9	Office	computer terminal				142		1	1		1		x			
office	2	210.9	Office	container	garbage	sma l		78		1	1		1		x			
office	2	210.9	Office	tackboard	3x4			178		1	1		1		x			
office	2	210 9	Office	whiteboard	3x4			185		1	1		1		x			
office	2	210.9	Office	bookcase	tall			46		1	1		1				x	
office	2	210.9	Office	chair	task	80% sitting		45		1	1		1				x	
office	2	210.9	Office	chair	visitor			44		2	2		2				x	
office	2	210.9	Office	workstation	office	A3a		186		1	1		1				x	
office	2	210.9	Office	f ling cabinet	four drawer			47		1	1		1				x	
office	2	210.10	Office	computer terminal				142		1	1		1		x			
office	2	210.10	Office	container	garbage	sma l		78		1	1		1		x			
office	2	210.10	Office	tackboard	3x4			178		1	1		1		x			
office	2	210.10	Office	whiteboard	3x4			185		1	1		1		x			
office	2	210.10	Office	bookcase	tall			46		1	1		1				x	
office	2	210.10	Office	chair	task	80% sitting		45		1	1		1				x	
office	2	210.10	Office	chair	visitor			44		2	2		2				x	
office	2	210.10	Office	workstation	office	A3a		186		1	1		1				x	
office	2	210.10	Office	f ling cabinet	four drawer			47		1	1		1				x	
office	2	210.11	Office	computer terminal				142		1	1		1		x			
office	2	210.11	Office	container	garbage	sma l		78		1	1		1		x			
office	2	210.11	Office	tackboard	3x4			178		1	1		1		x			
office	2	210.11	Office	whiteboard	3x4			185		1	1		1		x			
office	2	210.11	Office	bookcase	tall			46		1	1		1				x	
office	2	210.11	Office	chair	task	80% sitting		45		1	1		1				x	
office	2	210.11	Office	chair	visitor			44		2	2		2				x	
office	2	210.11	Office	workstation	office	A3a		186		1	1		1				x	
office	2	210 11	Office	f ling cabinet	four drawer			47		1	1		1				x	
office	2	210.12	Office	computer terminal				142		1	1		1		x			
office	2	210.12	Office	container	garbage	sma l		78		1	1		1		x			
office	2	210.12	Office	tackboard	3x4			178		1	1		1		x			
office	2	210.12	Office	whiteboard	3x4			185		1	1		1		x			
office	2	210.12	Office	bookcase	tall			46		1	1		1				x	
office	2	210.12	Office	chair	task	80% sitting		45		1	1		1				x	
office	2	210.12	Office	chair	visitor			44		2	2		2				x	
office	2	210.12	Office	workstation	office	A3a		186		1	1		1				x	
office	2	210.12	Office	f ling cabinet	four drawer			47		1	1		1				x	
office	2	210.13	Office	computer terminal				142		1	1		1		x			
office	2	210.13	Office	container	garbage	sma l		78		1	1		1		x			
office	2	210.13	Office	tackboard	3x4			178		1	1		1		x			
office	2	210.13	Office	whiteboard	3x4			185		1	1		1		x			
office	2	210.13	Office	bookcase	tall			46		1	1		1				x	
office	2	210.13	Office	chair	task	80% sitting		45		1	1		1				x	
office	2	210.13	Office	chair	visitor			44		2	2		2				x	
office	2	210.13	Office	workstation	office	A3a		186		1	1		1				x	
office	2	210.13	Office	f ling cabinet	four drawer			47		1	1		1				x	

office	2	210.14	Office	computer terminal				142		1	1		1		x			
office	2	210.14	Office	container	garbage	sma l		78		1	1		1		x			
office	2	210.14	Office	tackboard	3x4			178		1	1		1		x			
office	2	210.14	Office	whiteboard	3x4			185		1	1		1		x			
office	2	210.14	Office	bookcase	tall			46		1	1		1				x	
office	2	210.14	Office	chair	task	80% sitting		45		1	1		1				x	
office	2	210.14	Office	chair	visitor			44		2	2		2				x	
office	2	210.14	Office	workstation	office	A3a		186		1	1		1				x	
office	2	210.14	Office	f ling cabinet	four drawer			47		1	1		1				x	
office	2	210.15	Office	computer terminal				142		1	1		1		x			
office	2	210.15	Office	container	garbage	sma l		78		1	1		1		x			
office	2	210.15	Office	tackboard	3x4			178		1	1		1		x			
office	2	210.15	Office	whiteboard	3x4			185		1	1		1		x			
office	2	210.15	Office	bookcase	tall			46		1	1		1				x	
office	2	210.15	Office	chair	task	80% sitting		45		1	1		1				x	
office	2	210.15	Office	chair	visitor			44		2	2		2				x	
office	2	210.15	Office	workstation	office	A3a		186		1	1		1				x	
office	2	210.15	Office	f ling cabinet	four drawer			47		1	1		1				x	
office	2	210.16	Office	computer terminal				142		1	1		1		x			
office	2	210.16	Office	container	garbage	sma l		78		1	1		1		x			
office	2	210.16	Office	tackboard	3x4			178		1	1		1		x			
office	2	210.16	Office	whiteboard	3x4			185		1	1		1		x			
office	2	210.16	Office	bookcase	tall			46		1	1		1				x	
office	2	210.16	Office	chair	task	80% sitting		45		1	1		1				x	
office	2	210.16	Office	chair	visitor			44		2	2		2				x	
office	2	210.16	Office	workstation	office	A3a		186		1	1		1				x	
office	2	210.16	Office	f ling cabinet	four drawer			47		1	1		1				x	
office	2	210.17	Office	computer terminal				142		1	1		1		x			
office	2	210.17	Office	container	garbage	sma l		78		1	1		1		x			
office	2	210.17	Office	tackboard	3x4			178		1	1		1		x			
office	2	210.17	Office	whiteboard	3x4			185		1	1		1		x			
office	2	210.17	Office	bookcase	tall			46		1	1		1				x	
office	2	210.17	Office	chair	task	80% sitting		45		1	1		1				x	
office	2	210.17	Office	chair	visitor			44		2	2		2				x	
office	2	210.17	Office	workstation	office	A3a		186		1	1		1				x	
office	2	210.17	Office	f ling cabinet	four drawer			47		1	1		1				x	
office	2	210.18	Office	computer terminal				142		1	1		1		x			
office	2	210.18	Office	container	garbage	sma l		78		1	1		1		x			
office	2	210.18	Office	tackboard	3x4			178		1	1		1		x			
office	2	210.18	Office	whiteboard	3x4			185		1	1		1		x			
office	2	210.18	Office	bookcase	tall			46		1	1		1				x	
office	2	210.18	Office	chair	task	80% sitting		45		1	1		1				x	
office	2	210.18	Office	chair	visitor			44		2	2		2				x	
office	2	210.18	Office	workstation	office	A3a		186		1	1		1				x	
office	2	210.18	Office	f ling cabinet	four drawer			47		1	1		1				x	
office	2	210.19	Office	computer terminal				142		1	1		1		x			
office	2	210.19	Office	container	garbage	sma l		78		1	1		1		x			
office	2	210.19	Office	tackboard	3x4			178		1	1		1		x			
office	2	210.19	Office	whiteboard	3x4			185		1	1		1		x			
office	2	210.19	Office	bookcase	tall			46		1	1		1				x	
office	2	210.19	Office	chair	task	80% sitting		45		1	1		1				x	
office	2	210.19	Office	chair	visitor			44		2	2		2				x	
office	2	210.19	Office	workstation	office	A3a		186		1	1		1				x	
office	2	210.19	Office	f ling cabinet	four drawer			47		1	1		1				x	
office	2	210.20	Office	computer terminal				142		1	1		1		x			
office	2	210.20	Office	container	garbage	sma l		78		1	1		1		x			
office	2	210.20	Office	tackboard	3x4			178		1	1		1		x			
office	2	210.20	Office	whiteboard	3x4			185		1	1		1		x			
office	2	210.20	Office	bookcase	tall			46		1	1		1				x	
office	2	210.20	Office	chair	task	80% sitting		45		1	1		1				x	
office	2	210.20	Office	chair	visitor			44		2	2		2				x	
office	2	210.20	Office	workstation	office	A3a		186		1	1		1				x	
office	2	210.20	Office	f ling cabinet	four drawer			47		1	1		1				x	
office	2	210.21	Office	computer terminal				142		1	1		1		x			
office	2	210.21	Office	container	garbage	sma l		78		1	1		1		x			
office	2	210.21	Office	tackboard	3x4			178		1	1		1		x			

office	2	210.21	Office	whiteboard	3x4			185		1	1		1		x			
office	2	210.21	Office	bookcase	tall			46		1	1		1				x	
office	2	210.21	Office	chair	task	80% sitting		45		1	1		1				x	
office	2	210.21	Office	chair	visitor			44		2	2		2				x	
office	2	210.21	Office	workstation	office	A3a		186		1	1		1				x	
office	2	210.21	Office	filing cabinet	four drawer			47		1	1		1				x	
office	2	210.22	Office	computer terminal				142		1	1		1		x			
office	2	210.22	Office	container	garbage	small		78		1	1		1		x			
office	2	210.22	Office	tackboard	3x4			178		1	1		1		x			
office	2	210.22	Office	whiteboard	3x4			185		1	1		1		x			
office	2	210.22	Office	bookcase	tall			46		1	1		1				x	
office	2	210.22	Office	chair	task	80% sitting		45		1	1		1				x	
office	2	210.22	Office	chair	visitor			44		2	2		2				x	
office	2	210.22	Office	workstation	office	A3a		186		1	1		1				x	
office	2	210.22	Office	filing cabinet	four drawer			47		1	1		1				x	
office	2	210.23	Office	computer terminal				142		1	1		1		x			
office	2	210.23	Office	container	garbage	small		78		1	1		1		x			
office	2	210.23	Office	tackboard	3x4			178		1	1		1		x			
office	2	210.23	Office	whiteboard	3x4			185		1	1		1		x			
office	2	210.23	Office	bookcase	tall			46		1	1		1				x	
office	2	210.23	Office	chair	task	80% sitting		45		1	1		1				x	
office	2	210.23	Office	chair	visitor			44		2	2		2				x	
office	2	210.23	Office	workstation	office	A3a		186		1	1		1				x	
office	2	210.23	Office	filing cabinet	four drawer			47		1	1		1				x	
office	2	210.24	Office	computer terminal				142		1	1		1		x			
office	2	210.24	Office	container	garbage	small		78		1	1		1		x			
office	2	210.24	Office	tackboard	3x4			178		1	1		1		x			
office	2	210.24	Office	whiteboard	3x4			185		1	1		1		x			
office	2	210.24	Office	bookcase	tall			46		1	1		1				x	
office	2	210.24	Office	chair	task	80% sitting		45		1	1		1				x	
office	2	210.24	Office	chair	visitor			44		2	2		2				x	
office	2	210.24	Office	workstation	office	A3a		186		1	1		1				x	
office	2	210.24	Office	filing cabinet	four drawer			47		1	1		1				x	
office	2	210.25	Office	computer terminal				142		1	1		1		x			
office	2	210.25	Office	container	garbage	small		78		1	1		1		x			
office	2	210.25	Office	tackboard	3x4			178		1	1		1		x			
office	2	210.25	Office	whiteboard	3x4			185		1	1		1		x			
office	2	210.25	Office	bookcase	tall			46		1	1		1				x	
office	2	210.25	Office	chair	task	80% sitting		45		1	1		1				x	
office	2	210.25	Office	chair	visitor			44		2	2		2				x	
office	2	210.25	Office	workstation	office	A3a		186		1	1		1				x	
office	2	210.25	Office	filing cabinet	four drawer			47		1	1		1				x	
office	2	210.26	Office	computer terminal				142		1	1		1		x			
office	2	210.26	Office	container	garbage	small		78		1	1		1		x			
office	2	210.26	Office	tackboard	3x4			178		1	1		1		x			
office	2	210.26	Office	whiteboard	3x4			185		1	1		1		x			
office	2	210.26	Office	bookcase	tall			46		1	1		1				x	
office	2	210.26	Office	chair	task	80% sitting		45		1	1		1				x	
office	2	210.26	Office	chair	visitor			44		2	2		2				x	
office	2	210.26	Office	workstation	office	A3a		186		1	1		1				x	
office	2	210.26	Office	filing cabinet	four drawer			47		1	1		1				x	
office	2	210.27	Office	computer terminal				142		1	1		1		x			
office	2	210.27	Office	container	garbage	small		78		1	1		1		x			
office	2	210.27	Office	tackboard	3x4			178		1	1		1		x			
office	2	210.27	Office	whiteboard	3x4			185		1	1		1		x			
office	2	210.27	Office	bookcase	tall			46		1	1		1				x	
office	2	210.27	Office	chair	task	80% sitting		45		1	1		1				x	
office	2	210.27	Office	chair	visitor			44		2	2		2				x	
office	2	210.27	Office	workstation	office	A3a		186		1	1		1				x	
office	2	210.27	Office	filing cabinet	four drawer			47		1	1		1				x	
office	2	210.28	Office	computer terminal				142		1	1		1		x			
office	2	210.28	Office	container	garbage	small		78		1	1		1		x			
office	2	210.28	Office	tackboard	3x4			178		1	1		1		x			
office	2	210.28	Office	whiteboard	3x4			185		1	1		1		x			
office	2	210.28	Office	bookcase	tall			46		1	1		1				x	
office	2	210.28	Office	chair	task	80% sitting		45		1	1		1				x	
office	2	210.28	Office	chair	visitor			44		2	2		2				x	
office	2	210.28	Office	workstation	office	A3a		186		1	1		1				x	

office	2	210.28	Office	f ling cabinet	four drawer			47		1	1		1				x	
office	2	210.29	Office	computer terminal				142		1	1		1		x			
office	2	210 29	Office	container	garbage	sma l		78		1	1		1		x			
office	2	210.29	Office	tackboard	3x4			178		1	1		1		x			
office	2	210.29	Office	whiteboard	3x4			185		1	1		1		x			
office	2	210.29	Office	bookcase	tall			46		1	1		1				x	
office	2	210.29	Office	chair	task	80% sitting		45		1	1		1				x	
office	2	210.29	Office	chair	visitor			44		2	2		2				x	
office	2	210.29	Office	workstation	office	A3a		186		1	1		1				x	
office	2	210.29	Office	f ling cabinet	four drawer			47		1	1		1				x	
office	2	210.30	Office	computer terminal				142		1	1		1		x			
office	2	210.30	Office	container	garbage	sma l		78		1	1		1		x			
office	2	210.30	Office	tackboard	3x4			178		1	1		1		x			
office	2	210.30	Office	whiteboard	3x4			185		1	1		1		x			
office	2	210.30	Office	bookcase	tall			46		1	1		1				x	
office	2	210.30	Office	chair	task	80% sitting		45		1	1		1				x	
office	2	210.30	Office	chair	visitor			44		2	2		2				x	
office	2	210.30	Office	workstation	office	A3a		186		1	1		1				x	
office	2	210.30	Office	f ling cabinet	four drawer			47		1	1		1				x	
office	2	210.31	Office	computer terminal				142		1	1		1		x			
office	2	210.31	Office	container	garbage	sma l		78		1	1		1		x			
office	2	210.31	Office	tackboard	3x4			178		1	1		1		x			
office	2	210.31	Office	whiteboard	3x4			185		1	1		1		x			
office	2	210.31	Office	bookcase	tall			46		1	1		1				x	
office	2	210.31	Office	chair	task	80% sitting		45		1	1		1				x	
office	2	210.31	Office	chair	visitor			44		2	2		2				x	
office	2	210.31	Office	workstation	office	A3a		186		1	1		1				x	
office	2	210.31	Office	f ling cabinet	four drawer			47		1	1		1				x	
office	2	210.32	Office	computer terminal				142		1	1		1		x			
office	2	210.32	Office	container	garbage	sma l		78		1	1		1		x			
office	2	210.32	Office	tackboard	3x4			178		1	1		1		x			
office	2	210.32	Office	whiteboard	3x4			185		1	1		1		x			
office	2	210.32	Office	bookcase	tall			46		1	1		1				x	
office	2	210.32	Office	chair	task	80% sitting		45		1	1		1				x	
office	2	210.32	Office	chair	visitor			44		2	2		2				x	
office	2	210.32	Office	workstation	office	A3a		186		1	1		1				x	
office	2	210.32	Office	f ling cabinet	four drawer			47		1	1		1				x	
office	2	210.33	Office	computer terminal				142		1	1		1		x			
office	2	210.33	Office	container	garbage	sma l		78		1	1		1		x			
office	2	210.33	Office	tackboard	3x4			178		1	1		1		x			
office	2	210.33	Office	whiteboard	3x4			185		1	1		1		x			
office	2	210.33	Office	bookcase	tall			46		1	1		1				x	
office	2	210.33	Office	chair	task	80% sitting		45		1	1		1				x	
office	2	210.33	Office	chair	visitor			44		2	2		2				x	
office	2	210.33	Office	workstation	office	A3a		186		1	1		1				x	
office	2	210.33	Office	f ling cabinet	four drawer			47		1	1		1				x	
office	2	210.34	Office	computer terminal				142		1	1		1		x			
office	2	210.34	Office	container	garbage	sma l		78		1	1		1		x			
office	2	210.34	Office	tackboard	3x4			178		1	1		1		x			
office	2	210.34	Office	whiteboard	3x4			185		1	1		1		x			
office	2	210.34	Office	bookcase	tall			46		1	1		1				x	
office	2	210.34	Office	chair	task	80% sitting		45		1	1		1				x	
office	2	210.34	Office	chair	visitor			44		2	2		2				x	
office	2	210.34	Office	workstation	office	A3a		186		1	1		1				x	
office	2	210.34	Office	f ling cabinet	four drawer			47		1	1		1				x	
office	2	210.35	Office	computer terminal				142		1	1		1		x			
office	2	210.35	Office	container	garbage	sma l		78		1	1		1		x			
office	2	210.35	Office	tackboard	3x4			178		1	1		1		x			
office	2	210.35	Office	whiteboard	3x4			185		1	1		1		x			
office	2	210.35	Office	bookcase	tall			46		1	1		1				x	
office	2	210.35	Office	chair	task	80% sitting		45		1	1		1				x	
office	2	210.35	Office	chair	visitor			44		2	2		2				x	
office	2	210.35	Office	workstation	office	A3a		186		1	1		1				x	
office	2	210.35	Office	f ling cabinet	four drawer			47		1	1		1				x	
office	2	211.1	Room exam	dispenser	glove					1	1				x			

office	2	211.1	Room exam	dispenser	paper towel	does not im t responsibil ties in schedule 1		82		1	1			x				
office	2	211.1	Room exam	dispenser	soap	does not im t responsibil ties in schedule 1		113		1	1			x				
office	2	211.1	Room exam	container	sharp			66		1	1				x			
office	2	211.1	Room exam	coat hooks		in addition to mandatory accessories	See room data sheets			2	2					x		
office	2	211.2	Room exam	dispenser	glove					1	1				x			
office	2	211.2	Room exam	dispenser	paper towel	does not im t responsibil ties in schedule 1		82		1	1			x				
office	2	211.2	Room exam	dispenser	soap	does not im t responsibil ties in schedule 1		113		1	1			x				
office	2	211.2	Room exam	container	sharp			66		1	1				x			
office	2	211.2	Room exam	coat hooks		in addition to mandatory accessories	See room data sheets			2	2					x		
office	2	211.3	Room exam	dispenser	glove					1	1				x			
office	2	211.3	Room exam	container	sharp			66		1	1				x			
office	2	211.3	Room exam	dispenser	paper towel	does not im t responsibil ties in schedule 1		82		1	1			x				
office	2	211.3	Room exam	dispenser	soap	does not im t responsibil ties in schedule 1		113		1	1			x				
office	2	211.3	Room exam	coat hooks		in addition to mandatory accessories	See room data sheets			2	2					x		
office	2	211.4	Room exam	dispenser	glove					1	1				x			
office	2	211.4	Room exam	container	sharp			66		1	1				x			
office	2	211.4	Room exam	dispenser	paper towel	does not im t responsibil ties in schedule 1		82		1	1			x				
office	2	211.4	Room exam	dispenser	soap	does not im t responsibil ties in schedule 1		113		1	1			x				
office	2	211.4	Room exam	coat hooks		in addition to mandatory accessories	See room data sheets			2	2					x		
office	2	211.5	Room exam	dispenser	glove					1	1				x			
office	2	211.5	Room exam	container	sharp			66		1	1				x			
office	2	211.5	Room exam	dispenser	paper towel	does not im t responsibil ties in schedule 1		82		1	1			x				
office	2	211.5	Room exam	dispenser	soap	does not im t responsibil ties in schedule 1		113		1	1			x				
office	2	211.5	Room exam	coat hooks		in addition to mandatory accessories	See room data sheets			2	2					x		
office	2	211.6	Room exam	dispenser	glove					1	1				x			
office	2	211.6	Room exam	container	sharp			66		1	1				x			
office	2	211.6	Room exam	dispenser	paper towel	does not im t responsibil ties in schedule 1		82		1	1			x				
office	2	211.6	Room exam	dispenser	soap	does not im t responsibil ties in schedule 1		113		1	1			x				
office	2	211.6	Room exam	coat hooks		in addition to mandatory accessories	See room data sheets			2	2					x		
office	2	211.7	Room exam	dispenser	glove					1	1				x			
office	2	211.7	Room exam	container	sharp			66		1	1				x			

office	2	211.7	Room exam	dispenser	paper towel	does not im t responsibil ties in schedule 1		82		1	1			x				
office	2	211.7	Room exam	dispenser	soap	does not im t responsibil ties in schedule 1		113		1	1			x				
office	2	211.7	Room exam	coat hooks		in addition to mandatory accessories	See room data sheets			2	2					x		
office	2	211.8	Room exam	dispenser	glove					1	1				x			
office	2	211.8	Room exam	container	sharp			66		1	1				x			
office	2	211.8	Room exam	dispenser	paper towel	does not im t responsibil ties in schedule 1		82		1	1			x				
office	2	211.8	Room exam	dispenser	soap	does not im t responsibil ties in schedule 1		113		1	1			x				
office	2	211.8	Room exam	coat hooks		in addition to mandatory accessories	See room data sheets			2	2					x		
office	2	211.9	Room exam	dispenser	glove					1	1				x			
office	2	211.9	Room exam	container	sharp			66		1	1				x			
office	2	211.9	Room exam	dispenser	paper towel	does not im t responsibil ties in schedule 1		82		1	1			x				
office	2	211.9	Room exam	dispenser	soap	does not im t responsibil ties in schedule 1		113		1	1			x				
office	2	211.9	Room exam	coat hooks		in addition to mandatory accessories	See room data sheets			2	2					x		
office	2	211.10	Room exam	dispenser	glove					1	1				x			
office	2	211.10	Room exam	container	sharp			66		1	1				x			
office	2	211.10	Room exam	dispenser	paper towel	does not im t responsibil ties in schedule 1		82		1	1			x				
office	2	211.10	Room exam	dispenser	soap	does not im t responsibil ties in schedule 1		113		1	1			x				
office	2	211.10	Room exam	coat hooks		in addition to mandatory accessories	See room data sheets			2	2					x		
office	2	211.11	Room exam	dispenser	glove					1	1				x			
office	2	211.11	Room exam	container	sharp			66		1	1				x			
office	2	211.11	Room exam	dispenser	paper towel	does not im t responsibil ties in schedule 1		82		1	1			x				
office	2	211.11	Room exam	dispenser	soap	does not im t responsibil ties in schedule 1		113		1	1			x				
office	2	211.11	Room exam	coat hooks		in addition to mandatory accessories	See room data sheets			2	2					x		
office	2	211.12	Room exam	dispenser	glove					1	1				x			
office	2	211.12	Room exam	container	sharp			66		1	1				x			
office	2	211.12	Room exam	dispenser	paper towel	does not im t responsibil ties in schedule 1		82		1	1			x				
office	2	211.12	Room exam	dispenser	soap	does not im t responsibil ties in schedule 1		113		1	1			x				
office	2	211.12	Room exam	coat hooks		in addition to mandatory accessories	See room data sheets			2	2					x		
office	2	211.13	Room exam	dispenser	glove					1	1				x			
office	2	211.13	Room exam	container	sharp			66		1	1				x			

office	2	211.13	Room exam	dispenser	paper towel	does not im t responsibil ties in schedule 1		82		1	1			x				
office	2	211.13	Room exam	dispenser	soap	does not im t responsibil ties in schedule 1		113		1	1			x				
office	2	211.13	Room exam	coat hooks		in addition to mandatory accessories	See room data sheets			2	2					x		
office	2	211.14	Room exam	dispenser	glove					1	1				x			
office	2	211.14	Room exam	container	sharp			66		1	1				x			
office	2	211.14	Room exam	dispenser	paper towel	does not im t responsibil ties in schedule 1		82		1	1			x				
office	2	211.14	Room exam	dispenser	soap	does not im t responsibil ties in schedule 1		113		1	1			x				
office	2	211.14	Room exam	coat hooks		in addition to mandatory accessories	See room data sheets			2	2					x		
office	2	211.15	Room exam	dispenser	glove					1	1				x			
office	2	211.15	Room exam	container	sharp			66		1	1				x			
office	2	211.15	Room exam	dispenser	paper towel	does not im t responsibil ties in schedule 1		82		1	1			x				
office	2	211.15	Room exam	dispenser	soap	does not im t responsibil ties in schedule 1		113		1	1			x				
office	2	211.15	Room exam	coat hooks		in addition to mandatory accessories	See room data sheets			2	2					x		
office	2	211.16	Room exam	dispenser	glove					1	1				x			
office	2	211.16	Room exam	container	sharp			66		1	1				x			
office	2	211.16	Room exam	dispenser	paper towel	does not im t responsibil ties in schedule 1		82		1	1			x				
office	2	211.16	Room exam	dispenser	soap	does not im t responsibil ties in schedule 1		113		1	1			x				
office	2	211.16	Room exam	coat hooks		in addition to mandatory accessories	See room data sheets			2	2					x		
office	2	211.17	Room exam	dispenser	glove					1	1				x			
office	2	211.17	Room exam	container	sharp			66		1	1				x			
office	2	211.17	Room exam	dispenser	paper towel	does not im t responsibil ties in schedule 1		82		1	1			x				
office	2	211.17	Room exam	dispenser	soap	does not im t responsibil ties in schedule 1		113		1	1			x				
office	2	211.17	Room exam	coat hooks		in addition to mandatory accessories	See room data sheets			2	2					x		
office	2	211.18	Room exam	dispenser	glove					1	1				x			
office	2	211.18	Room exam	container	sharp			66		1	1				x			
office	2	211.18	Room exam	dispenser	paper towel	does not im t responsibil ties in schedule 1		82		1	1			x				
office	2	211.18	Room exam	dispenser	soap	does not im t responsibil ties in schedule 1		113		1	1			x				
office	2	211.18	Room exam	coat hooks		in addition to mandatory accessories	See room data sheets			2	2					x		
office	2	211.19	Room exam	dispenser	glove					1	1				x			
office	2	211.19	Room exam	container	sharp			66		1	1				x			

office	2	211.19	Room exam	dispenser	paper towel	does not im t responsibil ties in schedule 1		82		1	1			x				
office	2	211.19	Room exam	dispenser	soap	does not im t responsibil ties in schedule 1		113		1	1			x				
office	2	211.19	Room exam	coat hooks		in addition to mandatory accessories	See room data sheets			2	2					x		
office	2	211.20	Room exam	dispenser	glove					1	1				x			
office	2	211.20	Room exam	container	sharp			66		1	1				x			
office	2	211.20	Room exam	dispenser	paper towel	does not im t responsibil ties in schedule 1		82		1	1			x				
office	2	211.20	Room exam	dispenser	soap	does not im t responsibil ties in schedule 1		113		1	1			x				
office	2	211.20	Room exam	coat hooks		in addition to mandatory accessories	See room data sheets			2	2					x		
office	2	211.21	Room exam	dispenser	glove					1	1				x			
office	2	211.21	Room exam	container	sharp			66		1	1				x			
office	2	211.21	Room exam	dispenser	paper towel	does not im t responsibil ties in schedule 1		82		1	1			x				
office	2	211.21	Room exam	dispenser	soap	does not im t responsibil ties in schedule 1		113		1	1			x				
office	2	211.21	Room exam	coat hooks		in addition to mandatory accessories	See room data sheets			2	2					x		
office	2	211.22	Room exam	dispenser	glove					1	1				x			
office	2	211.22	Room exam	container	sharp			66		1	1				x			
office	2	211.22	Room exam	dispenser	paper towel	does not im t responsibil ties in schedule 1		82		1	1			x				
office	2	211.22	Room exam	dispenser	soap	does not im t responsibil ties in schedule 1		113		1	1			x				
office	2	211.22	Room exam	coat hooks		in addition to mandatory accessories	See room data sheets			2	2					x		
office	2	211.23	Room exam	dispenser	glove					1	1				x			
office	2	211.23	Room exam	container	sharp			66		1	1				x			
office	2	211.23	Room exam	dispenser	paper towel	does not im t responsibil ties in schedule 1		82		1	1			x				
office	2	211 23	Room exam	dispenser	soap	does not im t responsibil ties in schedule 1		113		1	1			x				
office	2	211.23	Room exam	coat hooks		in addition to mandatory accessories	See room data sheets			2	2					x		
office	2	211.24	Room exam	dispenser	glove					1	1				x			
office	2	211.24	Room exam	container	sharp			66		1	1				x			
office	2	211.24	Room exam	dispenser	paper towel	does not im t responsibil ties in schedule 1		82		1	1			x				
office	2	211.24	Room exam	dispenser	soap	does not im t responsibil ties in schedule 1		113		1	1			x				
office	2	211.24	Room exam	coat hooks		in addition to mandatory accessories	See room data sheets			2	2					x		
Staff Lunch Room																		
Staff Room	2	212	Room Staff	refridgerator	domestic	18 cuft with freezer		31		1	1		1		x			
Staff Room	2	212	Room Staff	table				579		2	2		2				x	
Staff Room	2	212	Room Staff	chair	wood frame			51		12	12		12				x	

Staff Room	2	212	Room Staff	dispenser	paper towel	does not im t responsibil ties in schedule 1		82		1	1			x				
Staff Room	2	212	Room Staff	dispenser	soap	does not im t responsibil ties in schedule 1		113		1	1			x				
Reception																		
Reception	2	214	Recep ion	chair	visitor			44		2	2		2				x	
Reception	2	214	Recep ion	dispenser	soap	does not im t responsibil ties in schedule 1		113		1	1			x				
Office	2	218.6	WKSTN Trans tion Ut l	computer terminal				142		2	2		2		x			
Office	2	218.6	WKSTN Trans tion Ut l	chair	task			45		2	2		2				x	
Office	2	218.6	WKSTN Trans tion Ut l	workstation	office	A2		186		2	2		2				x	
Office	2	218.6	WKSTN Trans tion Ut l	keyboard tray				151		2	2		2				x	
Office	2	218.6	WKSTN Trans tion Ut l	container	garbage			79		2	2		2		x			
Office	2	218.6	WKSTN Trans tion Ut l	container	recyc ing			78		2	2		2		x			
Office	2	218.5	WKSTN Trans tion Ut l	computer terminal				142		2	2		2		x			
Office	2	218.5	WKSTN Trans tion Ut l	chair	task			45		2	2		2				x	
Office	2	218.5	WKSTN Trans tion Ut l	workstation	office	A2		186		2	2		2				x	
Office	2	218.5	WKSTN Trans tion Ut l	keyboard tray				151		2	2		2				x	
Office	2	218.5	WKSTN Trans tion Ut l	container	garbage			79		2	2		2		x			
Office	2	218.5	WKSTN Trans tion Ut l	container	recyc ing			78		2	2		2		x			
Office	2	218.4	WKSTN Trans tion Ut l	computer terminal				142		2	2		2		x			
Office	2	218.4	WKSTN Trans tion Ut l	chair	task			45		2	2		2				x	
Office	2	218.4	WKSTN Trans tion Ut l	workstation	office	A2		186		2	2		2				x	
Office	2	218.4	WKSTN Trans tion Ut l	keyboard tray				151		2	2		2				x	
Office	2	218.4	WKSTN Trans tion Ut l	container	garbage			79		2	2		2		x			
Office	2	218.4	WKSTN Trans tion Ut l	container	recyc ing			78		2	2		2		x			
Office	2	217A	Room storage	Storage						0	0		0					
Office	2	217B	Room storage	Storage							0		0					
Office	2	221	Clean Ut lity							0	0		0		x			
Office	2	222	Room soiled u ility	dispenser	paper towel			82		2	2			x				
Office	2	222	Room soiled u ility	dispenser	soap			113		2	2			x				
Office	2	222	Room soiled u ility	dispenser	glove					1	1				x			
Office	2	222	Room soiled u ility	container	sharps					1	1				x			
Office	2	222	Room soiled u ility	tackboard				178		1	1				x			
Office	2	222	Room soiled u ility	whiteboard				185		1	1		1		x			
Public	2	216.1	washroom	container	garbage	large		79		1	1		1		x			
Public	2	216.1	washroom	dispenser	paper towel	does not im t responsibil ties in schedule 1		82		1	1			x				
Public	2	216.1	washroom	dispenser	soap	does not im t responsibil ties in schedule 1		113		1	1			x				
Public	2	216.1	washroom	dispenser	toilet paper	does not im t responsibil ties in schedule 1		112		1	1			x				
Public	2	216.1	washroom	coat hooks		does not im t responsibil ties in schedule 2				1	1			x				
Public	2	216.1	washroom	dispenser	sanitary napkin	does not im t responsibil ties in schedule 1				1	1			x				
Public	2	216.2	washroom	container	garbage	large		79		1	1		1		x			
Public	2	216.2	washroom	dispenser	paper towel	does not im t responsibil ties in schedule 1		82		1	1			x				
Public	2	216.2	washroom	dispenser	soap	does not im t responsibil ties in schedule 1		113		1	1			x				
Public	2	216.2	washroom	dispenser	toilet paper	does not im t responsibil ties in schedule 1		112		1	1			x				

Public	2	216.3	washroom	container	garbage	large		79		1	1		1		x			
Public	2	216.3	washroom	dispenser	paper towel	does not im t responsibil ties in schedule 1		82		1	1			x				
Public	2	216.3	washroom	dispenser	soap	does not im t responsibil ties in schedule 1		113		1	1			x				
Public	2	216.3	washroom	dispenser	toilet paper	does not im t responsibil ties in schedule 1		112		1	1			x				
Public	2	216.3	washroom	coat hooks		does not im t responsibil ties in schedule 2				1	1			x				
Public	2	216.3	washroom	dispenser	sanitary napkin	does not im t responsibil ties in schedule 1				1	1			x				
Public	2	216.4	washroom	container	garbage	large		79		1	1		1		x			
Public	2	216.4	washroom	dispenser	paper towel	does not im t responsibil ties in schedule 1		82		1	1			x				
Public	2	216.4	washroom	dispenser	soap	does not im t responsibil ties in schedule 1		113		1	1			x				
Public	2	216.4	washroom	dispenser	toilet paper	does not im t responsibil ties in schedule 1		112		1	1			x				
Public	2	215.1	washroom	container	garbage	large		79		1	1		1		x			
Public	2	215.1	washroom	dispenser	paper towel	does not im t responsibil ties in schedule 1		82		1	1			x				
Public	2	215.1	washroom	dispenser	soap	does not im t responsibil ties in schedule 1		113		1	1			x				
Public	2	215.1	washroom	dispenser	toilet paper	does not im t responsibil ties in schedule 1		112		1	1			x				
Public	2	215.1	washroom	coat hooks		does not im t responsibil ties in schedule 2				1	1			x				
Public	2	215.1	washroom	dispenser	sanitary napkin	does not im t responsibil ties in schedule 1				1	1			x				
Public	2	215.2	washroom	container	garbage	large		79		1	1		1		x			
Public	2	215.2	washroom	dispenser	paper towel	does not im t responsibil ties in schedule 1		82		1	1			x				
Public	2	215.2	washroom	dispenser	soap	does not im t responsibil ties in schedule 1		113		1	1			x				
Public	2	215.2	washroom	dispenser	toilet paper	does not im t responsibil ties in schedule 1		112		1	1			x				
Staff	2	215.3	washroom	container	garbage	large		79		1	1		1		x			
Staff	2	215.3	washroom	dispenser	paper towel	does not im t responsibil ties in schedule 1		82		1	1			x				
Staff	2	215.3	washroom	dispenser	soap	does not im t responsibil ties in schedule 1		113		1	1			x				
Staff	2	215.3	washroom	dispenser	toilet paper	does not im t responsibil ties in schedule 1		112		1	1			x				
Staff	2	215.3	washroom	coat hooks		does not im t responsibil ties in schedule 2				1	1			x				
Staff	2	215.3	washroom	dispenser	sanitary napkin	does not im t responsibil ties in schedule 1				1	1			x				
Staff	2	215.4	washroom	container	garbage	large		79		1	1		1		x			

Staff	2	215.4	washroom	dispenser	paper towel	does not im t responsibil ties in schedule 1		82		1	1			x				
Staff	2	215.4	washroom	dispenser	soap	does not im t responsibil ties in schedule 1		113		1	1			x				
Staff	2	215.4	washroom	dispenser	toilet paper	does not im t responsibil ties in schedule 1		112		1	1			x				
Staff	2	215.5	washroom	container	garbage	large		79		1	1		1		x			
Staff	2	215.5	washroom	dispenser	paper towel	does not im t responsibil ties in schedule 1		82		1	1			x				
Staff	2	215.5	washroom	dispenser	soap	does not im t responsibil ties in schedule 1		113		1	1			x				
Staff	2	215.5	washroom	dispenser	toilet paper	does not im t responsibil ties in schedule 1		112		1	1			x				
Staff	2	215.5	washroom	coat hooks		does not im t responsibil ties in schedule 2				1	1			x				
Staff	2	215.5	washroom	dispenser	sanitary napkin	does not im t responsibil ties in schedule 1				1	1			x				
Of ice		219.1	Room MOA	workstation		A1		186		1	1		1				x	
Of ice		219 1	Room MOA	chair				44		1	1		1				x	
office	2	219.1	Room exam	coat hooks		in addition to mandatory accessories	See room data sheets			2	2					x		
Of ice		219.1	Room MOA	tackboard				178		1	1				x			
Of ice		219.2	Room MOA	workstation		A1		186		1	1		1				x	
Of ice		219.2	Room MOA	chair				44		1	1		1				x	
Of ice		219.1	Room MOA	tackboard				178		1	1				x			
office	2	219.1	Room exam	coat hooks		in addition to mandatory accessories	See room data sheets			2	2					x		
Of ice	2	219.3	Room MOA	workstation		A1		186		1	1		1				x	
Of ice	2	219.3	Room MOA	chair				44		1	1		1				x	
Of ice	2	219.1	Room MOA	tackboard				178		1	1				x			
office	2	219.1	Room exam	coat hooks		in addition to mandatory accessories	See room data sheets			2	2					x		
Waiting Area																		
Of ice	2	220.1	Room wa ting	chair				44		7	7		7				x	
Of ice	2	220.1	Room wa ting	dispenser	soap	does not im t responsibil ties in schedule 1		113		1	1			x				
office	2	220.1	Room wa ting	coat hooks		in addition to mandatory accessories	See room data sheets			2	2					x		
Of ice	2	220.1	Room wa ting	tackboard				178		1	1				x			
Of ice	2	220.2	Room wa ting	chair				44		7	7		7				x	
Of ice	2	220.2	Room wa ting	dispenser	soap	does not im t responsibil ties in schedule 1		113		1	1			x				
office	2	220.2	Room wa ting	coat hooks		in addition to mandatory accessories	See room data sheets			2	2					x		
Of ice	2	220.1	Room wa ting	tackboard				178		1	1				x			
Of ice		220.3	Room wa ting	chair				44		7	7		7				x	
Of ice		220.3	Room wa ting	dispenser	soap	does not im t responsibil ties in schedule 1		113		1	1			x				
office	2	220.4	Room wa ting	coat hooks		in addition to mandatory accessories	See room data sheets			2	2					x		
Of ice	2	220.1	Room wa ting	tackboard				178		1	1				x			

Of ice	2	213	Room meeting	chair	visitor			44		10	10		10				x	
Of ice	2	213	Room meeting	table	conference			173		1	1		1				x	
Of ice	2	213	Room meeting	whiteboard	3x4			185		2	2		2		x			
Of ice	2	213	Room meeting	tackboard	3x4			178		2	2		2		x			
Of ice	2	213	Room meeting	container	garbage	sma l		79		2	2		2		x			
Of ice	2	213	Room meeting	container	recyc ing			78		2	2		2		x			
Of ice	2	213	Room meeting	workstation	office	A2		186		1	1		1				x	
Of ice	2	213	Room meeting	Computer terminal				142		1	1		1		x			
Of ice	2	213	Room meeting	chair	task	80% sitting		45		1	1		1				x	
Of ice	2	213	Room meeting	keyboard tray				151		1	1		1				x	
Of ice	2	213	Room meeting	video conferencing (medium)	T.V.			184		1	1		1		x			
Parking	1	171	Tank Gas								0		0					
Parking	1	164	Storage Old Chem								0		0					
Parking	1	165	Storage Flammable								0		0					
IMIT			Head in equipment								0		0					
Various	A l		Various	telephones		not be used for number of data drops				80	80		80		x			
Various	A l		Various work areas	Bench	Lab	measure in linear feet on room data sheets	Steelcase				to be confirmed		#VALUE!			x		
Various	A l		Various work areas	Emergency shower\eyewash		quant ty as per room data sheets					0		0			x		

A revised Indicative Equipment List, which includes additional equipment information such as equipment vender, dimensions, weight and power requirements where this information is known, is available in the Data Room.

The Authority makes no representation as to the accuracy or completeness of any aspect of this list. Design-Builders must confirm the accuracy of any and all information

SCHEDULE 5

SCHEDULE OF PRICES

The Contract Price represents the entire compensation to the Design-Builder by the Authority for any and all costs related to the Work, including but not limited to all fees, cash allowances, contingencies and all duties and taxes, excluding HST payable by the Authority to the Design-Builder.

The following schedule is a breakdown of the Contract Price solely for the purpose of assisting the parties to develop the Schedule of Values, and will not be used or relied upon by the Design-Builder for any purpose.

Schedule 5 - Schedule of Prices

Breakdown of Contract Price

	Value
HARD COSTS	[redacted]
Division 1 - General Requirements	
Division 2 - Existing Conditions	
Division 3 - Concrete	
Division 4 - Masonry	
Division 5 - Metals	
Division 6 - Wood, Plastics, and Composites	
Division 7 - Thermal and Moisture Protection	
Division 8 - Openings	
Division 9 - Finishes	
Division 10 - Specialties	
Division 12 - Furnishings	
Division 13 - Special Construction	
Division 14 - Conveying Equipment	
Division 21 - Fire Suppression	
Davison 22 - Plumbing	
Division 23 - Heating, Ventilating, and Air Conditioning (HVAC)	
Division 25 - Integrated Automation	
Division 26 - Electrical	
Division 27 - Communications	
Division 28 - Electronic Safety and Security	
Division 31 - Earthwork	
Division 32 - Exterior Improvements	
Division 33 - Utilities On Site	
Division 33 - Utilities Off Site	
Division 34 - Transportation	
Division 40 - Process Integration	-
Division 41 - Material Processing and Handling Equipment	-
Division 44 - Pollution and Waste Control Equipment	-
Division 45 - Industry-Specific Manufacturing Equipment	-
Division 46 - Water and Wastewater Equipment	-
Division 48 - Electrical Power Generation	[redacted]
Hard Costs Sub total	[redacted]
SOFT COSTS	[redacted]
Architectural Design Fees	
Structural Design Fees	
Mechanical Engineering Design Fees	
Electrical Engineering Design Fees	
Civil Engineering Design Fees	
Geotechnical Engineering Design Fees	
Building Envelope Consultants Fees	
Landscape Architect Fees	
Building Envelope Consultants Fees	
Code Consultant Fees	
Legal Advisor Fees	
Other Consultant - Specify	
Other Consultant - Specify	
Other Consultant - Specify	
Insurances - Specify	
Insurances - Specify	
Building Permit	
Development Cost Charges	
Other - Specify	
Other - Specify	
Other - Specify	
Cash Allowances – Swisslog Pneumatic Tube System	
Nominal Cost (Contract Price)	**$28,800,735**

SCHEDULE 6

TIME SCHEDULE

Schedule 6 - Time Schedule

KGH - CLINICAL SUPPORT BUILDING

CSB - PROJECT SCHEDULE - BY WBS

GRAHAM

Activity	Work-Days (Planned)	Start	Finish
KGH - CLINICAL SUPPORT BUILDING			
KEY MILESTONES			
PRE-CONSTRUCTION			
Schem. Design - Record Set Submission			
Fdn Permit - Obtained			
Shell Permit - Obtained			
Design Dev. - "Reviewed" Status Achieved			
Bldg Permit - Obtained			
Final Design Pkg - "Reviewed" Status Achieved			
CONSTRUCTION			
Site Prep. - Possession of Site (After Preload Removed)			
Const'n - Start Fdns			
Final Roof Slab Pour			
Start Interior Drywall			
Ext. Envelope Weathertight			
Start Ped. Bridge Erection			
Elec. Rms - Power Online			
Start Bldg Systems Commissioning			
Substantial Completion (Target 27 Apr. 2012)			
PRE-CONSTRUCTION			
PROJECT START-UP			
Kick-off - Technical Submission			
Kick-off - Financial Submission			
Kick-off - Selection of Preferred Proponent			
Kick-off - Finalize Contract Award			
Kick-off - Execution of DB Agreement			
Kick-off - Notice to Remove Preload & Occupy Site			
DESIGN & PERMITS			
SCHEMATIC DESIGN			
Schem. Design - Submission (RFP Design)			
Schem. Design - Workshop Mtg #1 (Rvw RFP Design)			
Schem. Design - Workshop Mtg #2 (Lab Spaces L2,L3)			
Schem. Design - Workshop Mtg #3 (Non-Lab Spaces L1,L2)			
Schem. Design - Workshop Mtg #4 (Closeout Mtg)			
Schem. Design - Workshops and Review Cycle			
Schem. Design - Record Set Submission			
Schem. Design - IHA Issue Final Eq`t List & Cut Sheets			
DESIGN COVENANT			
Design Covenant - Community Mtg			
Design Covenant - Schem. Design Input			
Design Covenant - Preferred Early Discharge Date			
Design Covenant - Latest Discharge Date			
FOUNDATION PERMIT			
Fdn Permit Pkg - Prepare Doc's			
Fdn Permit Pkg - Final Rvw & Prep./Print Pkg			
Fdn Permit Pkg - Issue Record Set to IHA			

2011														2012											
Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
-1	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25

Schedule 6 - Time Schedule

Activity	Work-Days (Planned)	Start	Finish
Fdn Permit Pkg - Submit to City			
Fdn Permit - Obtained			
SHELL PERMIT			
Shell Permit Pkg - Prepare Doc's			
Shell Permit Pkg - Final Rvw & Prep./Print Pkg			
Shell Permit Pkg - Issue Record Set to IHA			
Shell Permit Pkg - Submit to City			
Shell Permit - Obtained			
DESIGN DEVELOPMENT			
Design Dev. - Workshop Mtg #5 (Lab Spaces L2,L3)			
Design Dev. - Workshop Mtg #6 (Non-Lab Spaces L1,L2)			
Design Dev. - Workshop Mtg #7 (Door Hwr, Access Control)			
Design Dev. - Workshop Mtg #8 (Elec., IT Systems)			
Design Dev. - Prepare Doc's			
Design Dev. - Final Rvw & Prep./Print Pkg			
Design Dev. - IHA Review #1			
Design Dev. - Workshop Mtg #9 (Closeout Mtg)			
Design Dev. - Graham/Stantec Review, Revise & Resubmit (if Req'd)			
Design Dev. - IHA Review #2 (if Req'd)			
Design Dev. - "Reviewed" Status Achieved			
INTERIM DESIGN PACKAGE			
Interim Design Pkg - Prepare Doc's			
Interim Design Pkg - Final Rvw & Prep./Print Pkg			
FULL BUILDING PERMIT			
Bldg Permit Pkg - Prepare Doc's			
Bldg Permit Pkg - Final Rvw & Prep./Print Pkg			
Bldg Permit Pkg - Issue Record Set to IHA			
Bldg Permit Pkg - Submit to City			
Bldg Permit - Obtained			
FINAL DESIGN PACKAGE			
Final Design Pkg - Workshop Mtg #10 (CD Development Rvw 1)			
Final Design Pkg - Workshop Mtg #11 (CD Development Rvw 2)			
Final Design Pkg - Prepare Doc's			
Final Design Pkg - Final Rvw & Prep./Print Pkg			
Final Design Pkg - IHA Review #1			
Final Design Pkg - Workshop Mtg #12 (CD Closeout)			
Final Design Pkg - Graham/Stantec Review, Revise & Resubmit (if R			
Final Design Pkg - IHA Review #2 (if Req'd)			
Final Design Pkg - "Reviewed" Status Achieved			
IFC DESIGN			
IFC - FOUNDATIONS			
100% IFC Design (Fdns) - Prepare Doc's			
100% IFC Design (Fdns) - Final Rvw & Prep./Print Pkg			
100% IFC Design (Fdns) - Issue to Site			
IFC - SUPERSTRUCTURE			
100% IFC Design (Super-Struc.) - Prepare Doc's			
100% IFC Design (Super-Struc.) - Final Rvw & Prep./Print Pkg			
100% IFC Design (Super-Struc.) - Issue to Site			
IFC - ENVELOPE			
100% IFC Design (Env.) - Prepare Doc's			

Schedule 6 - Time Schedule

Activity	Work-Days (Planned)	Start	Finish
100% IFC Design (Env.) - Final Rvw & Prep./Print Pkg			
100% IFC Design (Env.) - Issue to Site			
IFC - FITOUT			
100% IFC Design (Fitout) - Prepare Doc's			
100% IFC Design (Fitout) - Final Rvw & Prep./Print Pkg			
100% IFC Design (Fitout) - Issue to Site			
TENDERING & PROCUREMENT			
022 - VIBRO-DENSIFICATION			
022 (Dens.) - Finalize & Award			
022 (Dens.) - Submittals Approved			
023 - EXCAVATION			
023 (Excav.) - Bid & Award			
023 (Excav.) - Submittals Approved			
027 - CIVIL WORKS & UTILITIES			
027 (Civil & Util.) - Bid & Award			
027 (Civil & Util.) - Submittals Approved			
028 - LANDSCAPING			
028 (L-Scape) - Bid & Award			
028 (L-Scape) - Hard LS Items - Deliver to Site (12 wk Leadtime)			
028 (L-Scape) - Plants - Deliver to Site (12 wk Leadtime)			
031 - FORMWORK			
031 (Fwk) - Finalize & Award			
031 (Fwk) - Wall/Col. Fwk - Deliver to Site (3 wk Leadtime)			
031 (Fwk) - Slab Fwk - Deliver to Site (4 wk Leadtime)			
032 - REBAR			
032 (Rebar) - Finalize & Award			
032 (Rebar) - Fdn Rebar - Deliver to Site (2 wk Leadtime)			
032 (Rebar) - Wall/Col. Rebar - Deliver to Site (3 wk Leadtime)			
032 (Rebar) - SoG Rebar - Deliver to Site (3 wk Leadtime)			
032 (Rebar) - Susp. Slab Rebar - Deliver to Site (3 wk Leadtime)			
033 - CONC. SUPPLY			
033 (Conc.) - Finalize & Award			
033 (Conc.) - Mix Designs Approved (2 wk Leadtime)			
042 - MASONRY			
042 (Masonry) - Bid & Award			
042 (Masonry) - Conc. Block - Deliver to Site (2 wk Leadtime)			
051 - STRUC. STEEL, GLULAM & METAL DECK			
051 (Steel/Deck) - Bid & Award			
051 (Steel/Deck) - PH Steel - Deliver to Site (10 wk Leadtime)			
051 (Steel/Deck) - PH Metal Deck - Deliver to Site (6 wk Leadtime)			
051 (Steel/Deck) - Bridge Sections - Deliver to Site (16 wk Leadtime)			
061 - GLULAM			
061 (Glulam) - Bid & Award			
061 (Glulam) - Deliver to Site (10 wk Leadtime)			
064 - MILLWORK			
064 (Millwk) - Bid & Award			
064 (Millwk) - Deliver to Site (12 wk Leadtime)			
074 - PANEL SYSTEMS			
074 (Panel Systems) - Bid & Award			
074 (Panel Systems) - Framing/Insul. - Deliver to Site (8 wk Leadtim			

Schedule 6 - Time Schedule

Activity	Work-Days (Planned)	Start	Finish
074 (Panel Systems) - Panels - Deliver to Site (12 wk Leadtime)			
075 - MEMB. ROOFING			
075 (Memb. Roof) - Bid & Award			
075 (Memb. Roof) - Deliver to Site (4 wk Leadtime)			
081, 087 - DOORS, FRAMES & HARDWARE			
081 (Doors, Frames, Hwr) - Bid & Award			
081 (Doors, Frames, Hwr) - Finalize Door Schedule			
081 (Doors, Frames, Hwr) - Frames - Deliver to Site (8 wk Leadtime)			
081 (Doors, Frames, Hwr) - Doors/Hwr - Deliver to Site (12 wk Leadti			
085 - WINDOWS			
085 (Windows) - Bid & Award			
085 (Windows) - Deliver to Site (12 wk Leadtime)			
092 - STUDS & DRYWALL (INT. & EXT.)			
092 (Studs & Drywall) - Bid & Award			
092 (Studs & Drywall) - Ext. - Deliver to Site (4 wk Leadtime)			
092 (Studs & Drywall) - Int. - Deliver to Site (2 wk Leadtime)			
093, 096 - FLOORING			
096 (Flooring) - Bid & Award			
096 (Flooring) - Deliver to Site (8 wk Leadtime)			
099 - PAINTING			
099 (Painting) - Bid & Award			
099 (Painting) - Deliver to Site (4 wk Leadtime)			
14 - ELEVATORS			
140 (Elev.) - Finalize & Award			
140 (Elev.) - Issue Pit & Shaft Details			
140 (Elev.) - Eq't - Deliver to Site (16 wk Leadtime)			
15 - MECHANICAL			
150 (Mech.) - Finalize & Award			
150 (Mech.) - Underslab Drainage/Sumps - Deliver to Site (4 wk Leadt			
150 (Mech.) - AHUs - Deliver to Site (16 wk Leadtime)			
150 (Mech.) - Med Gas Eq't - Deliver to Site (16 wk Leadtime)			
150 (Mech.) - Boiler - Deliver to Site (16 wk Leadtime)			
150 (Mech.) - Chiller - Deliver to Site (16 wk Leadtime)			
150 (Mech.) - Fire Pump - Deliver to Site (16 wk Leadtime)			
16 - ELECTRICAL			
160 (Elec.) - Finalize & Award			
160 (Elec.) - Underslab Ductbank - Deliver to Site (2 wk Leadtime)			
160 (Elec.) - Light Fixtures - Deliver to Site (16 wk Leadtime)			
160 (Elec.) - Switchgear - Deliver to Site (16 wk Leadtime)			
160 (Elec.) - Genset - Deliver to Site (16 wk Leadtime)			
160 (Elec.) - Panels, MCCs - Deliver to Site (12 wk Leadtime)			
160 (Elec.) - Network/Comm. Eq't - Deliver to Site (16 wk Leadtime)			
160 (Elec.) - Fire Alarm Panels - Deliver to Site (16 wk Leadtime)			
EQ'T - OWNER SUPPLIED (CAT. 1,2,4,5)			
Eq't (IHA Supplied) - Issue R/I Req'ts			
Eq't (IHA Supplied) - Built-in Items - Deliver to Site			
Eq't (IHA Supplied) - Loose Items - Deliver to Site			
EQ'T - DB SUPPLIED (CAT. 3)			
Eq't (DB Supplied) - Bid & Award			
Eq't (DB Supplied) - Issue R/I Req'ts			

Schedule 6 - Time Schedule

Activity	Work-Days (Planned)	Start	Finish
Eq't (DB Supplied) - Built-in Items - Deliver to Site			
Eq't (DB Supplied) - Loose Items - Deliver to Site			
CONSTRUCTION			
SITE PREPARATION			
Site Prep. - Preload Removal Period			
Site Prep. - Possession of Site (After Preload Removed)			
Site Prep. - Setup Site Fencing			
Site Prep. - Setup Site Traffic Controls			
Site Prep. - Establish Survey Control			
Site Prep. - Vibro-Densification			
SITE UTILITIES			
SANITARY			
Site Util. - Sanitary Line, MH & Tie-in @ Lane			
Site Util. - Sanitary in Service			
STORM			
Site Util. - Storm Line & Tie-in @ Lane			
Site Util. - Storm in Service			
WATER			
Site Util. - Water Lines & Tie-ins @ Pandosy, Royal			
Site Util. - Water in Service			
HYDRO			
Site Util. - Elec. Service to Bldg			
Site Util. - Elec. in Service			
STRUCTURE & ENVELOPE			
L1			
POUR AREA 1 (SOUTH)			
L1 (Sth) - Detail Exc. Fdns (incl. Setup Dewatering)			
L1 (Sth) - Raft & Pad Fdns - Form, Rebar, Pour			
L1 (Sth) - Strip Fdns - Form, Rebar, Pour			
L1 (Sth) - Walls & Col's - Form, Rebar, Pour			
L1 (Sth) - Backill to U/S SoG			
L1 (Sth) - Underslab Plumb. & Elec.			
L1 (Sth) - Slab-on-Grade - Prep. & Pour			
POUR AREA 2 (CENTRE)			
L1 (Centre) - Detail Exc. Fdns (incl. Setup Dewatering)			
L1 (Centre) - Raft & Pad Fdns - Form, Rebar, Pour			
L1 (Centre) - Strip Fdns - Form, Rebar, Pour			
L1 (Centre) - Walls & Col's - Form, Rebar, Pour			
L1 (Centre) - Backill to U/S SoG			
L1 (Centre) - Underslab Plumb. & Elec.			
L1 (Centre) - Slab-on-Grade - Prep. & Pour			
POUR AREA 3 (NORTH)			
L1 (Nth) - Detail Exc. Fdns (+ Setup Dewatering)			
L1 (Nth) - Raft & Pad Fdns - Form, Rebar, Pour (& Rmv De			
L1 (Nth) - Strip Fdns - Form, Rebar, Pour			
L1 (Nth) - Walls & Col's - Form, Rebar, Pour			
L1 (Nth) - Backill to U/S SoG			
L1 (Nth) - Underslab Plumb. & Elec.			
L1 (Nth) - Slab-on-Grade - Prep. & Pour			
EXT. WALLS			

2011														2012											
Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
-1	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25

Schedule 6 - Time Schedule

Activity	Work-Days (Planned)	Start	Finish
L1 - Ext. Studs & Sheathing			
L1 - Wall System - VB, Sub-Frame & Insul.			
L1 - Windows & C-Wall (to Watertight)			
L1 - Wall System - Panels & Trim			
L1 - Misc. Wall Finishes, Canopies etc.			
L2			
POUR AREA 1 (SOUTH)			
L2 (Sth) - Susp. Slab - Form, Rebar, M/E Embeds			
L2 (Sth) - Susp. Slab - Pour			
L2 (Sth) - Walls & Col's - Form, Rebar, Pour			
L2 (Sth) - Susp. Slab - Strip & Reshore (from L1 Below)			
L2 (Sth) - Susp. Slab - Reshores Removed (from L1 Below)			
POUR AREA 2 (CENTRE)			
L2 (Centre) - Susp. Slab - Form, Rebar, M/E Embeds			
L2 (Centre) - Susp. Slab - Pour			
L2 (Centre) - Walls & Col's - Form, Rebar, Pour			
L2 (Centre) - Susp. Slab - Strip & Reshore (from L1 Below)			
L2 (Centre) - Susp. Slab - Reshores Removed (from L1 Below)			
POUR AREA 3 (NORTH)			
L2 (Nth) - Susp. Slab - Form, Rebar, M/E Embeds			
L2 (Nth) - Susp. Slab - Pour			
L2 (Nth) - Walls & Col's - Form, Rebar, Pour			
L2 (Nth) - Susp. Slab - Strip & Reshore (from L1 Below)			
L2 (Nth) - Susp. Slab - Reshores Removed (from L1 Below)			
EXT. WALLS			
L2 - Ext. Studs & Sheathing			
L2 - Wall System - VB, Sub-Frame & Insul.			
L2 - Windows & C-Wall (to Watertight)			
L2 - Wall System - Panels & Trim			
L2 - Misc. Wall Finishes, Canopies etc.			
L3			
POUR AREA 1 (SOUTH)			
L3 (Sth) - Susp. Slab - Form, Rebar, M/E Embeds			
L3 (Sth) - Susp. Slab - Pour			
L3 (Sth) - Walls & Col's - Form, Rebar, Pour			
L3 (Sth) - Susp. Slab - Strip & Reshore (from L2 Below)			
L3 (Sth) - Susp. Slab - Reshores Removed (from L2 Below)			
POUR AREA 2 (CENTRE)			
L3 (Centre) - Susp. Slab - Form, Rebar, M/E Embeds			
L3 (Centre) - Susp. Slab - Pour			
L3 (Centre) - Walls & Col's - Form, Rebar, Pour			
L3 (Centre) - Susp. Slab - Strip & Reshore (from L2 Below)			
L3 (Centre) - Susp. Slab - Reshores Removed (from L2 Below)			
POUR AREA 3 (NORTH)			
L3 (Nth) - Susp. Slab - Form, Rebar, M/E Embeds			
L3 (Nth) - Susp. Slab - Pour			
L3 (Nth) - Walls & Col's - Form, Rebar, Pour			
L3 (Nth) - Susp. Slab - Strip & Reshore (from L2 Below)			
L3 (Nth) - Susp. Slab - Reshores Removed (from L2 Below)			
EXT. WALLS			

Schedule 6 - Time Schedule

Activity	Work-Days (Planned)	Start	Finish
L3 - Ext. Studs & Sheathing			
L3 - Wall System - VB, Sub-Frame & Insul.			
L3 - Windows & C-Wall (to Watertight)			
L3 - Wall System - Panels & Trim			
L3 - Misc. Wall Finishes, Canopies etc.			
ROOF & PENTHOUSE			
POUR AREA 1 (SOUTH)			
RF (Sth) - Susp. Slab - Form, Rebar, M/E Embeds			
RF (Sth) - Susp. Slab - Pour			
RF (Sth) - Curbs, Upstands - Form, Rebar, Pour			
RF (Sth) - Susp. Slab - Strip & Reshore (from L3 Below)			
RF (Sth) - Susp. Slab - Reshores Removed (from L3 Below)			
POUR AREA 2 (CENTRE)			
RF (Centre) - Susp. Slab - Form, Rebar, M/E Embeds			
RF (Centre) - Susp. Slab - Pour			
RF (Centre) - Walls, Curbs, Upstands, Shaft Cap Slabs - Form, Reb			
RF (Centre) - Susp. Slab - Strip & Reshore (from L3 Below)			
RF (Centre) - Susp. Slab - Reshores Removed (from L3 Below)			
POUR AREA 3 (NORTH)			
RF (Nth) - Susp. Slab - Form, Rebar, M/E Embeds			
RF (Nth) - Susp. Slab - Pour			
RF (Nth) - Walls, Curbs, Upstands, Shaft Cap Slabs - Form, Rebar,			
RF (Nth) - Susp. Slab - Strip & Reshore (from L3 Below)			
RF (Nth) - Susp. Slab - Reshores Removed (from L3 Below)			
PENTHOUSE STRUCTURE			
PH - Erect Steel & Glulam Frame			
PH - Metal Deck			
PENTHOUSE ENVELOPE			
PH - Ext. Studs & Sheathing			
PH - Memb. Roofing (to Watertight)			
PH - Wall System - VB, Sub-Frame & Insul.			
PH - Louvres (to Watertight)			
PH - Roof Finishes			
PH - Wall System - Panels & Trim			
PH - Misc. Wall Finishes, Canopies etc.			
MAIN ROOF ENVELOPE			
RF - Parapet Studs & Sheathing			
RF - Memb. Roofing (to Watertight)			
RF - Roof Finishes			
INTERIOR ROUGH-IN & FITOUT			
L1 - PARKADE			
L1 Parkade - M/E Rough-in			
L1 Parkade - Finishes & Fixtures			
L1 - ROOMS			
L1 Rooms - Stud Framing & M/E Rough-in			
L1 Rooms - Drywall & Paint			
L1 Rooms - Int. Finishes & Fixtures			
L2 - ROOMS			
L2 Rooms - Stud Framing & M/E Rough-in			
L2 Rooms - Drywall & Paint			

Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
		2011												2012											
-1	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25

Schedule 6 - Time Schedule

Activity	Work-Days (Planned)	Start	Finish
L2 Rooms - Int. Finishes & Fixtures			
L3 - ROOMS			
L3 Rooms - Stud Framing & M/E Rough-in			
L3 Rooms - Drywall & Paint			
L3 Rooms - Int. Finishes & Fixtures			
EQUIPMENT ROOMS			
MECH ROOMS/RISERS			
Mech PH - Set AHUs & Major Eq`t			
Mech PH - Room Buildout & Final Close-in			
Mech PH - Piping, Ductwk, Insul., Controls			
Mech PH - MCCs & Elec Hookup			
ELEC. ROOMS/RISERS			
Elec. Rms - Room Buildout			
Elec. Rms - Set Eq't & Pull Feeders			
Elec. Rms - Power Online			
Elec. Rms - Pull Branch Wiring, Term. & Test			
COMM. ROOMS/RISERS			
Comm. Rms - Room Buildout			
Comm. Rms - Set Panels & Pull/Splice/Test Backbone			
Comm. Rms - Pull, Term. & Test Horizontal Cable			
Comm. Rms - Rooms Ready for Active Eq't			
Comm. Rms - Connect & Energize Systems			
ELEVATORS			
Elev. #1 - Install			
Elev. #2 - Install			
STAIR CORES			
Stairs - Rough-in and Fitout			
BRIDGE OVER PANDOSY			
Bridge - Assemble Sections & Prefinish Envelope (at Grade)			
Bridge - Erect			
Bridge - Interior Fitout			
Bridge - Rmv Hoarding & Tie-in @ ACC			
SITE FINISHES			
Site Finishes - Clear Laydown Areas & Rough Grade			
Site Finishes - U/G Utilities			
Site Finishes - Final Grade, Base Course			
Site Finishes - Sidewalks & Conc. Paving			
Site Finishes - Hard Landscaping			
Site Finishes - Soft Landscaping			
COMPLETION			
Completion - Pre-Occup./Subst. Punchlists			
Completion - Bldg Systems Commissioning			
Completion - Life Safety Tests			
Completion - LEED Bldg Flush			
Completion - Pre-Subst. Insp. & Rectif.			
Completion - Occupancy Permit & Subst. Perf. per Lien Act			
Completion - Subst. Completion (Target 27 Apr. 2012)			
Completion - Full Owner Move-in			
Completion - Post-Subst. Deficiencies			
Completion - Total Performance			

	2011													2012											
	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
	-1	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25

SCHEDULE 7

SUBMITTAL SCHEDULE

Schedule 7 – Submittal Schedule

Design Methodology and General Approach Overall

The Graham Design-Build Team proposes a number of enhancements to the design methodology and processes that will provide successful outcomes for the Authority in terms of managing reviews and minor changes, and accelerating project delivery.

The design methodology below provides for orderly design progress to develop and implement the Graham Design-Build Team's design scheme, with regular participation, review and acceptance of work by the Authority at appropriate milestones. This process closely follows the sequential format laid out in the Statement of Requirements and the Design-Build Agreement. The proposed enhancements will accelerate the process in order to meet the Project's tight time schedule.

The Graham Design-Build Team recognizes that efficient management of the user group involvement process is a critical path item in achieving a fully-functional and reviewed design. The Team will accommodate changes and maintain flexibility while leading the user group process effectively along with the Authority's management staff. Please refer to Section 3.1.3 (b) (ii) of this proposal for detailed user group meeting and progress milestones.

The Graham Design-Build Team is relying on the Authority to review and identify any design concerns prior to the Authority's issuance of the Invitation to Make a Financial Submission. This will provide the Team with the opportunity to advance the design prior to Financial Submission.

In order to deliver the Clinical Support Building Design-Build Project as scheduled, the Graham Design- Build Team requires, upon selection as Preferred Proponent, that the design receive "Reviewed" status on the following items:

- Structural grid and column locations;
- Shear wall locations;
- Elevator, stair and shaft locations;
- Building location, and floorplate dimensions;
- Departmental adjacencies; and
- Design, form, character and materials of the building and bridge link exterior.

This will enable the Team to prepare building permit applications for the City of Kelowna for foundations and superstructure in order to meet the schedule.

Schematic Design Phase

The Schematic Design Phase will confirm the location of all rooms, walls and doors, and will finalize wall and ceiling types and room configurations. This phase will include the following activities:

- Review any requested variations, adjustments and planning changes with the Authority and identify their impact.
- Coordinate the consultant's schematic building systems and servicing approaches.
- Refine and document the Schematic Planning.
- Submit Schematic Design documents for the Authority's review.
- Receive the Authority's final Equipment List including manufacturers' cut sheets of all Authority supplied equipment prior to the start of Design Development.
- Receive approval from the Authority to proceed to the Design Development Phase.

Design Development Phase

The Design Development Phase will confirm room dimensioning, millwork (casework), equipment location plumbing, door hardware and access control, and electrical/IT systems. This phase will include the following activities:

- Meet with the Authority and user groups to review room dimensioning, millwork (casework), equipment location, plumbing, door hardware and access control, and electrical and IT systems.
- Review the fire and life-safety code review of the new construction and any impact on the existing Centennial Building.
- Prepare for and conduct design workshops with lab and non-lab users to confirm planning layouts based on the submitted design scheme.
- Prepare Design Development documents based on the reviewed Schematic Design.
- Update the functional program/design comparison area summary.
- Coordinate the schedules and work of the engineering and specialist consultants.
- Review any requested variations, adjustments and planning changes with the Authority, and identify their impact and any effect they have on the Equipment List.
- Based on the Statement of Requirements and any accepted variances, finalize specifications for all design work and coordinate the specifications with other consultants.
- Submit Design Development documents for the Authority's review,
- Receive approval from the Authority to proceed to the Construction Documents and Construction phases.

Construction Documents Phase

The Construction Documents Phase will develop drawings, schedules and specifications suitable to tender the Project. This phase will include the following activities:

- Based on the approved Design Development, prepare Construction Documents incorporating the construction requirements, room data and equipment servicing requirements.
- Coordinate the sub-consultant and engineering requirements and documents.
- Update the program area/construction comparison area summary.
- Submit for a full Building Permit.
- Submit 95% final design documents (tender).

Proposed Submittal Schedules for the Project

Description	Schematic Design	Design Development	Final Design	Construction Period
Cover Sheet and Drawing List				
General Notes, Legends, and Abbreviations				
Site Plan				
Building Code Analysis				
Architectural Floor Plans 1:200				
Architectural Floor Plans 1:50				
Project Brief detailing area calculations				
Room layouts with furniture. equipment and fixtures				
Room Data Sheets				
Interior Elevations (only for rooms where patient care is provided, nursing centers, and clean / soiled / nourishment / medication centers.)				
Sections				
Millwork				
Ceiling plans				
Details				
Partition types				
Focal ceiling treatments				
Interior detailing				
Finish Schedule				
Two Exterior Renderings				
Exterior Elevations				
Two Interior Renderings				
LEED submission				
Energy Model				
Acoustic/Vibration Report				
Landscape Drawings				
Mechanical Plans (plumbing, HVAC, medical gases)				
Mechanical fixture cut sheets				
Electrical Plans				
Electrical fixture cut sheets				

Description	Schematic Design	Design Development	Final Design	Construction Period
Specifications (A/S/M/E)				
Sign Types & Standards				
Detailed Sign Layouts				
Door, Frame and Hardware Schedules				
Door, Frame and Hardware Specifications				

Workshop Meeting	Key Topic	Agenda	Outcome	Attendees	Page
	Selection as Preferred Proponent	[redacted]			
1	Project Start-up Meeting				
2	Design Workshop 1 – Lab Spaces (Level 2 and 3)				
3	Design Workshop 2 – Non-Lab Spaces (Level 1 and 2)				
4	Schematic Design Closeout Meeting				
5	Design Development 1 – Lab Spaces (Level 2 and 3)				
6	Design Development 2 – Non-Lab Spaces (Level 1 and 2)				

Workshop Meeting	Key Topic	Agenda	Outcome	Attendees	Page
7	Door Hardware and Access Control Meetings				
8	Electrical/IT Systems Meeting				
9	Design Development Closeout Meeting				
10	Construction Documents Development Meeting 1				
11	Construction Documents Development Meeting 2				
12	Construction Documents Closeout Meeting				

*Where a conflict exists between the dates on this document and other documents these dates shall prevail.

PROPOSAL SCHEDULE - Rev. 4

KGH - CLINICAL SUPPORT BUILDING (BID - REV. 4)

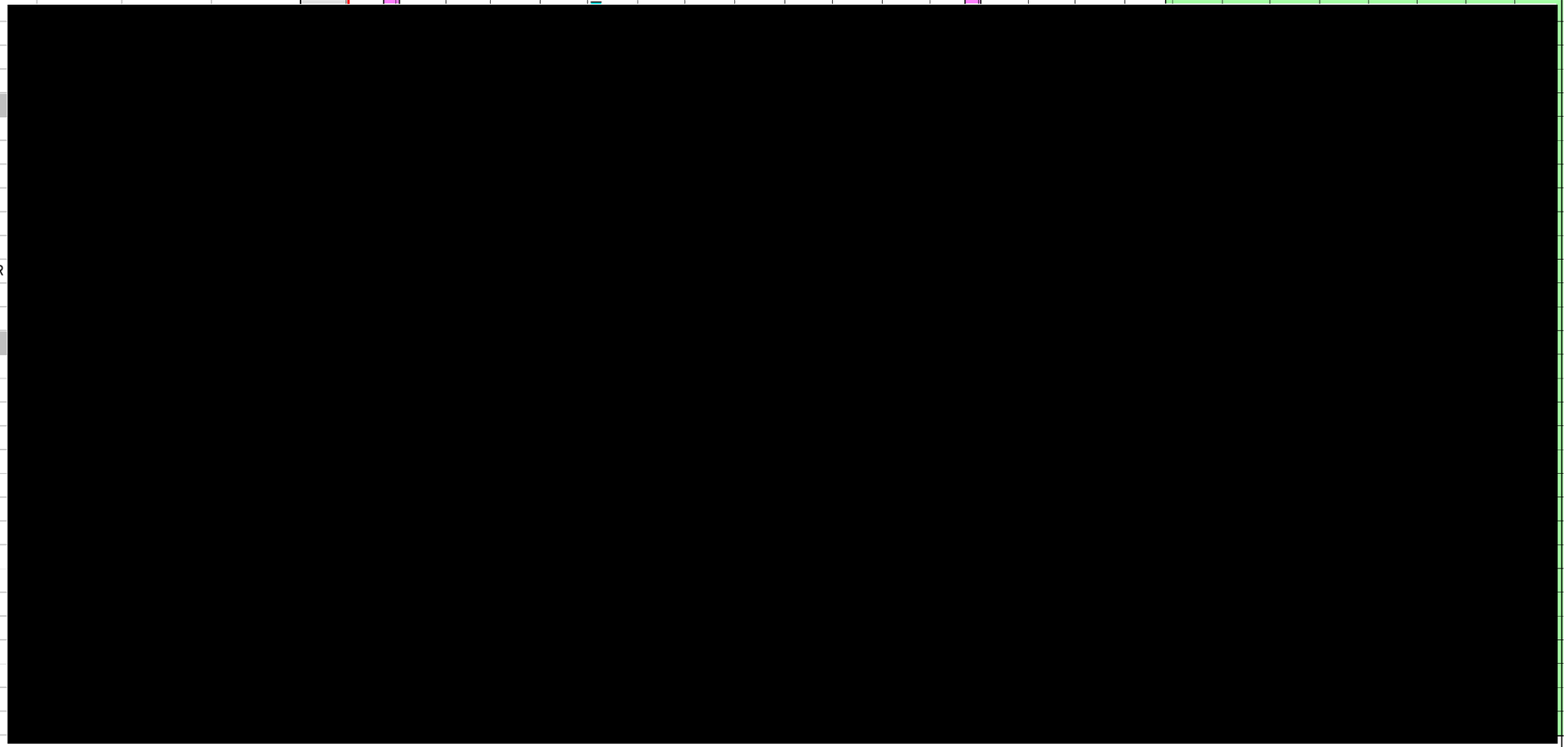
CSB - EXTRACT - DESIGN + PERMITS

GRAHAM

Activity	Work-Days (Planned)	Start	Finish
KGH - CLINICAL SUPPORT BUILDING (BID - REV. 4)			
PRE-CONSTRUCTION			
DESIGN & PERMITS			
SCHEMATIC DESIGN			
Schem. Design - Submission (RFP Design)			
Schem. Design - Workshop Mtg #1 (Rvw RFP Design)			
Schem. Design - Workshop Mtg #2 (Lab Spaces L2,L3)			
Schem. Design - Workshop Mtg #3 (Non-Lab Spaces L1,L2)			
Schem. Design - Workshop Mtg #4 (Closeout Mtg)			
Schem. Design - Workshops and Review Cycle			
Schem. Design - Record Set Submission			
Schem. Design - IHA Issue Final Eq`t List & Cut Sheets			
DESIGN COVENANT			
Design Covenant - Community Mtg			
Design Covenant - Schem. Design Input			
Design Covenant - Preferred Early Discharge Date			
Design Covenant - Latest Discharge Date			
FOUNDATION PERMIT			
Fdn Permit Pkg - Prepare Doc's			
Fdn Permit Pkg - Final Rvw & Prep./Print Pkg			
Fdn Permit Pkg - Issue Record Set to IHA			
Fdn Permit Pkg - Submit to City			
Fdn Permit - Obtained			
SHELL PERMIT			
Shell Permit Pkg - Prepare Doc's			
Shell Permit Pkg - Final Rvw & Prep./Print Pkg			
Shell Permit Pkg - Issue Record Set to IHA			
Shell Permit Pkg - Submit to City			
Shell Permit - Obtained			
DESIGN DEVELOPMENT			
Design Dev. - Workshop Mtg #5 (Lab Spaces L2,L3)			
Design Dev. - Workshop Mtg #6 (Non-Lab Spaces L1,L2)			
Design Dev. - Workshop Mtg #7 (Door Hwr, Access Control)			
Design Dev. - Workshop Mtg #8 (Elec., IT Systems)			
Design Dev. - Prepare Doc's			
Design Dev. - Final Rvw & Prep./Print Pkg			
Design Dev. - IHA Review #1			
Design Dev. - Workshop Mtg #9 (Closeout Mtg)			
Design Dev. - Graham/Stantec Review, Revise & Resubmit (if Req'd)			
Design Dev. - IHA Review #2 (if Req'd)			
Design Dev. - "Reviewed" Status Achieved			
INTERIM DESIGN PACKAGE			
Interim Design Pkg - Prepare Doc's			
Interim Design Pkg - Final Rvw & Prep./Print Pkg			
FULL BUILDING PERMIT			
Bldg Permit Pkg - Prepare Doc's			

2011														2012											
Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
-1	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25

Activity	Work-Days (Planned)	Start	Finish
Bldg Permit Pkg - Final Rvw & Prep./Print Pkg			
Bldg Permit Pkg - Issue Record Set to IHA			
Bldg Permit Pkg - Submit to City			
Bldg Permit - Obtained			
FINAL DESIGN PACKAGE			
Final Design Pkg - Workshop Mtg #10 (CD Development Rvw 1)			
Final Design Pkg - Workshop Mtg #11 (CD Development Rvw 2)			
Final Design Pkg - Prepare Doc's			
Final Design Pkg - Final Rvw & Prep./Print Pkg			
Final Design Pkg - IHA Review #1			
Final Design Pkg - Workshop Mtg #12 (CD Closeout)			
Final Design Pkg - Graham/Stantec Review, Revise & Resubmit (if R			
Final Design Pkg - IHA Review #2 (if Req'd)			
Final Design Pkg - "Reviewed" Status Achieved			
IFC DESIGN			
IFC - FOUNDATIONS			
100% IFC Design (Fdns) - Prepare Doc's			
100% IFC Design (Fdns) - Final Rvw & Prep./Print Pkg			
100% IFC Design (Fdns) - Issue to Site			
IFC - SUPERSTRUCTURE			
100% IFC Design (Super-Struc.) - Prepare Doc's			
100% IFC Design (Super-Struc.) - Final Rvw & Prep./Print Pkg			
100% IFC Design (Super-Struc.) - Issue to Site			
IFC - ENVELOPE			
100% IFC Design (Env.) - Prepare Doc's			
100% IFC Design (Env.) - Final Rvw & Prep./Print Pkg			
100% IFC Design (Env.) - Issue to Site			
IFC - FITOUT			
100% IFC Design (Fitout) - Prepare Doc's			
100% IFC Design (Fitout) - Final Rvw & Prep./Print Pkg			
100% IFC Design (Fitout) - Issue to Site			



SCHEDULE 8

COMMUNICATION ROLES

The Authority and the Design-Builder will share responsibilities for communications, including community relations, stakeholder consultation, media relations and emergency communications on the terms set out in this Schedule.

1. GENERAL

1.1 The Design-Builder will be guided by the Authority's best practices regarding communications. Unless otherwise specified by the Authority, the governing document relating to best practices will be the disclosure guidance document entitled "Procurement Related Disclosure for Public Private Partnerships" posted at www.Partnershipsbc.ca.

1.2 The Design-Builder will consult and cooperate with the Authority regarding communications activities relating to the Project.

1.3 The desired outcome of communications activities is to inform and involve the public and other stakeholders about the progress, value and benefits of the Project and to develop and maintain support for the Project.

1.4 Communications strategies and plans involving the interests of both parties are to be prepared on a joint basis, with one party taking a lead role and the other a supporting role, as described in this Schedule.

1.5 Where communications strategies and plans involve the interests of both parties, each party will give the other a reasonable opportunity (taking into account the need for timely communications) to consider communications strategies and plans initiated by the other and, if information is supplied by a party, it should include or be accompanied by sufficient explanatory or other material to enable the information to be properly considered.

1.6 The Design-Builder will consider and, acting reasonably, take into account, public and other stakeholder input in regard to its plans for the Design and Construction.

1.7 This Schedule is a guideline and may be amended by mutual agreement. Non-compliance with this Schedule by either party will not constitute a breach of this Agreement.

1.8 No communication regarding the subject matter of a Dispute, including one resolved under Section 61 (Dispute Resolution), will be made without the prior written consent of the Authority or the Design-Builder, as the case may be, unless otherwise ordered under the Dispute resolution procedure.

1.9 The Design-Builder acknowledges that FIPPA applies to the Authority, that nothing in this Schedule limits any requirements for compliance with FIPPA and that the Authority may be required to make disclosure of information under FIPPA.

1.10 The Design-Builder acknowledges that the Authority will be free to disclose (including on Websites) this Agreement and any and all terms hereof, except for those portions that would not be required to be disclosed under FIPPA. The Authority will consult with the Design-Builder prior to such disclosure.

1.11 Except for Section 1.10, this Schedule is subject to the parties' obligations in respect of Confidential Information pursuant to Section 64 (Confidentiality and Communications) of this Agreement.

2. CATEGORIES OF COMMUNICATIONS

The following categories of communications are covered by this Schedule and each category applies during the Construction period:

(a) Communications Planning: the Design-Builder will be provided with a copy of parts of the Interior Heart and Surgical Centre Communications Plan applicable to this project and will support the implementation of the strategies and activities listed in it;

(b) Community Relations: keeping all key audiences (as identified in communications plans) informed, including providing overall Project information, including information about schedule, design, construction (including traffic management), facilities management and other services, using any and all appropriate communications tools and tactics;

(c) Consultation: engaging in discussions with Project stakeholders;

(d) Media Relations: providing media with Project updates and responding to issues raised by the media; and

(e) Emergency Communications: preparing and implementing crisis communications planning and preparedness.

3. LEAD AND SUPPORTING ROLES

3.1 Within each category of communications set out in Section 2 of this Schedule, the Design-Builder will play either a lead or supporting role, working with the Authority to achieve the desired communications outcomes.

3.2 For all categories of communication, and whether communication occurs as part of a lead or supporting role, no advertising that involves payment, by the Design-Builder, to a third party may include the Authority or the Project unless the Design-Builder obtains the prior consent of the Authority, not to be unreasonably withheld or delayed.

4. LEAD RESPONSIBILITIES

The following is an overview of the responsibilities associated with lead roles:

(a) developing an overall strategic communications plan for the Project, that includes plans for communications, community relations, consultation, media relations and emergency communications;

(b) having regard for the input of the supporting party, approving communication plans and tactics in response to specific circumstances, unless otherwise indicated in this Schedule;

(c) implementing its role in approved plans;

(d) achieving the outcomes set out in the strategic communication plan;

(e) maintaining constructive and positive relationships with the public and other stakeholders;

(f) providing information, as required by the supporting party and its team members, to support communication and consultation activities;

(g) as relevant to its lead role, organizing, attending and participating in community and other stakeholder consultation meetings and carrying out other communication activities to consult with and report back to the community and other stakeholders, including open houses, information updates, public displays, advertising, website creation, maintenance updates, construction notices, milestone celebration events, news releases and tours, and directing inquiries to the supporting party as appropriate;

(h) assuming responsibility for costs related to carrying out lead responsibilities to a standard acceptable to the Authority, in the amounts and in the manner approved by the Authority;

(i) monitoring whether the Design and Construction are conducted in a manner consistent with strategic communication plans and advising the parties of any material inconsistency; and

(j) having a trained media relations spokesperson available 24/7 to respond to media requests.

5. SUPPORTING RESPONSIBILITIES

The following is an overview of the responsibilities associated with supporting roles:

(a) assisting with the implementation of plans, including drafting of other communication documents, as directed by the lead party;

(b) implementing its role in approved plans;

(c) maintaining constructive and positive relationships with the public and other stakeholders;

(d) providing information, as required by the lead party and its team members, to support communication and consultation activities;

(e) as relevant to its supporting role, organizing, attending and participating in community and other stakeholder consultation meetings and carrying out other communication activities to consult with and report back to the community and other stakeholders, including open houses, information updates, public displays, advertising, website creation, maintenance updates, construction notices, milestone celebration events, news releases and tours, and directing inquiries to the lead party as appropriate;

(f) assuming responsibility for costs related to carrying out supporting responsibilities to a standard acceptable to the Authority, in amounts and in a manner approved by the Authority; and

(g) having a local, trained media relations spokesperson available 24/7 to respond to media requests.

6. ALLOCATION OF LEAD AND SUPPORTING ROLES

The lead and supporting roles will be allocated as set out in the following table, unless otherwise required by the Authority in consultation with the Design-Builder:

CATEGORY	LEAD	SUPPORTING
Communications Planning	Authority	Design-Builder
Community Relations	Authority	Design-Builder
Consultation	Authority	Design-Builder
Media Relations	Authority	Design-Builder
Emergency Communications	Authority	Design-Builder
Construction	Design-Builder	Authority
Traffic	Design-Builder	Authority
Noise	Design-Builder	Authority

7. AUTHORITY RIGHT TO STEP IN AT DESIGN-BUILDER'S COST

If the Design-Builder is required to take a lead role but fails to comply with its obligations under this Schedule in any material respect, the Authority may give reasonable notice to the Design-Builder that it intends to undertake and assume the lead role obligations of the Design-Builder, at the expense of the Design-Builder, including all direct costs of engaging third party assistance with communication responsibilities and all direct losses of the Authority in connection with fulfilling the Design-Builder's obligations under this Schedule.

SCHEDULE 9

KEY PERSONNEL

Schedule 9 – Key Personnel

Individual's Name	Company Name	Role
[redacted]	Graham Design Build Services, a JV	Construction Lead
	Graham Design Build Services, a JV	Project Lead
	Graham Design Build Services, a JV	Design Lead for the Design-Builder

Individual's Name	Company Name	Role
[redacted]	Graham Design Build Services, a JV	(i) Construction Lead
	Graham Design Build Services, a JV	(ii) Project Lead
	Graham Design Build Services, a JV	(iii) Design Lead for the Design-Builder
	Stantec Architecture Ltd	(iv) Design Lead for the Architect
	Stantec Consulting Ltd.	(v) Structural Engineer
	Stantec Consulting Ltd.	(vi) Mechanical Engineer
	Stantec Consulting Ltd.	(vii) Electrical Engineer
	Interior Testing Services Ltd.	(viii) Geotechnical Engineer
	Stantec Consulting Ltd.	(ix) Civil Engineer
	Stantec Architecture Ltd.	(x) LEED® Coordinator
	Apex Building Sciences Inc.	(xi) Building Envelope Specialist

SCHEDULE 10

QUALITY MANAGEMENT PLAN

Schedule 10 – Quality Management

Quality Assurance / Quality Management Plan

The Graham Design-Build Team initiates quality management of the Clinical Support Building Design-Build Project by taking ownership of the design process. The Design Team will plan and execute their internal quality control on design deliverables for verification and to ensure that they meet the Authority's technical requirements. These quality control activities will be documented in the Design Team's Quality Plan, and will include: individual discipline checks, interdisciplinary checks, technical reviews, and independent technical reviews for select disciplines. The Design-Builder will also conduct its own quality assurance checks on the Design Team. The main criteria will be to verify the compliance of the design to the approved Quality Plan.

The Graham Design-Build Team has a long-standing commitment to quality performance through Graham's Quality Management System (QMS), Quality Assurance Manual (QAM) and Project Quality Plans (PQP), and believes that the key to the delivery of a successful quality program is leadership. The Team has nominated senior level individuals who will lead the creation, implementation and management of the final PQP. The PQP shall be implemented to ensure a well-coordinated approach to all operations, with the goal of doing things right the first time.

Means by which all service and quality non-conformance issues, including work performed by sub-contractors, will be identified, corrected and monitored

The Graham Design-Build Team will prepare and implement an Inspection and Test Plan (ITP) that records all the required quality activities associated with each chosen scope of work, so that it:

- Identifies the project or construction activity to be inspected and verified;
- Stipulates the acceptance criteria–Code, Performance Specification or PQP;
- Calls up the Inspection Test Record (ITR) to be completed; and
- Identifies the hold or witness surveillance points to be initialed and dated by the appropriate party upon completion.

The ITP becomes a project-specific list of commitments verifying that all services are in compliance with the Design-Build Agreement, applicable laws, jurisdictional authorities, specifications and drawings.

The Graham Design-Build Team's Quality Control Program assures that all supply and service no-compliances are remediated promptly to the required contractual standard. The Graham Design-Build Team uses computerized hand-held field tablets to record all deficiencies, which in turn generate e-mail notifications to the responsible subcontractor or discipline. When the remedial action has been completed, the responsible party notifies the Graham Design-Build Team's quality control staff, who in turn re-inspect to verify compliance and, if approved, close-out. Where the deficiency is elevated to a non-conformance, the Team's Non-Compliance Procedure is implemented to ensure written identification of the issue, proposed disposition, the Authority's and Engineer of Record's written acceptance, remedial action, and close-out. This detailed process ensures transparency and traceability.

Means by which all services are delivered in compliance with all applicable laws, provincial policies and good industry practice

Using the ITP described above–and identifying the acceptance criteria for all applicable laws and provincial policies–provides a complete compliance check. Following the same process using the design specifications ensures that industry practices are met and exceeded.

Roles and responsibilities related to Quality Assurance and any other key features of the Quality Assurance system

The Graham Design-Build Team's Project Lead Quality Process Manager will be responsible for carrying out the following responsibilities:

- Delegating responsibilities for the Project's QMS and PQP to appropriate team members;
- Ensuring that the Design Team and subcontractors are fully integrated into the program through their Quality Control Plans;
- Ensuring that all Project personnel adequately understand the Quality Control Plan;
- Ensuring that all deficiencies are identified and properly resolved; and
- Promoting continuous improvement of the process.

The Graham Design-Build Team's field Quality Control Inspector will be responsible for carrying out the following responsibilities:

- Ensuring that, prior to commencement of their construction phase, subcontractors submit a detailed quality control plan that will meet or exceed both the performance specifications and the Graham Design-Build Team's PQP;
- Ensuring that all testing and inspection is performed in accordance with applicable industry standards, the Authority's Statement of Requirements, and the Design-Build Team's project specifications;
- Developing and implementing the ITP to include all required verification for inclusion in the turnover documents; and
- Ensuring non-conformances are reported and resolved through corrective action, lessons learned and continuous improvement.

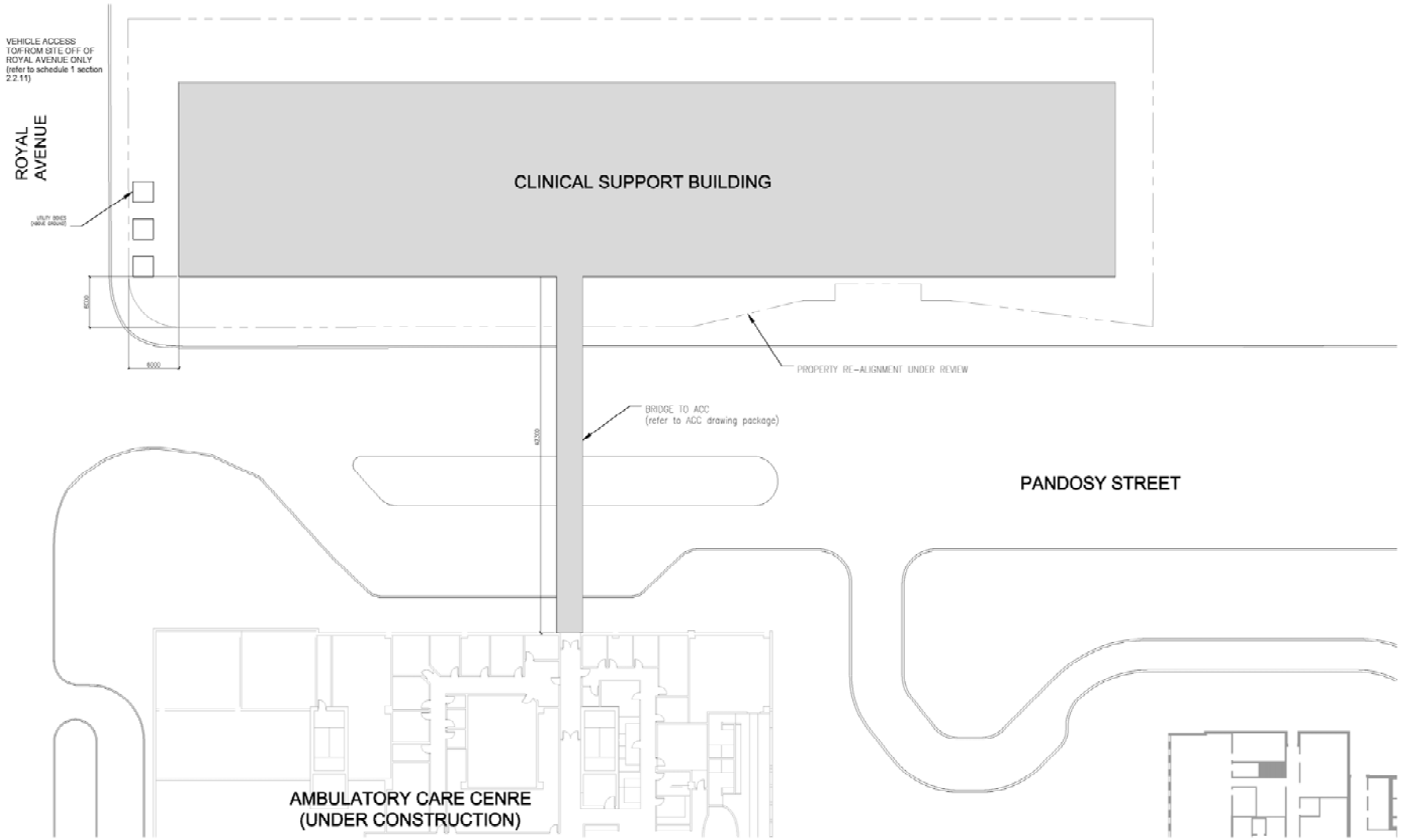
SCHEDULE 11

PROPOSAL EXTRACTS

Attached are the Proposal Extracts, with the exception of the drawings referred to in the list of drawings included in the attached documents. The drawings are separately bound and are incorporated by reference into the Proposal Extracts.

SCHEDULE 12

SITE PLAN



Interior Health

INTERIOR HEART AND SURGICAL CENTRE	AUGUST 3, 2010	CLINICAL SUPPORT BUILDING INDICATIVE PLAN - SITE PLAN	Scale 1:150 NORTH	A101

SCHEDULE 13

FUNCTIONAL PROGRAM

Attached is a copy of the Functional Program referred to in this Agreement, including Schedule 1 – Statement of Requirements. For greater certainty, references to the Functional Program, including references in Schedule 1 to a data room or RFP, are deemed to be references to the attached Functional Program.

Interior Health Authority

OKANAGAN HEALTH SERVICE AREA LABORATORY REDEVELOPMENT

LABORATORY FUNCTIONAL PROGRAM

Mort and P ann ng & Des gn, Inc/ CannonDes gn
May 11, 2009

TABLE OF CONTENTS

EXECUTIVE SUMMARY

The Laboratory Functional Program was requested as part of the Pre- ndicative Design for the KGH Coronary Revascularization Program and Surgical Centre project The Functional Program is an assessment of the lab requirements for three options

- Option 1 is a Consolidated laboratory located somewhere between Peachland and Winfield with Rapid Response Labs at Kelowna General Hospital Penticton Regional Hospital and Vernon Jubilee Hospital The consolidated lab will incorporate labs from KGH PRH and VJH with consideration for future catchment areas/growth
- Option 2 is a new full service lab at Kelowna General Hospital only The laboratories at PRH and VJH would not have any work included in this Option
- Option 3 is a Consolidated laboratory located at KGH with Rapid Response Labs at Penticton Regional Hospital and Vernon Jubilee Hospital The consolidated lab will incorporate labs from PRH and VJH with consideration for future catchment areas/growth

 nformation about staffing equipment existing historical workloads and projections from nterior Health and projections from People33 BC stats were utilized to create opinions of projections for the necessary net square meters (NSM) workloads and staffing (FTEs) for the two options ncreases in the population served additional nterior Health programs additional patient beds and projected reductions in available staffing indicate a strong need for laboratory renovations

The workloads staffing requirements hours of operations program/areas and equipment lists were generated to show an opinion of the probable needs for the three options Summary of the workloads staffing and areas are as follows

	EXISTING LABORATORIES			2014/2015			2024/2025		
	WORKLOAD	FTE'S	NSM	WORKLOAD	FTE'S	NSM	WORKLOAD	FTE'S	NSM
TOTAL EX ST NG KGH PRH VJH	5 670 974	154 75	2 573						
OPT ON 1 - CONSOL LAB OFFS TE W TH RRL @ KGH PRH VJH				10 164 936	213 00	4 148	17 902 326	399 00	4 552
OPT ON 2 - NEW KGH LAB W TH EX ST NG PRH & VJH				10 164 936	248 32	1 802	17 902 326	475 02	2 021
OPT ON 3 - CONSOL LAB AT KGH W TH RRL @ PRH VJH				10 164 936	213 00	3 755	17 902 326	399 00	4 071

* t is important to note that comparisons between the options based on the above information cannot accurately be made unless projections for the laboratories at PRH and VJH would be studied to project the number of FTEs and the NSM that would be required to keep them operational through the fiscal year 2024/2025 The existing FTE's and net square meters at PRH and VJH are included in the Option 2 summaries Because there is no improvement to PRH and VJH the Pathology staff feels that a new KGH full service laboratory (Option 2) would not be a good solution to the problems of the region and that the Option 1 or Option 3 Consolidated laboratory model would be more optimal

 n Option 1 the Consolidated laboratory places all of Microbiology and Anatomic Pathology with the exception of Frozen Section in the new off-site facility The Pathologists have a very strong preference to keep their offices Microbiology and Gross Anatomy in the hospitals instead of being located in an off-site facility This is to facilitate their interaction with the Medical staff and students

Option 3 was determined to be a better solution for the Medical staff This would allow them 24/7 coverage at KGH for all consolidated departments better interaction with the medical staff infection control and students at KGH This will also require the construction of only two rapid response laboratories instead of three and will minimize some of the transportation needs

PROJECT OVERVIEW

Introduct on

- The Laboratory Functional Program was requested as part of the Pre- ndicative Design for the KGH Coronary Revascularization Program and Surgical Centre project The Functional Program is an assessment of the lab requirements for three options
    - Option 1 is a Consolidated laboratory located somewhere between Peachland and Winfield with Rapid Response Labs at Kelowna General Hospital Penticton Regional Hospital and Vernon Jubilee Hospital The consolidated lab will incorporate labs from KGH PRH and VJH with consideration for future catchment areas/growth
    - Option 2 is a new full service lab at Kelowna General Hospital only
    - Option 3 is a Consolidated laboratory located at KGH with Rapid Response Labs at Penticton Regional Hospital and Vernon Jubilee Hospital The consolidated lab will incorporate labs from PRH and VJH with consideration for future catchment areas/growth
    - Functional Programming will include functional descriptions operational descriptions workload summaries staffing summaries room lists functional relationship diagrams space requirements and user group meetings
- The three existing laboratories do work for their specific facilities as well as some for the surrounding areas and facilities Standard routine testing includes Transfusion Medicine (Blood Bank) Chemistry mmunology Hematology Coagulation Urinalysis Microbiology and Anatomic Pathology
    - KGH does special chemistry (e g hepatitis testing) special coagulation special microbiology all parasite testing and all immunohistochemistry testing for Okanagan Health Services Area (OHSA) They also do cytology testing for East Kootenay Regional Hospital and the East Kootenay Health Service Area KGH also does some special chemistry testing for the rest of H labs
    - VJH does referred testing for Salmon Arm and Revelstoke include all their microbiology and anatomic pathology as well as special chemistry and hematology They also have collection sites in Armstrong and Enderby and all specimens from those sites (and physician offices) are sent to VJH for testing VJH also does protein electrophoresis for Central Okanagan and Northern Okanagan and hemoglobin A1C for the entire OHSA
    - PRH does referred testing for Oliver and Princeton including all microbiology and anatomic pathology as well as special chemistry and hematology There are also a collection sites in Summerland and Keremeos All specimens are processed in PRH PRH also does all of the hormone testing for the OHSA and Protein Electrophoresis for SOK
- The planning looks forward to fiscal year 2014/2015 and to 2024/2025 to try to plan for future workload increases technology changes and staffing fluctuations Historical information and projections were utilized in an attempt to predict how many factors will affect the laboratory All of the information concluded is opinions of probable results as it is impossible to perfectly predict what will happen in the future Some of the key factors in the decisions were
    - Staffing will decrease due to retirements and lack of trained new personnel in the market
    - Patient population will increase based on local census and projections and adding testing
    - Patient population will age based on local census and projections and adding testing
    - New Medical School will add testing
    - New KGH Coronary Revascularization Program and Surgical Centre project program will add testing
    - New technologies will be added
    - Additional residential care and inpatient beds will add testing
- The information that follows should be considered an opinion based on best understanding of the future needs at this time and by the documents given to the Consultant As new information becomes available the concepts assertions assumptions and conclusions should be reassessed with the intent to determine the impact of any changes on the proposed laboratory design

Background

- With workload projections increasing and the staffing projections decreasing the laboratories at KGH PRH and VJH anticipate problems fulfilling their goals to meet the testing needs of the area Generally they anticipate an 18% to 49% reduction in staff with a 90% increase in workload in the next 7 years Lean measures are already being employed to try to streamline workflow and minimize staffing needs as much as possible for the immediate future
    - The laboratory administration normally looks to plan for 7 years in the future 50% of the staff will be 55 or over so could chose to retire The number who will chose retirement is variable About 18% are at the full pension level but there is no mandatory retirement age This could cause a serious staffing shortage Competition to recruit qualified staff is very difficult and competitive The creation of an efficient and state of the art laboratory could decrease staffing needs and could act as a magnet to recruit new staff
    - General testing growth for the laboratories was projected by the laboratory administration at approximately 6% per year overall This would account for almost 50% increase in 7 years The addition of the Medical School and the KGH Coronary Revascularization Program and Surgical Centre program could add another 40% to that number
    - More Medical Technology (MT) students could be trained in the future Space for internships for the MT students would be necessary in the hospital laboratory No single laboratory can handle all 20 students so they would be spread throughout the nterior Health system The BC T program is also scheduled to expand
    - The laboratory administration is trying to standardize equipment for all the facilities to create better purchasing power sharing of reagents standardization of test results and sharing of staff resources
    - New testing utilizing Molecular Diagnostics is planned to be added in the future t is presently not being done due to lack of area and staff
- There are several problems with the existing laboratories
    - KGH
        - The KGH lab is currently located within the Pandosy Building originally built in 1938 and has undergone many redevelopments including a major laboratory redevelopment in 1971 As the processes for laboratory services have developed with technology and process modifications the building design has not been as flexible for the required changes The current laboratory is spread out across multiple locations within the Pandosy Building with limited opportunities for growth consolidation or redevelopment of the interior spaces
        - The lab is presently incorporating Lean principals based on consultation services from Ortho-Diagnostics This has allowed them to consolidate Hematology and Chemistry into a single area t will provide space for Pathologist offices that they need but are not provided for today Administration believes this will help the laboratory survive in place for a maximum of four years
    - VJH
        - The Vernon Jubilee Hospital Laboratory is currently located in the West Wing of the main floor of the hospital n 1981 the Laboratory underwent a redevelopment to renovate the space for lab services Since that renovation testing volumes have increased at the hospital and two inpatient 4-bed ward rooms have been taken over for lab services The current lab has limitations for growth and expansion in the current footprint and the 2nd floor space may eventually be converted back to patient rooms thus reducing the amount of space for lab services
    - PRH
        - The Penticton Regional Hospital underwent a major redevelopment in 1980 to create an open concept lab Since this redevelopment the population that the lab serves has grown increasing the laboratory workload The increased volumes have resulted in offices being moved out the laboratory to accommodate testing spaces
- Several documents presented to the Consultant by nterior Health were utilized for these studies
    - Central Okanagan Redevelopment Project Phase 1 – Facility Program
        - Resource Planning Group nc Feb 4 2005
    - Central Okanagan Redevelopment Project Phase 1 – Facility Program Update nterior Health Academic & Research
        - Resource Planning Group nc Nov 29 2005
    - Stat tests in the Okanagan – 2008 Joint Summary
        - Laboratory staff from KGH VJH PRH
    - Occupational First Aid Guidelines to accompany the Occupational Health and Safety Regulation
        - WorkSafeBC Feb 22 2008

- Retention of Documents Records Slides and Specimens Guideline
  - OHSA Laboratory General Operations Dec 2004
- Networks and Telecommunications
  - nterior Health Aug 24 2007
- nterior Health Core Lab Analysis
  - Ortho-Clinical Diagnostics July 9 2008
- KGH Coronary Revascularization Program and Surgical Centre Project Master Program
  - CannonDesign/ RPG April 17 2008
- Lab Statistics Summary
  - Laboratory staff from KGH VJH PRH
- People33 Population Projections
  - People33 BC Stats March 31 2009
- Ambulatory Care Centre Relocation Penticton Regional Hospital
  - RPG Feb 21 2008
- Staffing Summary
  - nterior Health
- Vernon Jubilee Hospital Diagnostic and Treatment Building Functional Program
  - Stantec Aug 11 2006

Popu at on of Area and project ons

- The existing population of the areas supported by KGH PRH and VJH is changing necessitating changes in the hospitals to support the increases and the procedures necessary for the health of the patients
- Projections were given to the Consultants by nterior Health and are in the following chart

PEOPLE33 Population Projections

Fiscal Year	LHA				
	Central Okanagan	Penticton	Vernon	Northern Okanagan	Southern Okanagan
2008/09	180 009	41 111	64 679	124 435	82 721
2009/10	183 616	41 572	65 558	125 784	83 399
2010/11	187 120	42 043	66 417	127 134	84 073
2011/12	190 477	42 480	67 241	128 456	84 754
2012/13	193 865	42 937	68 033	129 812	85 464
2013/14	197 172	43 408	68 815	131 145	86 171
2014/15	200,501	43,908	69,597	132,530	86,923
% increase from 2008	11%	7%	8%	7%	5%
2015/16	203 870	44 429	70 398	133 943	87 713
2016/17	207 228	44 962	71 200	135 371	88 529
2017/18	210 567	45 505	71 951	136 755	89 357
2018/19	213 843	46 046	72 712	138 139	90 174
2019/20	217 086	46 573	73 458	139 507	90 956
2020/21	220 298	47 107	74 203	140 875	91 743
2021/22	223 483	47 653	74 938	142 213	92 544
2022/23	226 608	48 178	75 664	143 538	93 291
2023/24	229 679	48 693	76 397	144 852	94 011
2024/25	232,706	49,203	77,111	146,136	94,715
% increase from 2014	16%	12%	11%	10%	9%

Source PEOPLE33 BC Stats

Prepared By Tristan Laidlow Strategic nformation Analyst March 31 2009

- Laboratory administration noted that the population they serve is aging ncreases in patients over the age of 65 peaking at approximately 2030 to 2035 are anticipated These patients could require more medical care than younger populations
- Laboratory administration noted that certain socioeconomic classes can have an impact on laboratory testing as certain demographics are more susceptible to types of ailments The Central Okanagan area ranked "Low" suggesting a low level of socio-economic stress relative to other BC areas The Penticton and Vernon areas are ranked at Moderate suggesting a moderate level of socio-economic stress relative to other BC areas Specifics on demographics and the testing resources they would need were not included in the statistics Source BC Stats Socio-Economic ndices 2007
- The increase in population and age for the patients has lead nterior Health to determine an approximate increase of 6% per year in laboratory testing This is variable between the different departments and is more specifically analyzed later in the document The Consultant utilized historical workload information presented by nterior health for the workload projections

ndicator/ Measure	Central Okanagan	Vernon	Penticton	Northern Okanagan	Southern Okanagan
Total Population 2008/2009	180 009	64 679	41 111	124 435	82 721
Median Age (years)	42 9	44 2	47 6	40 3	44 2
Residents < 20 years of age (% of total)	20 5%	21 5%	18 7%	22 0%	15 7%
Residents 65 years of age or older (% of total)	18 2%	19 0%	23 8%	19 3%	26 1%
Residents 75 years of age or older (% of total)	9 0%	9 1%	13 1%	8 9%	13 2%
Residents 85 years of age or older (% of total)	2 6%	2 6%	4 0%	2 5%	3 7%

Source P E O P L E 33 Population Projections BC Stats Ministry of Labour and Citizens/ Services

Hosp ta Serv ce Changes

- The UBC Medical Program is planning for expansion of its undergraduate and post-graduate trainees at KGH and nterior Health
  - 24 to 32 students are anticipated at KGH for the 2014/2015 fiscal year This represents at 100% to 150% increase from the present number of 12
  - Key activities include patient examinations that anticipate laboratory testing towards monitoring and diagnosing Projections from laboratory administration are for a 30% increase in testing
- The KGH Coronary Revascularization Program and Surgical Centre will add a new comprehensive system of cardiac care on the KGH campus
  - An increase in cardiac catheterizations and surgeries are part of this program and an anticipated 10% increase in laboratory testing is projected to support this
- Since 2007/2008 there have been additional residential care beds Mt Cartier in Revelstoke has 48 additional Residential Care Beds Pleasant Valley Manor in Armstrong has 42 additional beds and Orchard Haven in Keremeos has an additional 14 beds The KGH ACC has space designed for an estimated 140 shelled inpatient beds and the Vernon Jubilee Hospital has space designed for an estimated 60 shelled inpatient beds The completion of these shelled in beds is still to be determined

Laboratory Opt on Descr pt ons

- Option 1
  - Consolidated laboratory – Routine testing from KGH PRH and VJH will all be performed at a consolidated laboratory in a site yet to be determined Testing would include all of Gross Anatomy Histology Cytology and Microbiology from all three facilities t would also include Hematology Chemistry Coagulation Urinalysis and mmunology testing that is to be done on outpatients and those that are not considered urgent There is also testing from some of the other regional facilities that send their work to VJH and PRH Those numbers are included in the workload projections created by the nterior Health Laboratory Administration The location of the consolidated laboratory will be located between Peachland and Winfield

- Rapid Response Labs for KGH PRH and VJH General parameters include those true stats and urgents that would need a 3 hour maximum turn around time (TAT) All Frozen Section work and Blood Banking will be kept at each of the facilities Other testing will be standardized based on a list that was developed previously for the types of institutions at nterior Health This will be used as a starting point and specific issues for the various facilities will be addressed from there Some of the facilities anticipate that there will be testing needs to address specialized patient populations that are not seen at the other facilities The testing list given to the Consultant is as follows

- Option 2
  - Full service lab at Kelowna General Hospital only This will provide all testing for Frozen Sections Gross Anatomy Histology Cytology Microbiology Hematology Coagulation Chemistry Urinalysis and mmunology for the inpatients and surrounding patient populations that they presently serve The laboratories at VJH and PRH will not be addressed at all with this option
- Option 3
  - Consolidated laboratory – Routine testing from KGH PRH and VJH will all be performed at a consolidated laboratory in a site yet to be determined Testing would include all of Gross Anatomy Histology Cytology and Microbiology from all three facilities t would also include Hematology Chemistry Coagulation Urinalysis and mmunology testing that is to be done on outpatients and those that are not considered urgent There is also testing from some of the other regional facilities that send their work to VJH and PRH Those numbers are included in the workload projections created by the nterior Health Laboratory Administration The location of the consolidated laboratory will be located at KGH
  - Rapid Response Labs for PRH and VJH General parameters include those true stats and urgents that would need a 3 hour maximum turn around time (TAT) All Frozen Section work and Blood Banking will be kept at each of the facilities Other testing will be standardized based on a list that was developed previously for the types of institutions at nterior Health This will be used as a starting point and specific issues for the various facilities will be addressed from there Some of the facilities anticipate that there will be testing needs to address specialized patient populations that are not seen at the other facilities
- A decision on which model to utilize or any variations will be made by the KGH Coronary Revascularization Program and Surgical Centre Steering Committee after the information is documented

Staff ng Impact Summary

- The following tables summarize the existing staff as given to the Consultant by nterior Health and the projected future staffing needs in full time equivalents (FTE) Specifics are shown in the detailed staffing charts later in the report The FTEs are for all shifts that will be staffed for particular laboratories and support areas t is recognized that the projected FTEs would have to be substantiated and approved for funding over time and reevaluated as testing and population needs change Opinions are based on information generated by nterior Health's Human Resources Department and Laboratory Administration

STAFFING SUMMARY OF ALL OPTIONS

	2008/2008	2014/2015	2024/2025
	# FTEs	**# FTEs**	**# FTEs**
EX ST NG STAFF NG	154 75		
OPT ON 1 CONSOL DATED OFFS TE LAB W TH 3 RRLS		213 00	399 00
OPT ON 2 KGH NEW LABORATORY VJH AND PRH EX ST NG LABS		248 32	475 02
OPT ON 3 CONSOL DATED LAB AT KGH W TH 2 RRLS - SUMMARY		213 00	399 00

Area Requ rements Impact Summary

- The following tables summarize the opinion of proposed area necessary for the laboratories in the two options Specifics are shown in the detailed area/program later in the report The numbers are shown as the departmental Net Square Meters (NSM) Gross increments can be variable based on the site locations so are not addressed at this time The numbers

represent area determined by the laboratory testing needs based on specific equipment and workstations to support the testing for each option Also included are safety equipment code clearances and casework sizes that are standard for the industry The numbers should be reevaluated as the site is selected and as anticipated future needs are re-accessed The equipment and growth that dictates the area calculations are based on information from nterior Health and constitute an opinion of probable area

	2008/2009	2014/2015				2024/2025			
	Existing	Consol Lab	KGH	PRH	VJH	Consol Lab	KGH	PRH	VJH
EX ST NG KGH	1411 0								
EX ST NG PRH	503 0								
EX ST NG VJH	689 0								
OPT ON 1		2331 4	645 4	620 5	551 0	2639 7	700 9	641 5	570 1
OPT ON 2			1801 7				2020 6		
OPT ON 3		2583 7		620 5	551 0	2859 1		641 5	570 7

GENERAL PLANNING CRITERIA

Overa P ann ng Assumpt ons

- Relocation of the laboratory at KGH is required to accommodate the KGH Coronary Revascularization Program and Surgical Centre
- f the Consolidated Lab Model is chosen it will impact the lab designs at PRH KGH and VJH The laboratories at these sites will require design changes to be reconfigured to Rapid Response Labs The consolidated laboratory will be in a location yet to be determined in between Peachland and Winfield
- The location of the labs for both models will be determined through an indicative design process

P ann ng goa s

- The two options should be evaluated for projected area and staffing to allow the KGH Coronary Revascularization Program and Surgical Centre Steering Committee to make a decision on what is the best option to serve the needs of the Okanagan Valley and nterior Health
- The options should incorporate opinions of future anticipated testing and staffing limitations to allow the design of efficient and flexible laboratories
    - This is projected for the 2014/2015 and the 2024/2025 fiscal years
- t is recognized that the information generated is opinions based on the projections and information given

S te P ann ng Cr ter a

- Option 1 – Consolidated laboratory
    - The laboratory will be in a location yet to be determined in between Peachland and Winfield Location parameters will have to be discussed to be able to serve all the communities
        - The site should be one that is fairly easy access for the multiple couriers that will be accessing the facility with samples There should be room for them to park cars and get into and out of the facility in a timely manner
    - The distance from the hospitals to the consolidated lab will affect the turn around times (TATs) for the various facilities
        - The proposed list of stat tests was made to control the types of testing done on a stat and urgent basis A 3 hour maximum TAT was the criteria
        - There are concerns that if the TAT is worse for some testing that the medical staff will start to order more of them as stats t was agreed that monitoring of stat order and volumes will be very important
    - Transportation issues will be important There will be transportation costs and site issues that will need to be addressed when a site is chosen The type of courier employees and number of pick-ups and deliveries per day will have to be determined
        - Couriers will need access to the facility at all times day and night
        - There could be some environmental impacts with the increase in courier traffic
    - Room for large trucks that will carry equipment and supplies to an offsite facility will be important They will need turnaround space parking area and a loading dock with easy access
    - There should be sufficient room for staff parking with security lighting
    - All specimens will be triaged at their home facility before sending to a consolidated lab That way if there are any issues they can be resolved quickly before the specimen is sent all the way to the Consolidated site and several hours are lost
    - The M T system must be very good to create a seamless lab environment Clients should not be able to see any difference as to testing location when accessing result information Printing of reports and results should be able to go to any printer in the system
- Option 1 – RRLs
    - These should be located as close as possible to the areas that will be the greatest need for rapid TATs Those would include the Emergency Room OR's and CUs
    - Blood Bank needs to have easy access for hospital and laboratory staff to pick up and deliver blood products rapidly mainly to the ER and OR's

- Frozen Section should ideally be immediately accessible to the OR's but if that is not physically possible it should have easy access for OR and hospital staff to transport specimens rapidly
- Couriers will need access to the facility at all times day and night

- Option 2 – new KGH laboratory
  - This is planned to be located on the KGH campus in a new location that can be constructed fully and the laboratory moved in without phasing or temporary locations
  - This should be a location that allows contiguous laboratory space but still has easy access for delivery of specimens by couriers and hospital staff
  - Blood Bank needs to have easy access for hospital and laboratory staff to pick up and deliver blood products rapidly mainly to the ER and OR's
  - Frozen Section should ideally be immediately accessible to the OR's but if that is not physically possible it should have easy access for OR and hospital staff to transport specimens rapidly
  - Couriers will need access to the facility at all times day and night
- Option 3 – Consolidated laboratory
  - The laboratory will be in a location yet to be determined at KGH
    - The site should be one that is fairly easy access for the multiple couriers that will be accessing the facility with samples There should be room for them to park cars and get into and out of the facility in a timely manner
  - Access to the rest of the KGH facility should be evaluated to ensure timely transportation of stat and urgent specimens as well as supplies
  - The consolidated laboratory will increase staff parking on the KGH site and that will have to be evaluated
  - Blood Bank needs to have easy access for hospital and laboratory staff to pick up and deliver blood products rapidly mainly to the ER and OR's
  - All specimens from PRH and VJH will be triaged at their home facility before sending to the consolidated lab That way if there are any issues they can be resolved quickly before the specimen is sent all the way to the Consolidated site and several hours are lost
  - The M T system must be very good to create a seamless lab environment Clients should not be able to see any difference as to testing location when accessing result information Printing of reports and results should be able to go to any printer in the system
- Option 3 – RRLs
  - These should be located as close as possible to the areas that will be the greatest need for rapid TATs Those would include the Emergency Room OR's and CUs
  - Blood Bank needs to have easy access for hospital and laboratory staff to pick up and deliver blood products rapidly mainly to the ER and OR's
  - Frozen Section should ideally be immediately accessible to the OR's but if that is not physically possible it should have easy access for OR and hospital staff to transport specimens rapidly
  - Couriers will need access to the facility at all times day and night
- Building planning
  - The consolidated laboratory building will be located in between Peachland and Winfield in a location yet to be determined
  - The planning will be based on a "flat plane" single story building concept Final design could be single or two stories depending on site constraints
- Scalability
  - The projections for future testing and laboratory needs are based on the information we have today and the use of historical data There are many unknowns and it would be unwise to design a new building that did not have the capability of expanding if that was necessary t should be designed with the knowledge that it could expand either vertically or horizontally in the future if necessary
- Safety and Security issues
  - Attention to security during site selection should be observed Chemicals utilized in laboratories are also used for illegal drug creation laboratories Needles used in the labs could be utilized for illegal drug use Specimens being housed could be used for bioterrorism
  - The majority of the lab testing will be done on day and evening shifts There may be a night shift but that has not been determined officially yet Many types of testing has moved to 24/7 status in other situations so this should be considered when designing the laboratory
  - Parking for staff should be well lit and secure for those who have to access their cars after dark

- The facility should remain locked at all times due to the hazardous nature of the specimens being testing chemicals being stored and expense of equipment f an entrance is constantly monitored during working hours that can be unlocked but should be locked after those hours
- Windows should be of materials that cannot easily be opened or broken to obtain access to the laboratories

- Zoning impact
  - The location to be determined for the consolidated laboratory could be effected by implications on the surrounding community
  - What are the communities emotional issues concerning laboratory testing facilities in their neighborhood?
    - Effects on the environment should be address as well as traffic patterns for couriers that will be accessing the facility day and night
  - Are there some cost and construction benefits or detriments to having the facility in an offsite location as opposed to being part of the hospital?

Env ronmenta Requ rements

- The laboratory testing areas are to be considered a Biosafety Level 2 space and require the following to ensure safety for staff and surrounding areas
  - Negative pressurization
    - Rooms with negative pressure must be kept closed at all times and the walls need to be constructed to the underside of the slab above to maintain the pressure differences
  - Sufficient air changes
    - Air handling systems must be designed to address not only the heat loads of the equipment in the laboratories but also the air changes necessary to eliminate biohazardous aerosols and chemical fumes that are present in laboratory testing areas
  - No recirculation of air
    - Air from laboratory testing areas cannot be recirculated and must be exhausted 100% to the outside This is due to the presence of chemical fumes and biohazardous aerosols that could carry bloodborne pathogens
  - Cleanable surfaces
    - No carpeting or fabric is allowed in laboratory testing areas as it is not considered easily washable Chairs should have cleanable surfaces and flooring should be of a material that can be mopped on a daily basis All casework and countertops need to be of a surface that can be cleaned with a disinfectant cleaner and can withstand water acids and other chemicals used in the laboratories
  - Emergency eyewash
    - Emergency eyewash stations that are fed with tempered water and able to go from off to on in one second or less are required in laboratory testing areas These are ideally located near an exit or a high hazard area They must be located within 30 5m (100') or 10 seconds travel of any testing area They cannot require the use of hands while operating as the hands must be free to hold the eyes opened
  - Emergency flood showers
    - Emergency flood showers that are fed with tempered water and able to go from off to on in one second or less are required in laboratory testing areas These are ideally located near an exit or a high hazard area They must be located within 30 5m (100') or 10 seconds travel of any testing area They can be located in the same area as emergency eyewash and there are units that have both features that meet laboratory standards A floor drain is recommended as there is a huge amount of water that is released when these are used
  - Dedicated handwash sinks
    - Sinks that are totally dedicated to handwashing must be supplied in laboratory testing areas They should ideally be hands free using either foot pedal controls or electric eye controls There should be a paper towel dispenser and a soap dispenser with each one The sinks cannot be used for any laboratory testing purposes
    - Other laboratory sinks can be used for hand washing but should only supplement the dedicated sinks
    - deally these should be located in high hazard areas and near exits to remind staff to wash their hands upon exiting the laboratory

Phys ca Des gn Requ rements

- Lean implications

- Workstations that perform similar tasks should be designed in the same way with equipment and supply storage identical in each station
- t is important to maintain an open plan work area to enhance visual and verbal communication between staff and traffic flow within the lab Avoid overhead casework that will limit visibility
- Storage should be limited in the testing areas to one to two day supply at most A close easily accessible storage area that houses larger amounts should be part of the laboratory design

- Flexibility
  - Option 1 – Consolidated Lab/ RRLs
    - Casework - Employ a modular flexible casework system The laboratory casework systems should be a fully flexible model that supports adjustments in countertop height Storage units should have the ability to easily move pieces out or in as the equipment changes from floor to counter mounted pieces
    - Drainage- The drainage should be arranged in grid fashion with capped drains where not immediately necessary for use This allows instruments requiring drains and additional sinks to be added with less disruption and construction
    - Electrical/ Data - Wiring should be fed through overhead utility enclosures provided by the casework manufacturer allowing for easy access to make changes and additions without major construction work Sufficient outlets should be provided to allow additional equipment to be added in the future and to allow equipment to be moved easily to new locations Quantities should not limit rearranging pieces as needs change
    - Lighting - Lighting should be such that there are sufficient foot-candles and minimum areas of shadow that would limit procedures being moved due to glare or bad visual f overhead cabinets are utilized the lighting should be arranged perpendicular to the casework Task lighting should be used where there are overhead cabinets Adjustable articulating arm lights should be used at Histology cutting stations and at Microbiology reading stations to assist in the close work necessary without glare problems
  - Option 2 – KGH New Laboratory
    - Casework - Employ a modular flexible casework system The laboratory casework systems should be a fully flexible model that supports adjustments in countertop height Storage units should have the ability to easily move pieces out or in as the equipment changes from floor to counter mounted pieces
    - Drainage - The drainage should be arranged in grid fashion with capped drains where not immediately necessary for use This allows instruments requiring drains and additional sinks to be added with less disruption and construction
    - Electrical/ Data - Wiring should be fed through overhead utility enclosures provided by the casework manufacturer allowing for easy access to make changes and additions without major construction work
    - Sufficient outlets should be provided to allow additional equipment to be added in the future and to allow equipment to be moved easily to new locations Quantities should not limit rearranging pieces as needs change
    - Lighting - Lighting should be such that there are sufficient foot-candles and minimum areas of shadow that would limit procedures being moved due to glare or bad visual f overhead cabinets are utilized the lighting should be arranged perpendicular to the casework Task lighting should be used where there are overhead cabinets Adjustable articulating arm lights should be used at Histology cutting stations and at Microbiology reading stations to assist in the close work necessary without glare problems
- Ergonomic implications
  - Acoustics is very important in laboratories as there are many pieces of equipment that emit constant noise called “white noise” This can cause headaches hearing problems and stress t can also disrupt communication necessary to work
    - Sound absorbing materials should be used in the laboratories to minimize the white noise such as cork recycled rubber flooring and high sound absorbance ceiling tiles All of these are cleanable surfaces and safe for use in the BSL2 laboratory environment
  - Sitting at microscopes and computer stations for long period of time can cause repetitive motion problems Casework chairs monitors and keyboards should be adjustable so the staff can change positions often to avoid problems
  - Vibrations from the building are a problem looking through microscopes and using sensitive equipment such as microtomes Not only will there be issues with headaches but there can be adverse effects on test results Structure should be designed to keep vibration at a reasonable level and materials such as recycled rubber flooring can be used to help absorb vibrations Also isolation pads can be added to sensitive equipment and microscopes that will keep some of the vibration from affecting them

- Lifting of heavy objects is a problem that can cause back and shoulder stains Use of overhead cabinets for storage of heavy supplies and equipment should be discouraged nstead use tall storage cabinets where the heavier objects can be kept at a level that is easy to load and unload tems such as isoton containers should be kept on carts that can be moved into and out of larger storage areas with the least movement and strain on the staff as possible
- Laboratory staffs have to stand for long periods of time at instruments while they are operating This can cause knee foot and back problems that need to be addressed Laboratories can utilize standing pads or recycled rubber flooring that provides a softer surface to stand on and relieve some of the stress

- Security requirements
  - The laboratory access should be secure to minimize theft of chemicals and biohazards that could be used for criminal purposes
    - Constant visual to access points by staff as provided during fully operational hours
    - Secure locking systems employed during hours of operation with small staff and to those access points that don't have visual

LABORATORY PLANNING

Laboratory Serv ces

- Specimens from the hospitals and outside clients are sent to the laboratories for testing
  - Couriers arrive with specimens from other hospitals that do not provide the testing provided at KGH PRH and VJH
  - Couriers Phlebotomists and Hospital staff bring specimens from the blood drawing sites and the patient areas to the laboratories
  - Couriers from outside sources come to the laboratories to pick up specimens that are sent to reference laboratories and other facilities for testing that is not provided by KGH PRH and VJH
- Laboratory Medicine is a group of separate departments all dedicated to the analysis of body fluids and tissues in support of medical diagnosis They include support spaces and offices that provide necessary supplies safety employee needs and supervision
- Specimen Processing
  - All specimens are received into the laboratory at a point where they are then triaged and input as necessary into the laboratory and hospital information systems
  - Couriers phlebotomists and hospital staff drop specimens in this area
- Send outs
  - Specimens that are not testing at the site facility are input into a reference lab/ joint venture hospital information system
  - Specimens are then centrifuged aliquotted packaged refrigerated or frozen as necessary to prepare them for pickup by couriers that will transport them to the testing facility
- Chemistry/ mmunology
  - This is a group of tests that are done mainly on blood serum Some procedures are also performed on whole blood urines and other body fluids The tests are generally done by chemical based methods and check many enzymes immunoglobulines electrolytes and other serum components
  - Testing is done either on specific analyzers or by more manual methods that employ several small pieces of equipment
  - As test results are obtained they are then input into the information systems for delivery to the patient floors and/or medical staff
- Hematology
  - This is a group of tests that are done on blood preserved with anticoagulants The test check specifically for blood cells their quantities and morphologies
  - Testing is done either on specific analyzers or with the use of microscopes and the expertise of the laboratory staff to identify normal and abnormal cells
  - As test results are obtained they are then input into the information systems for delivery to the patient floors and/or medical staff
- Coagulation
  - This is a group of tests that are done on blood preserved with an anticoagulant different from those of Hematology Tests check for a variety of blood clotting disorders and therapies
  - Almost all of the testing is done on specific analyzers
  - As test results are obtained they are then input into the information systems for delivery to the patient floors and/or medical staff
- Urinalysis
  - This is a group of tests that are done on urine samples and sometimes other fluids They check for chemical compositions as well as cells tissues and any other particulates that might be found in the specimens
  - Testing is done on specific analyzers and with manual methods including small analyzers and microscopes
  - As test results are obtained they are then input into the information systems for delivery to the patient floors and/or medical staff
- Blood Bank/ Transfusion Medicine
  - This group of testing includes the use of whole blood serum and blood preserved with anticoagulants
  - Testing is done to determine blood types antibodies and to check compatibility with units of blood for obstetrics surgery emergency or therapy

- As test results are obtained they are input into the information systems and blood and blood components are issued to hospital staff as necessary
- Microbiology
  - This group of testing is for the identification of bacteria fungi and viruses found in all types of body fluids swabs and tissues
  - Testing is done with automated and manual methods
  - New testing done on Molecular based enclosed platforms is being added and will add new procedures as well as supplementing some existing manual procedures
  - Some testing requires fluorescent antigen/ antibody reactions that can be seen under a microscope A separate room where all lights can be turned off is necessary for these procedures
  - As test results are obtained they are then input into the information systems for delivery to the patient floors and/or medical staff
- Anatomic Pathology
  - Gross Anatomy is the procedures where large tissue specimens are sent to the laboratory for dissection and analysis Specimens that have been dissected are then used for Frozen Section work or Histology work
  - Frozen Section is a rapid method used to quickly freeze and identify tissue samples from patients that are in surgery They are utilized to determine the extent of surgery on a tumor based on the type of tissue found
  - Histology utilizes small tissue samples and prepares them to be cut into paper thin sections that can be stained with various types and methods The different staining allows the Pathologists to analyze the subsequent slide to determine diagnosis
  - Cytology utilizes cells either already gathered on slides or in fluid The samples are prepared either manually or on some automated equipment and then stained so they can be screened and diagnosed by the Cytologists and the Pathologists

Hours of operation

- Assumptions on hours of operation criteria
  - Days/ First Shift – generally from 7 or 8am until 3 or 4pm
    - Majority of routine testing is done at this time as the medical staffs are in the hospitals and their offices ordering tests on the patients Routine testing as well as stats and urgent tests are all done during these hours Outpatient facilities are active and specimens are obtained and sent to the labs for routine testing Testing that is done only once per day or less are normally done on first shift
  - Evening/ Second Shift – generally from 3 or 4pm until 11pm or 12am
    - Many samples from outpatient facilities and doctor offices are sent after normal office hours to the labs for routine testing Stats and urgents are also done on this shift
  - Nights/ Third Shift – generally from 11am or 12am to 7 or 8am
    - Only stats and urgents are done on this shift Also some quality control is done by the staff at this time to prepare the laboratory for the larger testing volumes on first and second shifts
- Option 1 – Consolidated laboratory will generally operate on a first and second shift basis with some testing possibly moving to three shifts in the future This is a new model so there are no existing hours to use for comparison The existing hospital laboratories that will be consolidated into this option all operate on all three shifts
  - Option 1 - RRLs will operate on a 24/7 basis These will supply the stat and urgent tests that are presently done on all three shifts at the three facilities
- Option 2 – Departments will operate on the same basis as the existing laboratory at KGH
- Option 3 – Consolidated laboratory will generally operate on a first and second shift basis with some testing possibly moving to three shifts in the future As this incorporates all of the KGH stat and urgent testing the majority of the laboratory will operate all three shifts
  - Option 3 - RRLs will operate on a 24/7 basis These will supply the stat and urgent tests that are presently done on all three shifts at the three facilities

HOURS OF OPERATION

	Existing KGH, PRH, VJH	Option 1 Consolidated Lab off-site	Option 1 RRLs	Option 2 - new KGH lab	Option 3 Consolidated Lab at KGH	Option 3 RRLs
Core Laboratory	24	16-24	24	24	24	24
Blood Bank	24	0	24	24	24	24
Microbiology	16-24	16-24	0	16-24	16-24	0
Anatomic Pathology	16-24	16-24	0	16-24	16-24	0
Frozen Section	24	0	24	24	24	24

Work oad project ons

- An opinion of workload projections was created based on historical data by the nterior Health Laboratory Administration An average increase was determined for the various departments and the projections for the Medical School and Cardiac program was added
- The workload projections are out to fiscal years 2014/2015 and 2024/2025
- The laboratories are seeing approximately a 6% growth per year presently Specific numbers for departments are noted below
- The new Medical School could add 30% growth in testing volumes to the majority of departments Laboratory administration projected those departments at each facility that would realize increases with the new Medical School and added the growth factor accordingly Literature searches on other facilities who have added Medical programs support the 30% projection
- The new Cardiac program could add a projected 10% increase in testing to most of the laboratory departments Laboratory administration determined which departments would realize increases and added the growth factor accordingly
- The amount of elderly patient increases should continue until about 2030 to 2035
- A new Medical Technologist training program will necessitate room for students but could also help the staffing shortage problems

OPTION 1 WORKLOAD PROJECTIONS; CONSOLIDATED LABORATORY OFFSITE WITH RRLS AT KGH, PRH, VJH

OPTION 1 - CONSOLIDATED OFFSITE LAB

Dept	current procedures	projected 2014/2015 proc	projected 2024/2025 proc
Specimen Processing		583 022	1 436 627
Chemistry/ mmunology		4 172 561	6 917 849
Hematology/Coagulation/Urines		531 600	793 096
Microbiology		326 135	567 073
Blood Bank		-	-
Anatomic Pathology		607 874	899 802
TOTAL	-	**6,221,193**	**10,614,448**
OPTION 1 - KGH RRL			
Dept	**current procedures**	**projected 2014/2015 proc**	**projected 2024/2025 proc**
Specimen Processing	259 623	379 239	934 485
Chemistry/ mmunology	1 497 324	827 405	1 371 786
Hematology/Coagulation/Urines	325 401	283 863	423 496
Microbiology	75 550	-	-
Blood Bank	151 182	223 575	371 192
Anatomic Pathology	373 273	118 077	174 783
TOTAL	**2,682,353**	**1,832,160**	**3,275,743**
OPTION 1 - VJH RRL			
Dept	**current procedures**	**projected 2014/2015 proc**	**projected 2024/2025 proc**
Specimen Processing	326 197	476 487	1 174 112
Chemistry/ mmunology	981 061	542 124	898 808
Hematology/Coagulation/Urines	160 252	139 796	208 562
Microbiology	62 440	-	-
Blood Bank	40 488	59 876	99 409

Anatomic Pathology	164 178	51 934	76 876
TOTAL	**1,734,616**	**1,270,216**	**2,457,766**
OPTION 1 - PRH RRL			
Dept	**current procedures**	**projected 2014/2015 proc**	**projected 2024/2025 proc**
Specimen Processing	155 422	227 030	559 426
Chemistry/ mmunology	757 727	418 712	694 198
Hematology/Coagulation/Urines	123 736	107 941	161 037
Microbiology	76 782	-	-
Blood Bank	37 240	55 072	91 433
Anatomic Pathology	103 098	32 613	48 275
TOTAL	**1,254,005**	**841,368**	**1,554,370**

SUMMARY OPTION 1 - CONSOLIDATED OFFSITE LAB WITH RRL AT KGH, VJH & PRH

	current procedures	**projected 2014/2015 proc**	**projected 2024/2025 proc**
OFFS TE CONSOL DATED LAB	-	6 221 193	10 614 448
KGH RRL	2 682 353	841 368	1 554 370
VJH RRL	1 734 616	1 270 216	2 457 766
PRH RRL	1 254 005	841 368	1 554 370
TOTAL	**5,670,974**	**8,332,776**	**17,902,326**

OPTION 2 WORKLOAD PROJECTIONS; NEW LABORATORY AT KGH. NO WORK AT PRH AND VJH

OPTION 2 - NEW KGH LABORATORY

Dept	current procedures	projected 2014/2015 proc	projected 2024/2025 proc
Specimen Processing	259 623	583 445 06	1 437 668 69
Chemistry/ mmunology	1 497 324	2 758 016 42	4 572 621 48
Hematology/Coagulation/Urines	325 401	567 726 56	846 992 84
Microbiology	75 550	114 723 54	199 477 56
Blood Bank	151 182	223 574 62	371 191 87
Anatomic Pathology	373 273	472 309 85	699 133 95
TOTAL	**2,682,353**	**4,719,796**	**8,127,086**

OPTION 2 - EXISTING PRH LABORATORY

Dept	current procedures	projected 2014/2015 proc	projected 2024/2025 proc
Specimen Processing	155 422	349 277 27	860 655 14
Chemistry/ mmunology	757 727	1 395 706 06	2 313 994 75
Hematology/Coagulation/Urines	123 736	215 881 94	322 074 87
Microbiology	76 782	116 595 59	202 732 63
Blood Bank	37 240	55 071 65	91 433 22
Anatomic Pathology	103 098	130 451 82	193 100 55
TOTAL	**1,254,005**	**2,262,984**	**3,983,991**

OPTION 2 - EXISTING VJH LABORATORY

Dept	current procedures	projected 2014/2015 proc	projected 2024/2025 proc
Specimen Processing	326 197	733 056 16	1 806 325 84
Chemistry/ mmunology	981 061	1 807 078 72	2 996 025 30
Hematology/Coagulation/Urines	160 252	279 591 55	417 123 42

Dept	current procedures	projected 2014/2015 proc	projected 2024/2025 proc
Microbiology	62 440	94 815 98	164 862 94
Blood Bank	40 488	59 875 51	99 408 88
Anatomic Pathology	164 178	207 737 37	307 502 06
TOTAL	1 734 616	3 182 155	5 791 248

SUMMARY OPTION 2 - NEW KGH LAB WITH EXISTING AT VJH & PRH

	current procedures	projected 2014/2015 proc	projected 2024/2025 proc
NEW KGH LAB	2 682 353	4 719 796	8 127 086
EX ST NG VJH LAB	1 734 616	3 182 155	5 791 248
EX ST NG PRH LAB	1 254 005	2 262 984	3 983 991
TOTAL	**5,670,974**	**10,164,936**	**17,902,326**

OPTION 3 WORKLOAD PROJECTIONS; CONSOLIDATED LAB AT KGH WITH RRLS AT PRH AND VJH

OPTION 3 - CONSOLIDATED LAB AT KGH

Dept	current procedures	projected 2014/2015 proc	projected 2024/2025 proc
Specimen Processing		962 262	2 371 112
Chemistry/ mmunology		4 999 966	8 289 636
Hematology/Coagulation/Urines		815 463	1 216 592
Microbiology		326 135	567 073
Blood Bank		223 575	371 192
Anatomic Pathology		725 952	1 074 586
TOTAL	-	**8,053,352**	**13,890,190**
OPTION 3 - VJH RRL			
Dept	**current procedures**	**projected 2014/2015 proc**	**projected 2024/2025 proc**
Specimen Processing	326 197	476 487	1 174 112
Chemistry/ mmunology	981 061	542 124	898 808
Hematology/Coagulation/Urines	160 252	139 796	208 562
Microbiology	62 440	-	-
Blood Bank	40 488	59 876	99 409
Anatomic Pathology	164 178	51 934	76 876
TOTAL	**1,734,616**	**1,270,216**	**2,457,766**
OPTION 3 - PRH RRL			
Dept	**current procedures**	**projected 2014/2015 proc**	**projected 2024/2025 proc**
Specimen Processing	155 422	227 030	559 426
Chemistry/ mmunology	757 727	418 712	694 198
Hematology/Coagulation/Urines	123 736	107 941	161 037
Microbiology	76 782	-	-
Blood Bank	37 240	55 072	91 433
Anatomic Pathology	103 098	32 613	48 275

TOTAL	**1,254,005**	**841,368**	**1,554,370**

SUMMARY OPTION 3 - CONSOLIDATED OFFSITE LAB AT KGH WITH RRL AT VJH & PRH

	current procedures	projected 2014/2015 proc	projected 2024/2025 proc
KGH CONSOL DATED LAB	2 682 353	8 053 352	13 890 190
VJH RRL	1 734 616	1 270 216	2 457 766
PRH RRL	1 254 005	841 368	1 554 370
TOTAL	**5,670,974**	**9,323,568**	**17,902,326**

WORKLOAD SUMMARY OF ALL THREE OPTIONS

	2008/2008	2014/2015	2024/2025
	PROCEDURES	**PROCEDURES**	**PROCEDURES**
EX ST NG WORKLOAD	5 670 974		
OPT ON 1 CONSOL DATED OFFS TE LAB W TH 3 RRLS		10 164 936	17 902 326
OPT ON 2 KGH NEW LABORATORY VJH AND PRH EX ST NG LABS		10 164 936	17 902 326
OPT ON 3 CONSOL DATED LAB AT KGH W TH 2 RRLS - SUMMARY		10 164 936	17 902 326

Staff ng

- An opinion of staffing for the three options was created by the laboratory administration and based on their workload projections divided by the time necessary to do a procedure
  - n the Consolidated options 1 and 3 the advantage of an open laboratory with increased testing can lead to a more efficient use of staff The time per procedure used to determine the amount of staffing was reduced appropriately to reflect those efficiencies
- Staffing was broken out to support workload projections to fiscal year 2014/2015 and 2024/2025

EXISTING STAFFING

	2008/2009	2008/2009	2008/2009
Primary Job Title	**KGH FTEs**	**PRH FTEs**	**VJH FTEs**
ADM N ASS STANT LAB	1 00	0 00	0 00
HEU - CLERK UPP - RECEPT ON ST/STENOGRAPHER	1 00	0 00	0 00
HEU - LAB ASS STANT	18 28	9 35	16 30
HEU - MED CAL STENO UPP	3 79	1 00	2 00
HEU - SECRETARY MOS	1 00	0 00	0 00
HSA - CYTOTECHNOLOG ST	2 00	0 00	0 00
HSA - MED CAL TECHNOLOG ST	44 40	24 90	27 73
EXCLUDED CASUAL / TERM CERTA N (N 09)	0 00	0 00	0 00
PATHOLOG ST ASS STANT QUAL TY COORD NATOR	1 00	0 00	0 00
REG ONAL LAB MANAGER	0 00	0 00	1 00
ADM N STRAT VE D RECTOR- H	0 00	0 00	0 00
TOTAL	**72.47**	**35.25**	**47.03**

OPTION 1 STAFFING PROJECTIONS; CONSOLIDATED LABORATORY OFFSITE WITH RRLS AT KGH, PRH, VJH

OPTION 1 - CONSOLIDATED OFFSITE LAB WITH 3 RRLS

	2014/2015	2024/2025
Primary Job Title	**# FTEs**	**# FTEs**
ADM N ASS STANT LAB	2 00	3 00
HEU - CLERK UPP - RECEPT ON ST/STENOGRAPHER	0 00	0 00
HEU - CLERK MOS - HOUSEKEEP NG	0 00	0 00
HEU - LAB ASS STANT (A) UPP	29 00	61 00
HEU - LAB ASS STANT V UPP	1 00	2 00
HEU - MED CAL STENO UPP	8 00	14 00
HEU - SECRETARY MOS	2 00	3 00
HSA - CYTOTECHNOLOG ST UPP	2 00	4 00
HSA - CYTOTECHNOLOG ST UPP	1 00	1 00
HSA - MED CAL TECHNOLOG ST UPP	32 00	55 00
HSA - MED CAL TECHNOLOG ST UPP	1 50	1 50
HSA - MED CAL TECHNOLOG ST UPP	4 00	6 00
HSA - MED CAL TECHNOLOG ST V UPP	4 50	4 50
HSA - MED CAL TECHNOLOG ST V UPP	0 00	0 00
HSA - MED CAL TECHNOLOG ST V MOS	0 00	0 00
HSA - MED CAL TECHNOLOG ST V MOS	6 00	6 00
HSA - MED CAL TECHNOLOG ST V + 5% MOS	1 00	1 00
EXCLUDED CASUAL / TERM CERTA N (N 09)		
PATHOLOG ST ASS STANT QUAL TY COORD NATOR	1 00	1 00
REG ONAL LAB MANAGER	1 00	1 00
ADM N STRAT VE D RECTOR H	1 00	1 00
TOTAL	**97.00**	**165.00**

OPTION 1 - RRL KGH

	2014/2015	2024/2025
Primary Job Title	**# FTEs**	**# FTEs**
ADM N ASS STANT LAB	0 00	0 00
HEU - CLERK UPP - RECEPT ON ST/STENOGRAPHER	0 00	0 00

Primary Job Title	2014/2015 # FTEs	2024/2025 # FTEs
HEU - CLERK MOS - HOUSEKEEP NG	0 00	0 00
HEU - LAB ASS STANT (A) UPP	22 00	52 00
HEU - LAB ASS STANT V UPP	1 00	1 00
HEU - MED CAL STENO UPP	0 00	0 00
HEU - SECRETARY MOS	0 00	0 00
HSA - CYTOTECHNOLOG ST UPP	0 00	0 00
HSA - CYTOTECHNOLOG ST UPP	0 00	0 00
HSA - MED CAL TECHNOLOG ST UPP	18 00	36 00
HSA - MED CAL TECHNOLOG ST UPP	0 00	0 00
HSA - MED CAL TECHNOLOG ST UPP	6 00	7 00
HSA - MED CAL TECHNOLOG ST V UPP	1 00	1 00
HSA - MED CAL TECHNOLOG ST V UPP	0 00	0 00
HSA - MED CAL TECHNOLOG ST V MOS	0 00	0 00
HSA - MED CAL TECHNOLOG ST V MOS	1 00	1 00
HSA - MED CAL TECHNOLOG ST V + 5% MOS	0 00	0 00
EXCLUDED CASUAL / TERM CERTA N (N 09)	0 00	0 00
PATHOLOG ST ASS STANT QUAL TY COORD NATOR	0 00	0 00
REG ONAL LAB MANAGER	0 00	0 00
TOTAL	**49.00**	**98.00**

OPTION 1 - VJH RRL

Primary Job Title	2014/2015 # FTEs	2024/2025 # FTEs
ADM N ASS STANT LAB	0 00	0 00
HEU - CLERK UPP - RECEPT ON ST/STENOGRAPHER	0 00	0 00
HEU - CLERK MOS - HOUSEKEEP NG	0 00	0 00
HEU - LAB ASS STANT (A) UPP	24 00	59 00
HEU - LAB ASS STANT V UPP	1 00	1 00
HEU - MED CAL STENO UPP	0 00	0 00
	2014/2015	2024/2025

Primary Job Title	# FTEs	# FTEs
HEU - SECRETARY MOS	0 00	0 00
HSA - CYTOTECHNOLOG ST UPP	0 00	0 00
HSA - CYTOTECHNOLOG ST UPP	0 00	0 00
HSA - MED CAL TECHNOLOG ST UPP	10 00	22 00
HSA - MED CAL TECHNOLOG ST UPP	0 00	0 00
HSA - MED CAL TECHNOLOG ST UPP	4 00	4 00
HSA - MED CAL TECHNOLOG ST V UPP	1 00	1 00
HSA - MED CAL TECHNOLOG ST V UPP	0 00	0 00
HSA - MED CAL TECHNOLOG ST V MOS	0 00	0 00
HSA - MED CAL TECHNOLOG ST V MOS	1 00	1 00
HSA - MED CAL TECHNOLOG ST V + 5% MOS	0 00	0 00
EXCLUDED CASUAL / TERM CERTA N (N 09)	0 00	0 00
PATHOLOG ST ASS STANT QUAL TY COORD NATOR	0 00	0 00
REG ONAL LAB MANAGER	0 00	0 00
TOTAL	**41.00**	**88.00**

OPTION 1 - PRH RRL

	2014/2015	**2024/2025**
Primary Job Title	**# FTEs**	**# FTEs**
ADM N ASS STANT LAB	0 00	0 00
HEU - CLERK UPP - RECEPT ON ST/STENOGRAPHER	0 00	0 00
HEU - CLERK MOS - HOUSEKEEP NG	0 00	0 00
HEU - LAB ASS STANT (A) UPP	12 00	24 00
HEU - LAB ASS STANT V UPP	1 00	1 00
HEU - MED CAL STENO UPP	0 00	0 00
HEU - SECRETARY MOS	0 00	0 00
HSA - CYTOTECHNOLOG ST UPP	0 00	0 00
HSA - CYTOTECHNOLOG ST UPP	0 00	0 00
HSA - MED CAL TECHNOLOG ST UPP	8 00	17 00
HSA - MED CAL TECHNOLOG ST UPP	0 00	0 00
HSA - MED CAL TECHNOLOG ST UPP	3 00	4 00
	2014/2015	**2024/2025**

Primary Job Title	# FTEs	# FTEs
HSA - MED CAL TECHNOLOG ST V UPP	1 00	1 00
HSA - MED CAL TECHNOLOG ST V UPP	0 00	0 00
HSA - MED CAL TECHNOLOG ST V MOS	0 00	0 00
HSA - MED CAL TECHNOLOG ST V MOS	1 00	1 00
HSA - MED CAL TECHNOLOG ST V + 5% MOS	0 00	0 00
EXCLUDED CASUAL / TERM CERTA N (N 09)	0 00	0 00
PATHOLOG ST ASS STANT QUAL TY COORD NATOR	0 00	0 00
REG ONAL LAB MANAGER	0 00	0 00
TOTAL	**26.00**	**48.00**

OPTION 1; CONSOLIDATED OFFSITE LAB WITH 3 RRLS - SUMMARY

	2014/2015	2024/2025
Primary Job Title	**# FTEs**	**# FTEs**
CONSOL DATED LABORATORY TOTAL	97 00	165 00
RRL - KGH TOTAL	49 00	98 00
RRL - VJH TOTAL	41 00	88 00
RRL - PRH TOTAL	26 00	48 00
TOTAL	**213.00**	**399.00**

OPTION 2 STAFFING PROJECTIONS; NEW LABORATORY AT KGH. NO WORK AT PRH AND VJH

OPTION 2 - KGH NEW LABORATORY

	2014/2015	2024/2025
Primary Job Title	**# FTEs**	**# FTEs**
ADM N ASS STANT LAB	2 00	3 00
HEU - CLERK UPP - RECEPT ON ST/STENOGRAPHER	9 00	16 00
HEU - CLERK MOS - HOUSEKEEP NG	0 00	0 00
HEU - LAB ASS STANT (A) UPP	38 00	88 00
HEU - LAB ASS STANT V UPP	1 00	2 00
HEU - MED CAL STENO UPP	5 00	9 00
HEU - SECRETARY MOS	2 00	3 00
HSA - CYTOTECHNOLOG ST UPP	2 00	4 00
HSA - CYTOTECHNOLOG ST UPP	1 00	2 00
HSA - MED CAL TECHNOLOG ST UPP	31 00	60 00
HSA - MED CAL TECHNOLOG ST UPP	0 00	0 00
HSA - MED CAL TECHNOLOG ST UPP	8 00	10 00
HSA - MED CAL TECHNOLOG ST V UPP	3 00	3 00
HSA - MED CAL TECHNOLOG ST V UPP	0 00	0 00
HSA - MED CAL TECHNOLOG ST V MOS	2 00	2 00
HSA - MED CAL TECHNOLOG ST V MOS	6 00	6 00
HSA - MED CAL TECHNOLOG ST V + 5% MOS	1 00	1 00
EXCLUDED CASUAL / TERM CERTA N (N 09)	0 00	0 00
PATHOLOG ST ASS STANT QUAL TY COORD NATOR	1 00	1 00
REG ONAL LAB MANAGER	1 00	1 00
ADM N STRAT VE D RECTOR- H	1 00	1 00
TOTAL	**114.00**	**212.00**

OPTION 2; KGH NEW LABORATORY - SUMMARY

	2014/2015	2024/2025
Primary Job Title	**# FTEs**	**# FTEs**
KGH TOTAL	114 00	212 00

	2014/2015	2024/2025
Primary Job Title	**# FTEs**	**# FTEs**
VJH PROJECTED NC FOR EX ST NG LAB	76 16	150 10
PRH PROJECTED NC FOR EX ST NG LAB	58 15	112 92
TOTAL	**248.32**	**475.02**

OPTION 3 STAFFING PROJECTIONS; CONSOLIDATED LAB AT KGH WITH RRLS AT PRH AND VJH

OPTION 3 - CONSOLIDATED LAB AT KGH WITH RRLS

	2014/2015	2024/2025
Primary Job Title	**# FTEs**	**# FTEs**
ADM N ASS STANT LAB	2 00	3 00
HEU - CLERK UPP - RECEPT ON ST/STENOGRAPHER	0 00	0 00
HEU - CLERK MOS - HOUSEKEEP NG	0 00	0 00
HEU - LAB ASS STANT (A) UPP	51 00	113 00
HEU - LAB ASS STANT V UPP	2 00	3 00
HEU - MED CAL STENO UPP	8 00	14 00
HEU - SECRETARY MOS	2 00	3 00
HSA - CYTOTECHNOLOG ST UPP	2 00	4 00
HSA - CYTOTECHNOLOG ST UPP	1 00	1 00
HSA - MED CAL TECHNOLOG ST UPP	50 00	91 00
HSA - MED CAL TECHNOLOG ST UPP	1 50	1 50
HSA - MED CAL TECHNOLOG ST UPP	10 00	13 00
HSA - MED CAL TECHNOLOG ST V UPP	5 50	5 50
HSA - MED CAL TECHNOLOG ST V UPP	0 00	0 00
HSA - MED CAL TECHNOLOG ST V MOS	0 00	0 00
HSA - MED CAL TECHNOLOG ST V MOS	7 00	7 00
HSA - MED CAL TECHNOLOG ST V + 5% MOS	1 00	1 00
EXCLUDED CASUAL / TERM CERTA N (N 09)	0 00	
PATHOLOG ST ASS STANT QUAL TY COORD NATOR	1 00	1 00
REG ONAL LAB MANAGER	1 00	1 00
ADM N STRAT VE D RECTOR- H	1 00	1 00
TOTAL	**146.00**	**263.00**

OPTION 3 - VJH RRL

	2014/2015	2024/2025
Primary Job Title	**# FTEs**	**# FTEs**
ADM N ASS STANT LAB	0 00	0 00
HEU - CLERK UPP - RECEPT ON ST/STENOGRAPHER	0 00	0 00
HEU - CLERK MOS - HOUSEKEEP NG	0 00	0 00
HEU - LAB ASS STANT (A) UPP	24 00	59 00
HEU - LAB ASS STANT V UPP	1 00	1 00
HEU - MED CAL STENO UPP	0 00	0 00
HEU - SECRETARY MOS	0 00	0 00
HSA - CYTOTECHNOLOG ST UPP	0 00	0 00
HSA - CYTOTECHNOLOG ST UPP	0 00	0 00
HSA - MED CAL TECHNOLOG ST UPP	10 00	22 00
HSA - MED CAL TECHNOLOG ST UPP	0 00	0 00
HSA - MED CAL TECHNOLOG ST UPP	4 00	4 00
HSA - MED CAL TECHNOLOG ST V UPP	1 00	1 00
HSA - MED CAL TECHNOLOG ST V UPP	0 00	0 00
HSA - MED CAL TECHNOLOG ST V MOS	0 00	0 00
HSA - MED CAL TECHNOLOG ST V MOS	1 00	1 00
HSA - MED CAL TECHNOLOG ST V + 5% MOS	0 00	0 00
EXCLUDED CASUAL / TERM CERTA N (N 09)	0 00	0 00
PATHOLOG ST ASS STANT QUAL TY COORD NATOR	0 00	0 00
REG ONAL LAB MANAGER	0 00	0 00
TOTAL	**41.00**	**88.00**

OPTION 3 - PRH RRL

	2014/2015	2024/2025
Primary Job Title	**# FTEs**	**# FTEs**
ADM N ASS STANT LAB	0 00	0 00
HEU - CLERK UPP - RECEPT ON ST/STENOGRAPHER	0 00	0 00
HEU - CLERK MOS - HOUSEKEEP NG	0 00	0 00
HEU - LAB ASS STANT (A) UPP	12 00	24 00

	2014/2015	2024/2025
Primary Job Title	**# FTEs**	**# FTEs**

HEU - LAB ASS STANT V UPP	1 00	1 00
HEU - MED CAL STENO UPP	0 00	0 00
HEU - SECRETARY MOS	0 00	0 00
HSA - CYTOTECHNOLOG ST UPP	0 00	0 00
HSA - CYTOTECHNOLOG ST UPP	0 00	0 00
HSA - MED CAL TECHNOLOG ST UPP	8 00	17 00
HSA - MED CAL TECHNOLOG ST UPP	0 00	0 00
HSA - MED CAL TECHNOLOG ST UPP	3 00	4 00
HSA - MED CAL TECHNOLOG ST V UPP	1 00	1 00
HSA - MED CAL TECHNOLOG ST V UPP	0 00	0 00
HSA - MED CAL TECHNOLOG ST V MOS	0 00	0 00
HSA - MED CAL TECHNOLOG ST V MOS	1 00	1 00
HSA - MED CAL TECHNOLOG ST V + 5% MOS	0 00	0 00
EXCLUDED CASUAL / TERM CERTA N (N 09)	0 00	0 00
PATHOLOG ST ASS STANT QUAL TY COORD NATOR	0 00	0 00
REG ONAL LAB MANAGER	0 00	0 00
TOTAL	**26**	**48**

OPTION 3; CONSOLIDATED LAB AT KGH WITH 2 RRLS - SUMMARY

	2014/2015	**2024/2025**
Primary Job Title	**# FTEs**	**# FTEs**
CONSOL DATED LABORATORY TOTAL	146 00	263 00
RRL - VJH TOTAL	41 00	88 00
RRL - PRH TOTAL	26 00	48 00
TOTAL	**213.00**	**399.00**

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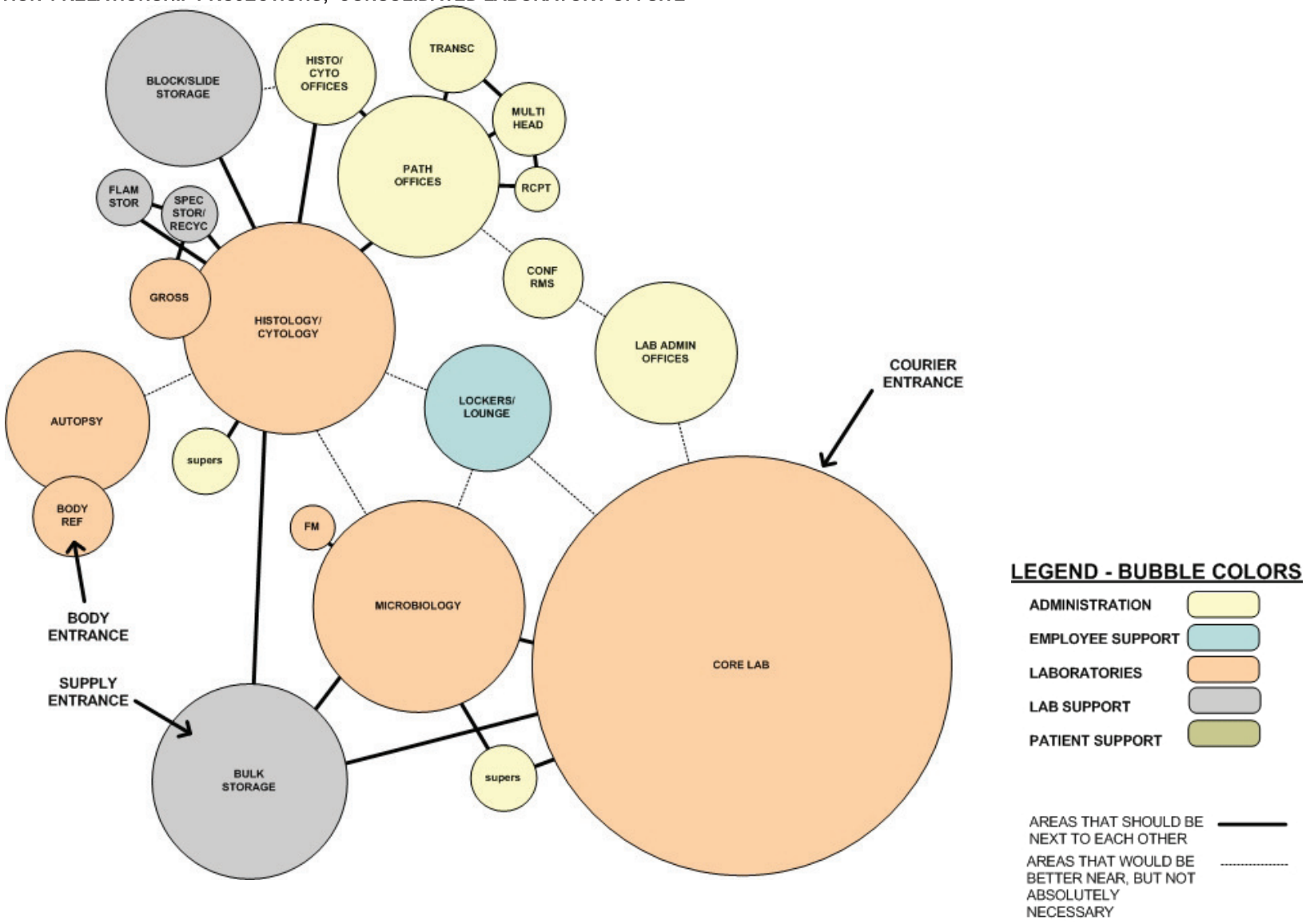
- The relationship diagrams (bubble diagrams) indicate the main laboratory spaces and the proximities necessary between them to achieve an efficient workflow

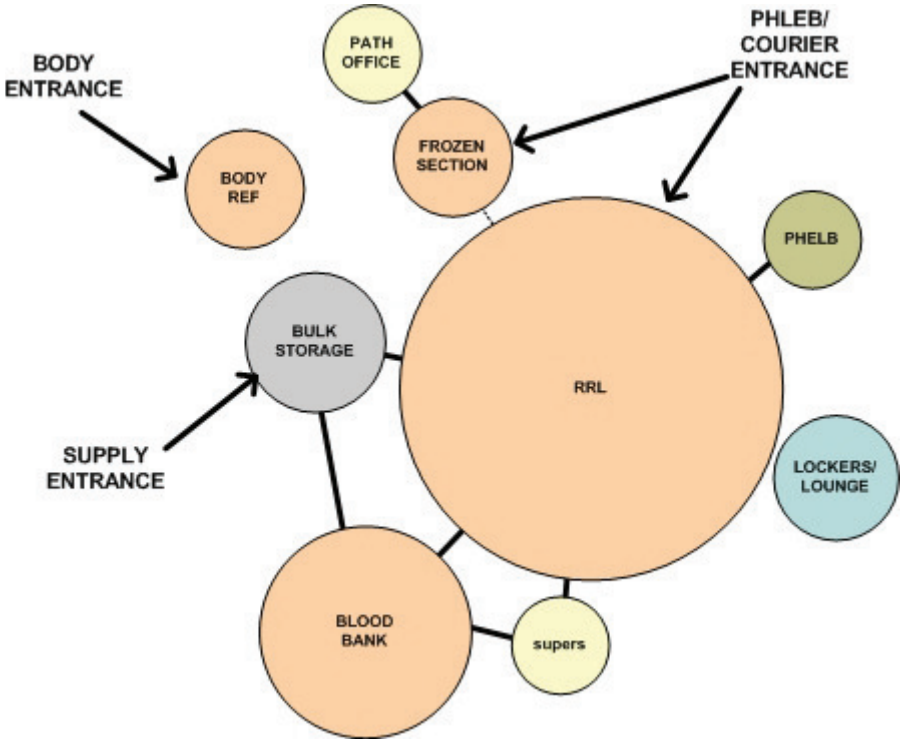
- The colors on the diagram represent the types of laboratory spaces as noted in the adjacent legend
- The lines between the bubbles are to indicate whether they are best located immediately adjacent to one another or if they can be nearby
- Abbreviations on the bubble diagrams are as follows
  - FM – Fluorescent Microscope
  - Supers – Supervisor offices
  - Phleb – Phlebotomy/ Blood Draw
  - Gross – Gross Anatomy Lab/ Frozen Section
  - Histo – Histology
  - Cyto – Cytology
  - Path – Pathologists
  - Ref – Refrigerator
  - Transc – Transcription
  - Multi Head – Multihead microscope/ Telemedicine
  - Rcpt – Reception
  - Conf – Conference
  - Rms – Rooms
  - Admin – Administration
  - Spec Stor/ Recyc – Specimen Storage
  - Flam – Flammable Storage

- The laboratory departments offices and support spaces have specific relationships necessary to allow efficient workflow
  - Specimens coming in from couriers phlebotomists and hospital staff
  - Supplies coming from outside vendors and materials management as well as those taken from supply rooms and refrigerated storage into the lab testing areas
  - Waste from specimens chemicals and general trash needs to be held or move directly out by housekeeping staff
  - Staff needs easy access into and out of testing areas and into and out of support space with a minimal waste of time but still keeping with separation of clean and dirty spaces

OPTION 1 RELATIONSHIP PROJECTIONS; CONSOLIDATED LABORATORY OFFSITE



OPTION 1 RELATIONSHIP PROJECTIONS; RRLS AT KGH, PRH, VJH



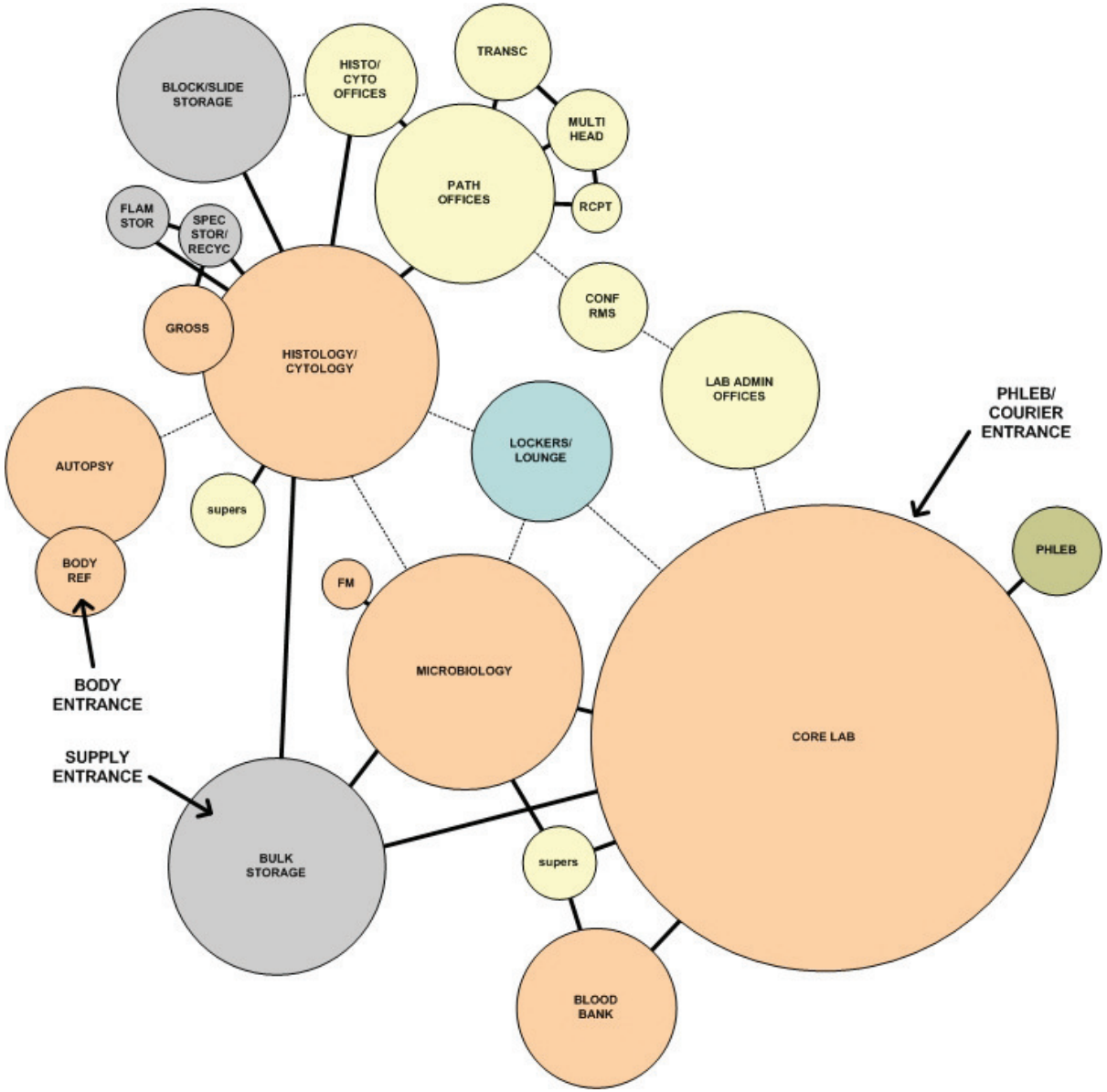
LEGEND - BUBBLE COLORS

- ADMINISTRATION
- EMPLOYEE SUPPORT
- LABORATORIES
- LAB SUPPORT
- PATIENT SUPPORT

AREAS THAT SHOULD BE NEXT TO EACH OTHER

AREAS THAT WOULD BE BETTER NEAR, BUT NOT ABSOLUTELY NECESSARY

OPTION 2 RELATIONSHIP PROJECTIONS; NEW LABORATORY AT KGH. NO WORK AT PRH AND VJH



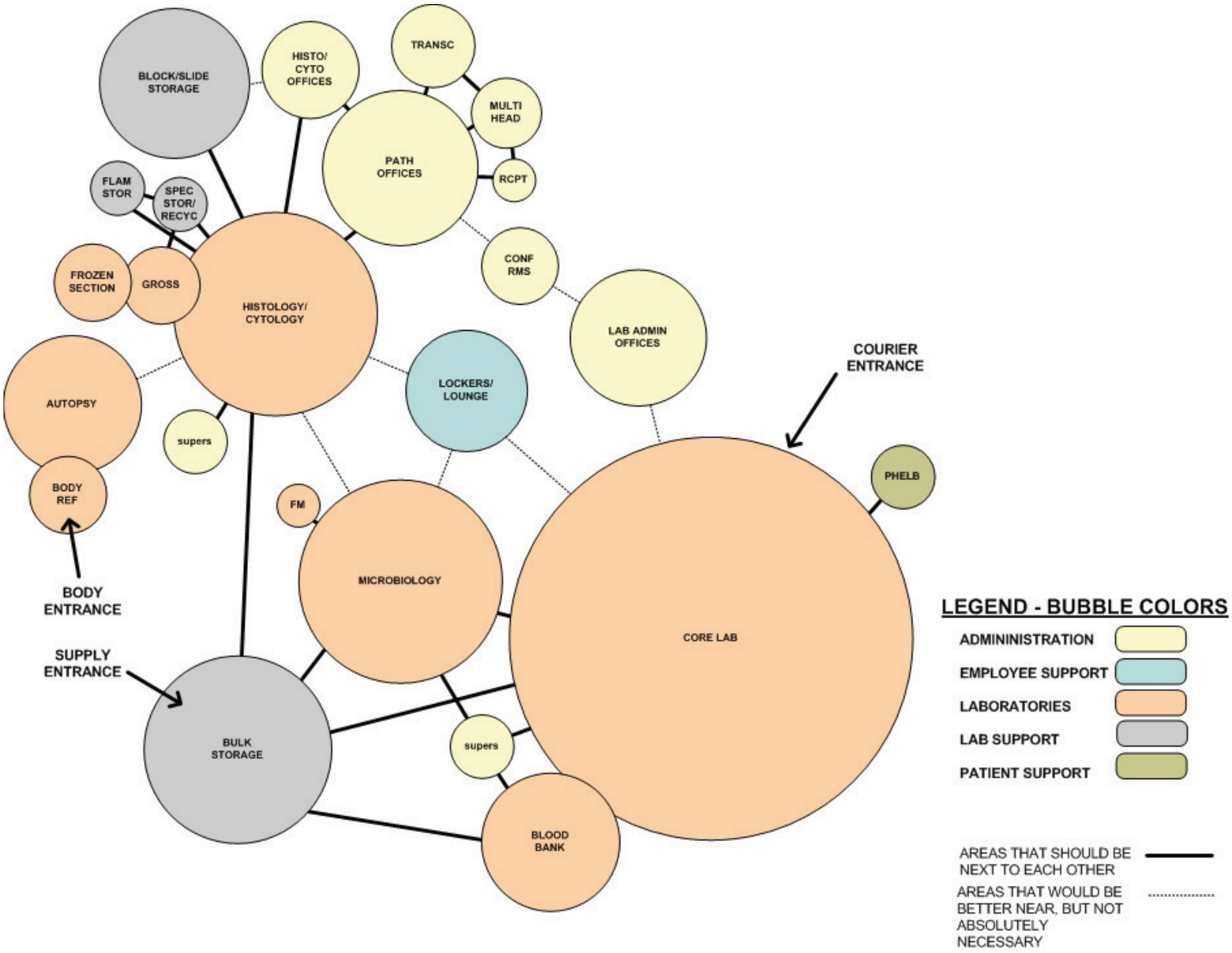
LEGEND - BUBBLE COLORS

- ADMINISTRATION
- EMPLOYEE SUPPORT
- LABORATORIES
- LAB SUPPORT
- PATIENT SUPPORT

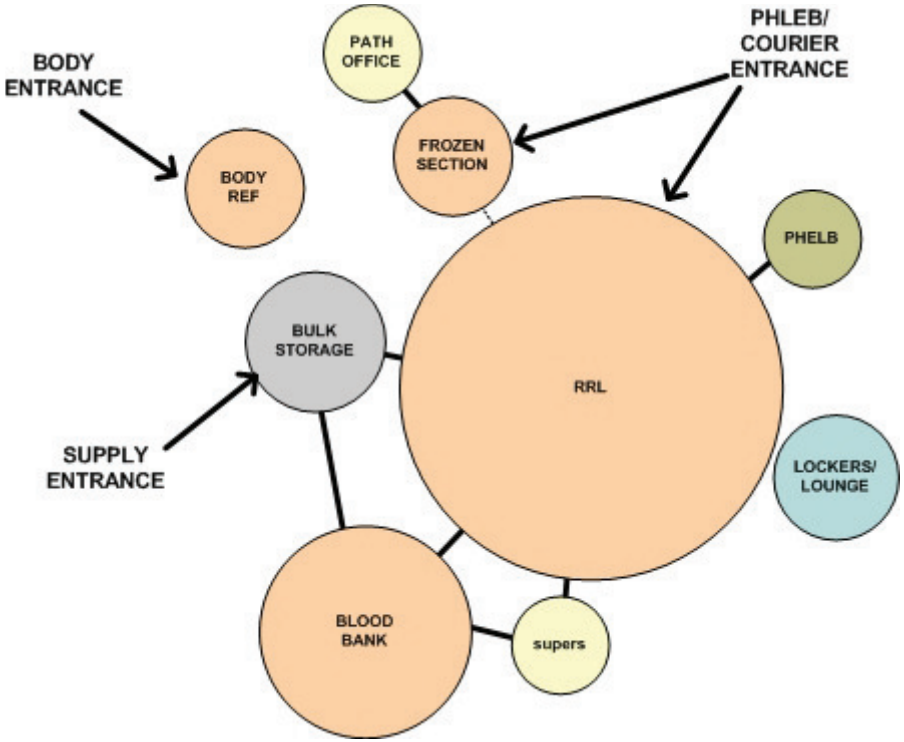
AREAS THAT SHOULD BE NEXT TO EACH OTHER

AREAS THAT WOULD BE BETTER NEAR, BUT NOT ABSOLUTELY NECESSARY

OPTION 3 RELATIONSHIP PROJECTIONS; CONSOLIDATED LAB AT KGH



OPTION 3 RELATIONSHIP PROJECTIONS; RRLS AT PRH AND VJH



LEGEND - BUBBLE COLORS

- ADMINISTRATION
- EMPLOYEE SUPPORT
- LABORATORIES
- LAB SUPPORT
- PATIENT SUPPORT

AREAS THAT SHOULD BE NEXT TO EACH OTHER

AREAS THAT WOULD BE BETTER NEAR, BUT NOT ABSOLUTELY NECESSARY

Space requ rements

- Calculations were made by utilizing graph paper and drawing in items necessary for the operation of the laboratories The requirements were based on the following
  - People/ workstations in offices and testing areas
  - Testing equipment and associated work areas – the opinion of probable equipment is listed at the end of the document
  - Safety equipment
  - Accessibility clearances
  - Fire egress/ life safety requirements
  - Countertops a minimum of 30" deep with a 1' utility core for each island
  - Clearance of 1 524m (5'-0") between back to back workstations

OPTION 1 SPACE PROJECTIONS; CONSOLIDATED LABORATORY OFFSITE WITH RRLS AT KGH, PRH, VJH

OPTION 1 - CONSOLIDATED LABORATORY OFF SITE

	2014/2015						2024/2025					
	units	nsm/ unit	nsm	Planning Factor	CGSM	Remarks	units	nsm/ unit	nsm	Planning Factor	CGSM	Remarks
ADMINISTRATION												
Reception	1 0	5 6	5 6	1 3	7 2		1 0	5 6	5 6	1 3	7 2	
Waiting	1 0	11 2	11 2	1 3	14 5		1 0	11 2	11 2	1 3	14 5	
Clinical Director office	1 0	13 9	13 9	1 3	18 1	1 person	1 0	13 9	13 9	1 3	18 1	1 person
Pathologist office	16 0	11 2	178 4	1 3	232 0	16 offices	20 0	11 2	223 0	1 3	290 0	20 offices
Pathology student office	4 0	2 8	11 2	1 3	14 5	4 carrels	4 0	2 8	11 2	1 3	14 5	4 carrels
PA Coordinator	1 0	5 6	5 6	1 3	7 2	1 workstation	1 0	5 6	5 6	1 3	7 2	1 workstation
Multihead Scope/ Telemedicine AP	1 0	13 9	13 9	1 3	18 1	5 head	1 0	13 9	13 9	1 3	18 1	5 head
Multihead Scope/ Telemedicine Micro	1 0	13 9	13 9	1 3	18 1	5 head	1 0	13 9	13 9	1 3	18 1	5 head
Section head workstations						in shared offices						in shared offices
Histology	1 0	5 6	5 6	1 3	7 2	1 workstation	1 0	5 6	5 6	1 3	7 2	1 workstation
Accessioning	1 0	5 6	5 6	1 3	7 2	1 workstation	1 0	5 6	5 6	1 3	7 2	1 workstation
Chemistry	1 0	5 6	5 6	1 3	7 2	1 workstation	1 0	5 6	5 6	1 3	7 2	1 workstation
Hematology	1 0	5 6	5 6	1 3	7 2	1 workstation	1 0	5 6	5 6	1 3	7 2	1 workstation

	2014/2015						2024/2025					
	units	nsm/ unit	nsm	Planning Factor	CGSM	Remarks	units	nsm/ unit	nsm	Planning Factor	CGSM	Remarks
Microbiology	2 0	5 6	11 2	1 3	14 5	1 workstation	4 0	5 6	22 3	1 3	29 0	1 workstation
Transcription	8 0	4 5	35 7	1 3	46 4	8 workstations	8 0	4 5	35 7	1 3	46 4	8 workstations
Chief Technologist office	1 0	11 2	11 2	1 3	14 5	1 office	1 0	11 2	11 2	1 3	14 5	1 office
Student Coordinator	1 0	5 6	5 6	1 3	7 2	1 workstation	1 0	5 6	5 6	1 3	7 2	1 workstation
POC	1 0	5 6	5 6	1 3	7 2	1 workstation	2 0	5 6	11 2	1 3	14 5	2 workstations
Administrative Assistant	1 0	5 6	5 6	1 3	7 2	1 workstation	1 0	5 6	5 6	1 3	7 2	1 workstation
Secretary	1 0	5 6	5 6	1 3	7 2	1 workstation	1 0	5 6	5 6	1 3	7 2	1 workstation
Lab Manager	1 0	11 2	11 2	1 3	14 5	1 office	1 0	11 2	11 2	1 3	14 5	1 office
Administrative Director	1 0	13 9	13 9	1 3	18 1	1 office	1 0	13 9	13 9	1 3	18 1	1 office
QA Coordinator	2 0	5 6	11 2	1 3	14 5	1 workstation	2 0	5 6	11 2	1 3	14 5	2 workstations
Call Center	4 0	4 5	17 8	1 3	23 2	4 workstations	10 0	4 5	44 6	1 3	58 0	10 workstations
Mail/ copy room	1 0	13 9	13 9	1 3	18 1		1 0	13 9	13 9	1 3	18 1	
H Clinical Director	1 0	13 9	13 9	1 3	18 1	1 office	1 0	13 9	13 9	1 3	18 1	1 office
H Administrative Assistant	1 0	5 6	5 6	1 3	7 2	1 workstation	1 0	5 6	5 6	1 3	7 2	1 workstation
H business/ touchdown	1 0	4 5	4 5	1 3	5 8	1 workstation	1 0	5 6	5 6	1 3	7 2	1 workstation
Visitors	2 0	4 5	8 9	1 3	11 6	2 workstations	2 0	4 5	8 9	1 3	11 6	2 workstations
Conference room	1 0	44 6	44 6	1 3	58 0	24 people	1 0	44 6	44 6	1 3	58 0	24 people
Meeting room	1 0	13 9	13 9	1 3	18 1	8 people	1 0	13 9	13 9	1 3	18 1	8 people
Biomedical /L S workstation	1 0	4 5	4 5	1 3	5 8	1 workstation	1 0	4 5	4 5	1 3	5 8	1 workstation
Courier dispatch workstation	1 0	4 5	4 5	1 3	5 8	1 person	2 0	4 5	8 9	1 3	11 6	2 people
Specimen tracking workstations	3 0	4 5	13 4	1 3	17 4	3 people	6 0	4 5	26 8	1 3	34 8	6 people
Cytology Screening	2 0	4 5	8 9	1 3	11 6	2 workstations	2 0	4 5	8 9	1 3	11 6	2 workstations
		Subtotal	**547.0**		**711.1**			**Subtotal**	**654.1**		**850.3**	
LABORATORIES												
Core Laboratory	1 0	536 8	536 8	1 3	697 8		1 0	598 1	598 1	1 3	777 6	
Specimen Processing/ Receiving		in Core	in Core					in Core	in Core			

	2014/2015						2024/2025					
	units	nsm/ unit	nsm	Planning Factor	CGSM	Remarks	units	nsm/ unit	nsm	Planning Factor	CGSM	Remarks
Send outs		in Core	in Core					in Core	in Core			
Courier drop/ bin area		in Core	in Core					in Core	in Core			
Automation line		in Core	in Core					in Core	in Core			
Chemistry/ mmunology		in Core	in Core					in Core	in Core			
Hematology/ Coagulation/Urines		in Core	in Core					in Core	in Core			
Development/ Teaching		in Core	in Core					in Core	in Core			
Walk in refrigerator reagents	2 0	7 4	14 9	1 3	19 3		2 0	7 4	14 9	1 3	19 3	
Microbiology	1 0	317 5	317 5	1 3	412 7		1 0	346 1	346 1	1 3	449 9	
Molecular testing		in Micro	in Micro			enclosed platform only		in Micro	in Micro			enclosed platform only
Fluorescent Scope	1 0	7 0	7 0	1 3	9 1	2 scopes	1 0	7 0	7 0	1 3	9 1	
Development/ Teaching		in Micro	in Micro					in Micro	in Micro			
Walk in refrigerator media	2 0	7 4	14 9	1 3	19 3		2 0	7 4	14 9	1 3	19 3	
Walk in incubator	1 0	5 6	5 6	1 3	7 2		1 0	5 6	5 6	1 3	7 2	
problem workstations	1 0	4 5	4 5	1 3	5 8	8 workstations	2 0	4 5	8 9	1 3	11 6	8 workstations
Anatomic Pathology	1 0	304 6	304 6	1 3	396 0		1 0	325 5	325 5	1 3	423 1	
Gross Anatomy	1 0	38 8	38 8	1 3	50 5		1 0	58 3	58 3	1 3	75 8	
Wet tissue storage	1 0	27 9	27 9	1 3	36 2		1 0	37 2	37 2	1 3	48 3	
Accessioning		in AP	in AP					in AP	in AP			
Histology		in AP	in AP					in AP	in AP			
Cytology		in AP	in AP					in AP	in AP			
Development/ Teaching		in AP	in AP					in AP	in AP			
Subtotal			**1272.4**		**1654.1**		**Subtotal**		**1416.4**		**1841.3**	

	2014/2015						2024/2025					
	units	nsm/ unit	nsm	Planning Factor	CGSM	Remarks	units	nsm/ unit	nsm	Planning Factor	CGSM	Remarks
LABORATORY SUPPORT												
Courier Storage	1 0	18 6	18 6	1 3	24 2		1 0	18 6	18 6	1 3	24 2	
Dry ce production/ storage room	1 0	7 4	7 4	1 3	9 7		1 0	7 4	7 4	1 3	9 7	
D water	1 0	7 4	7 4	1 3	9 7		1 0	7 4	7 4	1 3	9 7	
Xylene Recycling	1 0	7 4	7 4	1 3	9 7		1 0	7 4	7 4	1 3	9 7	
Old Chemical storage	1 0	7 4	7 4	1 3	9 7		1 0	7 4	7 4	1 3	9 7	
Flammable storage room	1 0	7 4	7 4	1 3	9 7		1 0	7 4	7 4	1 3	9 7	
Flammable drum storage	1 0	7 4	7 4	1 3	9 7		1 0	7 4	7 4	1 3	9 7	
Biohazard Waste closet	1 0	4 6	4 6	1 3	6 0		1 0	4 6	4 6	1 3	6 0	
Trash closet	1 0	4 6	4 6	1 3	6 0		1 0	4 6	4 6	1 3	6 0	
Shred bin storage	1 0	2 8	2 8	1 3	3 6		1 0	2 8	2 8	1 3	3 6	
Bulk Storage	1 0	74 3	74 3	1 3	96 7		1 0	92 9	92 9	1 3	120 8	inc to support inc workload
Logistics workstation	1 0	5 6	5 6	1 3	7 2		1 0	5 6	5 6	1 3	7 2	
RT reagent storage	1 0	in Bulk	in Bulk				1 0	in Bulk	in Bulk			
n use lab coat storage		in labs	in labs			in labs		in labs	in labs			
Clean lab coat storage	1 0	4 6	4 6	1 3	6 0		1 0	4 6	4 6	1 3	6 0	
Gas tank closet	1 0	4 6	4 6	1 3	6 0		1 0	4 6	4 6	1 3	6 0	
Block and slide storage	1 0	55 8	55 8	1 3	72 5		1 0	74 3	74 3	1 3	96 7	inc to support inc workload
Air compressor closet	1 0	7 4	7 4	1 3	9 7	for automation and walk-ins	1 0	7 4	7 4	1 3	9 7	
Loading dock	1 0	27 9	27 9	1 3	36 2		1 0	27 9	27 9	1 3	36 2	
Subtotal			**255.6**		**332.2**		**Subtotal**		**292.8**		**380.6**	
EMPLOYEE SUPPORT												

	2014/2015						2024/2025					
	units	nsm/ unit	nsm	Planning Factor	CGSM	Remarks	units	nsm/ unit	nsm	Planning Factor	CGSM	Remarks
Respite Room	1 0	8 6	8 6	1 3	11 1		1 0	8 6	8 6	1 3	11 1	
Toilet rooms	8 0	5 6	44 6	1 3	58 0	8 rooms	8 0	5 6	44 6	1 3	58 0	8 rooms
Shower	2 0	8 4	16 7	1 3	21 7	2 rooms	2 0	8 4	16 7	1 3	21 7	2 rooms
First Aid room	1 0	9 3	9 3	1 3	12 1		1 0	9 3	9 3	1 3	12 1	
First Aid room toilet facility	1 0	5 6	5 6	1 3	7 2		1 0	5 6	5 6	1 3	7 2	
Lounge	1 0	41 8	41 8	1 3	54 4	24 people	1 0	41 8	41 8	1 3	54 4	24 people
Lockers	1 0	30 1	30 1	1 3	39 1	96 1/2 sz lockers	1 0	50 2	50 2	1 3	65 2	160 1/2 sz lockers
Subtotal			**156.7**		**203.7**		**Subtotal**		**176.8**		**229.8**	
MORGUE/ AUTOPSY												
Autopsy room	1 0	72 0	72 0	1 3	93 6	2 tables	1 0	72 0	72 0	1 3	93 6	2 tables
**Ante room	1 0	9 7	9 7	1 3	12 6		1 0	9 7	9 7	1 3	12 6	
**Body cooler	1 0	9 7	9 7	1 3	12 6	4 bodies - walk in	1 0	9 7	9 7	1 3	12 6	4 bodies - walk in
Shower	1 0	8 4	8 4	1 3	10 9		1 0	8 4	8 4	1 3	10 9	
Subtotal			**99.7**		**129.6**		**Subtotal**		**99.7**		**129.6**	
TOTAL PROGRAMMED SPACE			**2331.4**		**3030.8**				**2639.7**		**3431.6**	

Note building net to gross to include stairs elevators columns shafts emergency generator mechanical rooms housekeeping electrical and telecommunication closets

OPTION 1 - KGH RRL

	2014/2015						2024/2025					
	units	nsm/ unit	nsm	Planning Factor	CGSM	Remarks	units	nsm/ unit	nsm	Planning Factor	CGSM	Remarks
ADMINISTRATION												
Rotational Pathology offices	2 0	13 9	27 9	1 3	36 2		2 0	13 9	27 9	1 3	36 2	
Section head workstations						in shared offices						
RRL	1 0	5 6	5 6	1 3	7 2	1 workstation	1 0	5 6	5 6	1 3	7 2	
Blood Bank	1 0	5 6	5 6	1 3	7 2	1 workstation	1 0	5 6	5 6	1 3	7 2	
		Subtotal	**39.0**		**50.7**			**Subtotal**	**39.0**		**50.7**	
LABORATORIES												
Rapid Response lab	1 0	303 3	303 3	1 3	394 3		1 0	312 8	312 8	1 3	406 7	
Specimen Processing/ Receiving		in RRL	in RRL					in RRL	in RRL			
Send outs		in RRL	in RRL					in RRL	in RRL			
Chemistry/ mmunology		in RRL	in RRL					in RRL	in RRL			
Hematology/ Coagulation/Urines		in RRL	in RRL					in RRL	in RRL			
POC workstation		in RRL	in RRL					in RRL	in RRL			
Frozen Section		in RRL	in RRL					in RRL	in RRL			
Blood Bank	1 0	124 9	124 9	1 3	162 4		1 0	159 7	159 7	1 3	207 6	
		Subtotal	**428.3**		**556.7**			**Subtotal**	**472.5**		**614.2**	
LABORATORY SUPPORT												
D water	1 0	in RRL	in RRL			POU system	1 0	in RRL	in RRL			

	2014/2015						2024/2025					
	units	nsm/ unit	nsm	Planning Factor	CGSM	Remarks	units	nsm/ unit	nsm	Planning Factor	CGSM	Remarks
Old Chemical storage	1 0	2 8	2 8	1 3	3 6		1 0	2 8	2 8	1 3	3 6	
Flammable storage	1 0	2 8	2 8	1 3	3 6		1 0	2 8	2 8	1 3	3 6	
Shred bin storage	1 0	2 8	2 8	1 3	3 6		1 0	2 8	2 8	1 3	3 6	
Bulk/ Phlebotomy Storage	1 0	27 9	27 9	1 3	36 2		1 0	32 5	32 5	1 3	42 3	inc size for larger workload
RT reagent storage	1 0	in bulk	in bulk				1 0	in bulk	in bulk			
Walk in refrigerator	1 0	7 4	7 4	1 3	9 7		1 0	7 4	7 4	1 3	9 7	
n use lab coat storage	1 0	in labs	in labs			in labs	1 0	in labs	in labs			
Clean lab coat storage	1 0	4 6	4 6	1 3	6 0		1 0	4 6	4 6	1 3	6 0	
		Subtotal	**48.3**		**62.8**			**Subtotal**	**53.0**		**68.9**	
EMPLOYEE SUPPORT												
Respite Room	1 0	8 6	8 6	1 3	11 1		1 0	8 6	8 6	1 3	11 1	
Toilet rooms	2 0	11 2	22 3	1 3	29 0	2 rooms	2 0	11 2	22 3	1 3	29 0	2 rooms
Lounge	1 0	13 9	13 9	1 3	18 1	5 people	1 0	13 9	13 9	1 3	18 1	5 people
Lockers	1 0	15 1	15 1	1 3	19 6	48 1/2 sz lockers	1 0	15 1	15 1	1 3	19 6	98 1/2 sz lockers
		Subtotal	**59.9**		**77.8**			**Subtotal**	**59.9**		**77.8**	
MORGUE/ AUTOPSY												
Viewing room	1 0	9 3	9 3	1 3	12 1		1 0	9 3	9 3	1 3	12 1	
Ante Room	1 0	12 6	12 6	1 3	16 4		1 0	19 3	19 3	1 3	25 1	
Body cooler	1 0	23 0	23 0	1 3	30 0	20 body cooler	1 0	23 0	23 0	1 3	30 0	20 body cooler
		Subtotal	**45.0**		**58.5**			**Subtotal**	**51.7**		**67.2**	

	2014/2015						2024/2025					
	units	nsm/ unit	nsm	Planning Factor	CGSM	Remarks	units	nsm/ unit	nsm	Planning Factor	CGSM	Remarks
PHLEBOTOMY												
Waiting	1 0	8 9	8 9	1 3	11 6	3 to 4 people	1 0	8 9	8 9	1 3	11 6	3 to 4 people
Phlebotomy	1 0	10 4	10 4	1 3	13 5	1 chair baby table	1 0	10 4	10 4	1 3	13 5	1 chair baby table
Toilet room	1 0	5 6	5 6	1 3	7 2	1 room	1 0	5 6	5 6	1 3	7 2	1 room
Subtotal			**24.9**		**32.4**		**Subtotal**		**24.9**		**32.4**	
TOTAL PROGRAMMED SPACE			**645.4**		**839.0**				**700.9**		**911.2**	

Note building net to gross to include stairs elevators columns shafts emergency generator mechanical rooms housekeeping electrical and telecommunication closets

OPTION 1 - VJH RRL

	2014/2015						2024/2025					
	units	nsm/ unit	nsm	Planning Factor	CGSM	Remarks	units	nsm/ unit	nsm	Planning Factor	CGSM	Remarks
ADMINISTRATION												
Rotational Pathology offices	1 0	13 9	13 9	1 3	18 1	1 office	1 0	13 9	13 9	1 3	18 1	1 office
Section head workstations						in shared offices						
RRL	1 0	5 6	5 6	1 3	7 2	1 workstation	1 0	5 6	5 6	1 3	7 2	
Blood Bank	1 0	5 6	5 6	1 3	7 2	1 workstation	1 0	5 6	5 6	1 3	7 2	
Subtotal			**25.1**		**32.6**		**Subtotal**		**25.1**		**32.6**	
LABORATORIES												
Rapid Response lab	1 0	293 9	293 9	1 3	382 0		1 0	293 9	293 9	1 3	382 0	
Specimen Processing/ Receiving		in RRL	in RRL					in RRL	in RRL			
Send outs		in RRL	in RRL					in RRL	in RRL			
Chemistry/ mmunology		in RRL	in RRL					in RRL	in RRL			
Hematology/ Coagulation/Urines		in RRL	in RRL					in RRL	in RRL			

	2014/2015						2024/2025					
	units	nsm/ unit	nsm	Planning Factor	CGSM	Remarks	units	nsm/ unit	nsm	Planning Factor	CGSM	Remarks
POC workstation		in RRL	in RRL					in RRL	in RRL			
Frozen Section		0 0	0 0		0 0	Part of the Diagnostic Treatment Building		0 0	0 0		0 0	
Blood Bank	1 0	65 4	65 4	1 3	85 1		1 0	65 4	65 4	1 3	85 1	
		Subtotal	**359.3**		**467.1**			**Subtotal**	**359.3**		**467.1**	
LABORATORY SUPPORT												
D water	1 0	in RRL	in RRL			POU system	1 0	in RRL	in RRL			
Old Chemical storage	1 0	2 8	2 8	1 3	3 6		1 0	2 8	2 8	1 3	3 6	
Flammable storage	1 0	2 8	2 8	1 3	3 6		1 0	2 8	2 8	1 3	3 6	
Shred bin storage	1 0	2 8	2 8	1 3	3 6		1 0	2 8	2 8	1 3	3 6	
Bulk/ Phlebotomy Storage	1 0	27 9	27 9	1 3	36 2		1 0	32 5	32 5	1 3	42 3	inc size for larger workload
Walk in refrigerator	1 0	7 4	7 4	1 3	9 7		1 0	7 4	7 4	1 3	9 7	
RT reagent storage	1 0	in bulk	in bulk				1 0	in bulk	in bulk			
n use lab coat storage	1 0	in labs	in labs			in labs	1 0	in labs	in labs			
Clean lab coat storage	1 0	4 6	4 6	1 3	6 0		1 0	4 6	4 6	1 3	6 0	
		Subtotal	**48.3**		**62.8**			**Subtotal**	**53.0**		**68.9**	
EMPLOYEE SUPPORT												
Respite Room	1 0	8 6	8 6	1 3	11 1		1 0	8 6	8 6	1 3	11 1	
Toilet rooms	2 0	11 2	22 3	1 3	29 0	2 rooms	2 0	11 2	22 3	1 3	29 0	2 rooms
Lounge	1 0	13 9	13 9	1 3	18 1	5 people	1 0	13 9	13 9	1 3	18 1	5 people
Lockers	1 0	12 5	12 5	1 3	16 3	40 1/2 sz lockers	1 0	27 0	27 0	1 3	35 1	86 1/2 sz lockers
		Subtotal	**57.3**		**74.5**			**Subtotal**	**71.8**		**93.3**	
MORGUE/ AUTOPSY												
Viewing room	1 0	9 3	9 3	1 3	12 1		1 0	9 3	9 3	1 3	12 1	
Ante Room	1 0	13 4	13 4	1 3	17 4		1 0	13 4	13 4	1 3	17 4	

	2014/2015						2024/2025					
	units	nsm/ unit	nsm	Planning Factor	CGSM	Remarks	units	nsm/ unit	nsm	Planning Factor	CGSM	Remarks
Body cooler	1 0	13 4	13 4	1 3	17 4	10 body cooler	1 0	13 4	13 4	1 3	17 4	10 body cooler
		Subtotal	36.1		46.9			Subtotal	36.1		46.9	
PHLEBOTOMY												
Waiting	1 0	8 9	8 9	1 3	11 6	3 to 4 people	1 0	8 9	8 9	1 3	11 6	3 to 4 people
Phlebotomy	1 0	10 4	10 4	1 3	13 5	1 chair baby table	1 0	10 4	10 4	1 3	13 5	1 chair baby table
Toilet room	1 0	5 6	5 6	1 3	7 2	1 room	1 0	5 6	5 6	1 3	7 2	1 room
		Subtotal	24.9		32.4			Subtotal	24.9		32.4	
TOTAL PROGRAMMED SPACE			**551.0**		**716.3**				**570.1**		**741.1**	

Note building net to gross to include stairs elevators columns shafts emergency generator mechanical rooms housekeeping electrical and telecommunication closets

OPTION 1 - PRH RRL

	2014/2015						2024/2025					
	units	nsm/ unit	nsm	Planning Factor	CGSM	Remarks	units	nsm/ unit	nsm	Planning Factor	CGSM	Remarks
ADMINISTRATION												
Rotational Pathology offices	1 0	13 9	13 9	1 3	18 1	1 office	1 0	13 9	13 9	1 3	18 1	1 office
Section head workstations						in shared offices						
RRL	1 0	5 6	5 6	1 3	7 2	1 workstation	1 0	5 6	5 6	1 3	7 2	
Blood Bank	1 0	5 6	5 6	1 3	7 2	1 workstation	1 0	5 6	5 6	1 3	7 2	
		Subtotal	25.1		32.6			Subtotal	25.1		32.6	
LABORATORIES												
Rapid Response lab	1 0	303 3	303 3	1 3	394 3		1 0	312 8	312 8	1 3	406 7	increase in instrumentation to support workload

	2014/2015					
	units	nsm/ unit	nsm	Planning Factor	CGSM	Remarks
Specimen Processing/ Receiving		in RRL	in RRL			
Send outs		in RRL	in RRL			
Chemistry/ mmunology		in RRL	in RRL			
Hematology/ Coagulation/Urines		in RRL	in RRL			
POC workstation		in RRL	in RRL			
Frozen Section		in RRL	in RRL			
Blood Bank	1 0	65 4	65 4	1 3	85 1	
		Subtotal	**368.8**		**479.4**	
LABORATORY SUPPORT						
D water	1 0	in RRL	in RRL			POU system
Old Chemical storage	1 0	2 8	2 8	1 3	3 6	
Flammable storage	1 0	2 8	2 8	1 3	3 6	
Shred bin storage	1 0	2 8	2 8	1 3	3 6	
Bulk/ Phlebotomy Storage	1 0	27 9	27 9	1 3	36 2	
RT reagent storage	1 0	in bulk	in bulk			
Walk in refrigerator	1 0	7 4	7 4	1 3	9 7	
n use lab coat storage	1 0	in labs	in labs			in labs
Clean lab coat storage	1 0	4 6	4 6	1 3	6 0	
		Subtotal	**48.3**		**62.8**	
EMPLOYEE SUPPORT						
Respite Room	1 0	8 6	8 6	1 3	11 1	
Toilet rooms	2 0	11 2	22 3	1 3	29 0	2 rooms
	2014/2015					

	2024/2025					
	units	nsm/ unit	nsm	Planning Factor	CGSM	Remarks
		in RRL	in RRL			
		in RRL	in RRL			
		in RRL	in RRL			
		in RRL	in RRL			
		in RRL	in RRL			
		in RRL	in RRL			
	1 0	65 4	65 4	1 3	85 1	
		Subtotal	**378.3**		**491.7**	
	1 0	in RRL	in RRL			
	1 0	2 8	2 8	1 3	3 6	
	1 0	2 8	2 8	1 3	3 6	
	1 0	2 8	2 8	1 3	3 6	
	1 0	32 5	32 5	1 3	42 3	inc size for larger workload
	1 0	in bulk	in bulk			
	1 0	7 4	7 4	1 3	9 7	
	1 0	in labs	in labs			
	1 0	4 6	4 6	1 3	6 0	
		Subtotal	**53.0**		**68.9**	
	1 0	8 6	8 6	1 3	11 1	
	2 0	11 2	22 3	1 3	29 0	2 rooms
	2024/2025					

	units	nsm/ unit	nsm	Planning Factor	CGSM	Remarks
Lounge	1 0	13 9	13 9	1 3	18 1	5 people
Lockers	1 0	8 2	8 2	1 3	10 6	26 1/2 sz lockers
		Subtotal	**53.0**		**68.8**	
MORGUE/ AUTOPSY						
Viewing room	1 0	9 3	9 3	1 3	12 1	
Ante Room	1 0	13 4	13 4	1 3	17 4	
Body cooler	1 0	13 4	13 4	1 3	17 4	10 body cooler
		Subtotal	**36.1**		**46.9**	
PHLEBOTOMY						
Waiting	1 0	15 3	15 3	1 3	19 9	10 chairs
Reception	1 0	5 6	5 6	1 3	7 2	1 workstations
Phlebotomy	1 0	31 2	31 2	1 3	40 6	3 chairs
Phleb storage/ workroom	1 0	31 6	31 6	1 3	41 1	
Toilet room	1 0	5 6	5 6	1 3	7 2	1 room
		Subtotal	**89.3**		**116.1**	
TOTAL PROGRAMMED SPACE			**620.5**		**806.7**	

	units	nsm/ unit	nsm	Planning Factor	CGSM	Remarks
Lounge	1 0	13 9	13 9	1 3	18 1	5 people
Lockers	1 0	15 1	15 1	1 3	19 6	48 1/2 sz lockers
		Subtotal	**59.9**		**77.8**	
Viewing room	1 0	9 3	9 3	1 3	12 1	
Ante Room	1 0	13 4	13 4	1 3	17 4	
Body cooler	1 0	13 4	13 4	1 3	17 4	10 body cooler
		Subtotal	**36.1**		**46.9**	
Waiting	1 0	15 3	15 3	1 3	19 9	10 chairs
Reception	1 0	5 6	5 6	1 3	7 2	1 workstations
Phlebotomy	1 0	31 2	31 2	1 3	40 6	3 chairs
Phleb storage/ workroom	1 0	31 6	31 6	1 3	41 1	
Toilet room	1 0	5 6	5 6	1 3	7 2	1 room
		Subtotal	**89.3**		**116.1**	
			641.5		**834.0**	

Note building net to gross to include stairs elevators columns shafts emergency generator mechanical rooms housekeeping electrical and telecommunication closets

OPTION 2 SPACE PROJECTIONS; NEW LABORATORY AT KGH. NO WORK AT PRH AND VJH

OPTION 2 - NEW KGH LABORATORY

	2014/2015						2024/2025					
	units	nsm/ unit	nsm	Planning Factor	CGSM	Remarks	units	nsm/ unit	nsm	Planning Factor	CGSM	Remarks
ADMINISTRATION												
Clinical Director office	1 0	13 9	13 9	1 3	18 1	1 office	1 0	13 9	13 9	1 3	18 1	1 office
Pathologist office	11 0	11 2	122 7	1 3	159 5	11 offices	16 0	11 2	178 4	1 3	232 0	16 0
Pathology student office	4 0	2 8	11 2	1 3	14 5	4 carrels	4 0	2 8	11 2	1 3	14 5	4 carrels
PA Coordinator	1 0	5 6	5 6	1 3	7 2	1 workstation	1 0	5 6	5 6	1 3	7 2	1 workstation
Multihead Scope/ Telemedicine	1 0	13 9	13 9	1 3	18 1	5 head scope	1 0	13 9	13 9	1 3	18 1	5 head scope
Section head workstations						in shared offices						in shared offices
Histology	1 0	5 6	5 6	1 3	7 2	1 workstation	1 0	5 6	5 6	1 3	7 2	1 workstation
Accessioning	1 0	5 6	5 6	1 3	7 2	1 workstation	1 0	5 6	5 6	1 3	7 2	1 workstation
Chemistry	1 0	5 6	5 6	1 3	7 2	1 workstation	1 0	5 6	5 6	1 3	7 2	1 workstation
Hematology	1 0	5 6	5 6	1 3	7 2	1 workstation	1 0	5 6	5 6	1 3	7 2	1 workstation
Microbiology	1 0	5 6	5 6	1 3	7 2	1 workstation	1 0	5 6	5 6	1 3	7 2	1 workstation
Blood Bank	1 0	5 6	5 6	1 3	7 2	1 workstation	1 0	5 6	5 6	1 3	7 2	1 workstation
Transcription	4 0	4 5	17 8	1 3	23 2	4 workstations	4 0	4 5	17 8	1 3	23 2	4 workstations
Chief Technologist office	1 0	11 2	11 2	1 3	14 5	1 office	1 0	11 2	11 2	1 3	14 5	1 office
Student Coordinator	1 0	5 6	5 6	1 3	7 2	1 workstation	1 0	5 6	5 6	1 3	7 2	1 workstation
POC	1 0	5 6	5 6	1 3	7 2	1 workstation	2 0	5 6	11 2	1 3	14 5	2 workstations
Administrative Assistant	1 0	5 6	5 6	1 3	7 2	1 workstation	1 0	5 6	5 6	1 3	7 2	1 workstation
Secretary	1 0	5 6	5 6	1 3	7 2	1 workstation	1 0	5 6	5 6	1 3	7 2	1 workstation
Lab Manager	1 0	11 2	11 2	1 3	14 5	1 office	1 0	11 2	11 2	1 3	14 5	1 office
Administrative Director	1 0	13 9	13 9	1 3	18 1	1 office	1 0	13 9	13 9	1 3	18 1	1 office
QA Coordinator	1 0	5 6	5 6	1 3	7 2	1 workstation	1 0	5 6	5 6	1 3	7 2	1 workstation
Call Center	2 0	4 5	8 9	1 3	11 6	2 workstations	4 0	4 5	17 8	1 3	23 2	4 workstations
Mail/ copy room	1 0	10 2	10 2	1 3	13 3		1 0	10 2	10 2	1 3	13 3	
Conference room	1 0	44 6	44 6	1 3	58 0	24 people	1 0	44 6	44 6	1 3	58 0	24 people

	2014/2015					
	units	nsm/ unit	nsm	Planning Factor	CGSM	Remarks
Cytology Screening	2 0	4 5	8 9	1 3	11 6	2 workstations
		Subtotal	355.4		462.0	
LABORATORIES						
Core Laboratory	1 0	423 8	423 8	1 3	550 9	
Specimen Processing/ Receiving		in Core	in Core			
Send outs		in Core	in Core			
Chemistry/ mmunology		in Core	in Core			
Hematology/ Coagulation/ Urines		in Core	in Core			
Development/ Teaching		in Core	in Core			
POC QC/ maintenance		in Core	in Core			
Blood Bank	1 0	124 9	124 9	1 3	162 4	
Microbiology	1 0	203 0	203 0	1 3	263 9	
Accessioning		in Micro	in Micro			
Molecular testing		in Micro	in Micro			new enclosed platform testing
Development/ Teaching		in Micro	in Micro			
Fluorescent Scope	1 0	3 5	3 5	1 3	4 5	
Anatomic Pathology	1 0	239 4	239 4	1 3	311 2	
Accessioning		in AP	in AP			
Gross Anatomy		in AP	in AP			
Frozen Section		in AP	in AP			
Histology		in AP	in AP			
	2014/2015					

	2024/2025					
	units	nsm/ unit	nsm	Planning Factor	CGSM	Remarks
Cytology Screening	2 0	4 5	8 9	1 3	11 6	2 workstations
		Subtotal	425.7		553.3	
LABORATORIES						
Core Laboratory	1 0	478 4	478 4	1 3	622 0	
Specimen Processing/ Receiving		in Core	in Core			
Send outs		in Core	in Core			
Chemistry/ mmunology		in Core	in Core			
Hematology/ Coagulation/ Urines		in Core	in Core			
Development/ Teaching		in Core	in Core			
POC QC/ maintenance		in Core	in Core			
Blood Bank	1 0	124 9	124 9	1 3	162 4	
Microbiology	1 0	203 0	203 0	1 3	263 9	
Accessioning		in Micro	in Micro			
Molecular testing		in Micro	in Micro			new enclosed platform testing
Development/ Teaching		in Micro	in Micro			
Fluorescent Scope	1 0	3 5	3 5	1 3	4 6	
Anatomic Pathology	1 0	239 4	239 4	1 3	311 2	
Accessioning		in AP	in AP			
Gross Anatomy		in AP	in AP			
Frozen Section		in AP	in AP			
Histology		in AP	in AP			
	2024/2025					

	units	nsm/ unit	nsm	Planning Factor	CGSM	Remarks	units	nsm/ unit	nsm	Planning Factor	CGSM	Remarks
Cytology		in AP	in AP					in AP	in AP			
Development/ Teaching		in AP	in AP					in AP	in AP			
		Subtotal	**994.6**		**1292.9**			**Subtotal**	**1049.3**		**1364.0**	
LABORATORY SUPPORT												
Walk in refrigerator reagents	1 0	11 2	11 2	1 3	14 5		1 0	13 0	13 0	1 3	16 9	inc to support inc workload
Walk in refrigerator media	1 0	9 3	9 3	1 3	12 1		1 0	9 3	9 3	1 3	12 1	
D water	1 0	5 6	5 6	1 3	7 2		1 0	5 6	5 6	1 3	7 2	
Xylene Recycling	1 0	7 4	7 4	1 3	9 7		1 0	7 4	7 4	1 3	9 7	
Old Chemical storage	1 0	7 4	7 4	1 3	9 7		1 0	7 4	7 4	1 3	9 7	
Flammable storage	1 0	7 4	7 4	1 3	9 7		1 0	7 4	7 4	1 3	9 7	
Shred bin storage	1 0	4 6	4 6	1 3	6 0		1 0	4 6	4 6	1 3	6 0	
Bulk Storage	1 0	55 8	55 8	1 3	72 5		1 0	74 3	74 3	1 3	96 7	inc to support inc workload
RT reagent storage	1 0	in Bulk	in Bulk				1 0	in Bulk	in Bulk			
n use lab coat storage		in labs	in labs					in labs	in labs			
Clean lab coat storage	1 0	2 8	2 8	1 3	3 6		1 0	4 6	4 6	1 3	6 0	inc to support more employees
Gas tank closet	1 0	4 6	4 6	1 3	6 0		1 0	4 6	4 6	1 3	6 0	
Block and slide storage	1 0	37 2	37 2	1 3	48 3		1 0	55 8	55 8	1 3	72 5	inc to support inc workload
Wet tissue storage	1 0	18 6	18 6	1 3	24 2		1 0	27 9	27 9	1 3	36 2	inc to support inc workload
		Subtotal	**171.9**		**223.5**			**Subtotal**	**222.1**		**288.8**	
EMPLOYEE SUPPORT												
Respite Room	1 0	8 6	8 6	1 3	11 1		1 0	8 6	8 6	1 3	11 1	
Toilet rooms	4 0	5 6	22 3	1 3	29 0	4 toilet rooms	5 0	5 6	27 9	1 3	36 2	5 toilet rooms
Shower	2 0	8 4	16 7	1 3	21 7	two rooms inc toilet	2 0	8 4	16 7	1 3	21 7	two rooms inc toilet
	2014/2015						**2024/2025**					

	units	nsm/ unit	nsm	Planning Factor	CGSM	Remarks	units	nsm/ unit	nsm	Planning Factor	CGSM	Remarks
Lounge	1 0	29 7	29 7	1 3	38 7	15 people	1 0	37 2	37 2	1 3	48 3	20 people
Lockers	1 0	35 1	35 1	1 3	45 7	112 1/2 sz lockers	1 0	65 9	65 9	1 3	85 6	210 1/2 sz lockers
Subtotal			**112.5**		**146.2**		**Subtotal**		**156.2**		**203.1**	
MORGUE/ AUTOPSY												
Autopsy room	1 0	72 0	72 0	1 3	93 6	2 tables	1 0	72 0	72 0	1 3	93 6	2 tables
Ante room	1 0	19 3	19 3	1 3	25 1		1 0	19 3	19 3	1 3	25 1	
Viewing room	1 0	9 3	9 3	1 3	12 1		1 0	9 3	9 3	1 3	12 1	
Body cooler	1 0	23 0	23 0	1 3	30 0	20 body cooler	1 0	23 0	23 0	1 3	30 0	20 body cooler
Shower	1 0	8 4	8 4	1 3	10 9		1 0	8 4	8 4	1 3	10 9	
Subtotal			**132.1**		**171.7**		**Subtotal**		**132.1**		**171.7**	
PHLEBOTOMY												
Waiting	1 0	8 9	8 9	1 3	11 6	3 to 4 people	1 0	8 9	8 9	1 3	11 6	3 to 4 people
Phlebotomy	1 0	20 8	20 8	1 3	27 1	1 cot 1 chair baby table	1 0	20 8	20 8	1 3	27 1	1 cot 1 chair baby table
Toilet room	1 0	5 6	5 6	1 3	7 2	1 room	1 0	5 6	5 6	1 3	7 2	1 room
Subtotal			**35.3**		**45.9**		**Subtotal**		**35.3**		**45.9**	
TOTAL PROGRAMMED SPACE			**1801.7**		**2342.2**				**2020.6**		**2626.8**	

Note building net to gross to include stairs elevators columns shafts emergency generator mechanical rooms housekeeping electrical and telecommunication closets

OPTION 3 SPACE PROJECTIONS; CONSOLIDATED LAB AT KGH WITH RRLS AT PRH AND VJH

OPTION 3 - CONSOLIDATED LABORATORY ON KGH CAMPUS

	2014/2015						2024/2025					
	units	nsm/ unit	nsm	Planning Factor	CGSM	Remarks	units	nsm/ unit	nsm	Planning Factor	CGSM	Remarks
ADMINISTRATION												
Reception	1 0	5 6	5 6	1 3	7 2		1 0	5 6	5 6	1 3	7 2	
Waiting	1 0	11 2	11 2	1 3	14 5		1 0	11 2	11 2	1 3	14 5	
Clinical Director office	1 0	13 9	13 9	1 3	18 1	1 person	1 0	13 9	13 9	1 3	18 1	1 person
Pathologist office	16 0	11 2	178 4	1 3	232 0	16 offices	20 0	11 2	223 0	1 3	290 0	20 offices
Pathology student office	4 0	2 8	11 2	1 3	14 5	4 carrels	4 0	2 8	11 2	1 3	14 5	4 carrels
PA Coordinator	1 0	5 6	5 6	1 3	7 2	1 workstation	1 0	5 6	5 6	1 3	7 2	1 workstation
Multihead Scope/ Telemedicine AP	1 0	13 9	13 9	1 3	18 1	5 head	1 0	13 9	13 9	1 3	18 1	5 head
Multihead Scope/ Telemedicine Micro	1 0	13 9	13 9	1 3	18 1	5 head	1 0	13 9	13 9	1 3	18 1	5 head
Section head workstations						in shared offices						in shared offices
Histology	1 0	5 6	5 6	1 3	7 2	1 workstation	1 0	5 6	5 6	1 3	7 2	1 workstation
Accessioning	1 0	5 6	5 6	1 3	7 2	1 workstation	1 0	5 6	5 6	1 3	7 2	1 workstation
Chemistry	1 0	5 6	5 6	1 3	7 2	1 workstation	1 0	5 6	5 6	1 3	7 2	1 workstation
Hematology	1 0	5 6	5 6	1 3	7 2	1 workstation	1 0	5 6	5 6	1 3	7 2	1 workstation
Microbiology	2 0	5 6	11 2	1 3	14 5	1 workstation	4 0	5 6	22 3	1 3	29 0	1 workstation
Blood Bank	1 0	5 6	5 6	1 3	7 2	1 workstation	1 0	5 6	5 6	1 3	7 2	
Transcription	8 0	4 5	35 7	1 3	46 4	8 workstations	8 0	4 5	35 7	1 3	46 4	8 workstations
Chief Technologist office	1 0	11 2	11 2	1 3	14 5	1 office	1 0	11 2	11 2	1 3	14 5	1 office
Student Coordinator	1 0	5 6	5 6	1 3	7 2	1 workstation	1 0	5 6	5 6	1 3	7 2	1 workstation
POC	1 0	5 6	5 6	1 3	7 2	1 workstation	2 0	5 6	11 2	1 3	14 5	2 workstations
Administrative Assistant	1 0	5 6	5 6	1 3	7 2	1 workstation	1 0	5 6	5 6	1 3	7 2	1 workstation
Secretary	1 0	5 6	5 6	1 3	7 2	1 workstation	1 0	5 6	5 6	1 3	7 2	1 workstation
	2014/2015						2024/2025					

	units	nsm/ unit	nsm	Planning Factor	CGSM	Remarks
Lab Manager	1 0	11 2	11 2	1 3	14 5	1 office
Administrative Director	1 0	13 9	13 9	1 3	18 1	1 office
QA Coordinator	2 0	5 6	11 2	1 3	14 5	1 workstation
Call Center	4 0	4 5	17 8	1 3	23 2	4 workstations
Mail/ copy room	1 0	13 9	13 9	1 3	18 1	
H Clinical Director	1 0	13 9	13 9	1 3	18 1	1 office
H Administrative Assistant	1 0	5 6	5 6	1 3	7 2	1 workstation
H business/ touchdown	1 0	4 5	4 5	1 3	5 8	1 workstation
Visitors	2 0	4 5	8 9	1 3	11 6	2 workstations
Conference room	1 0	44 6	44 6	1 3	58 0	24 people
Meeting room	1 0	13 9	13 9	1 3	18 1	8 people
Biomedical /L S workstation	1 0	4 5	4 5	1 3	5 8	1 workstation
Courier dispatch workstation	1 0	4 5	4 5	1 3	5 8	1 person
Specimen tracking workstations	3 0	4 5	13 4	1 3	17 4	3 people
Cytology Screening	2 0	4 5	8 9	1 3	11 6	2 workstations
		Subtotal	**552.6**		**718.4**	
LABORATORIES						
Core Laboratory	1 0	577 7	577 7	1 3	751 0	
Specimen Processing/ Receiving		in Core	in Core			
Send outs		in Core	in Core			
Courier drop/ bin area		in Core	in Core			
Automation line		in Core	in Core			
Chemistry/ mmunology		in Core	in Core			
Hematology/ Coagulation/Urines		in Core	in Core			
	2014/2015					

	units	nsm/ unit	nsm	Planning Factor	CGSM	Remarks
Lab Manager	1 0	11 2	11 2	1 3	14 5	1 office
Administrative Director	1 0	13 9	13 9	1 3	18 1	1 office
QA Coordinator	2 0	5 6	11 2	1 3	14 5	2 workstations
Call Center	10 0	4 5	44 6	1 3	58 0	10 workstations
Mail/ copy room	1 0	13 9	13 9	1 3	18 1	
H Clinical Director	1 0	13 9	13 9	1 3	18 1	1 office
H Administrative Assistant	1 0	5 6	5 6	1 3	7 2	1 workstation
H business/ touchdown	1 0	5 6	5 6	1 3	7 2	1 workstation
Visitors	2 0	4 5	8 9	1 3	11 6	2 workstations
Conference room	1 0	44 6	44 6	1 3	58 0	24 people
Meeting room	1 0	13 9	13 9	1 3	18 1	8 people
Biomedical /L S workstation	1 0	4 5	4 5	1 3	5 8	1 workstation
Courier dispatch workstation	2 0	4 5	8 9	1 3	11 6	2 people
Specimen tracking workstations	6 0	4 5	26 8	1 3	34 8	6 people
Cytology Screening	2 0	4 5	8 9	1 3	11 6	2 workstations
		Subtotal	**659.7**		**857.6**	
Core Laboratory	1 0	598 1	598 1	1 3	777 6	
Specimen Processing/ Receiving		in Core	in Core			
Send outs		in Core	in Core			
Courier drop/ bin area		in Core	in Core			
Automation line		in Core	in Core			
Chemistry/ mmunology		in Core	in Core			
Hematology/ Coagulation/Urines		in Core	in Core			
	2024/2025					

	units	nsm/ unit	nsm	Planning Factor	CGSM	Remarks
Development/ Teaching		in Core	in Core			
Walk in refrigerator reagents	2 0	7 4	14 9	1 3	19 3	
Microbiology	1 0	317 5	317 5	1 3	412 7	
Molecular testing		in Micro	in Micro			enclosed platform only
Fluorescent Scope	1 0	7 0	7 0	1 3	9 1	2 scopes
Development/ Teaching		in Micro	in Micro			
Walk in refrigerator media	2 0	7 4	14 9	1 3	19 3	
Walk in incubator	1 0	5 6	5 6	1 3	7 2	
problem workstations	1 0	4 5	4 5	1 3	5 8	8 workstations
Blood Bank	1 0	124 9	124 9	1 3	162 4	
Anatomic Pathology	1 0	304 6	304 6	1 3	396 0	
Gross Anatomy	1 0	38 8	38 8	1 3	50 5	
Wet tissue storage	1 0	27 9	27 9	1 3	36 2	
Frozen Section	1 0	15 3	15 3	1 3	19 9	
Accessioning		in AP	in AP			
Histology		in AP	in AP			
Cytology		in AP	in AP			
Development/ Teaching		in AP	in AP			
		Subtotal	**1453.5**		**1889.6**	
LABORATORY SUPPORT						
Courier Storage	1 0	18 6	18 6	1 3	24 2	
Dry ce production/ storage room	1 0	7 4	7 4	1 3	9 7	
D water	1 0	7 4	7 4	1 3	9 7	
Xylene Recycling	1 0	7 4	7 4	1 3	9 7	
Old Chemical storage	1 0	7 4	7 4	1 3	9 7	
Flammable storage room	1 0	7 4	7 4	1 3	9 7	
	2014/2015					

	units	nsm/ unit	nsm	Planning Factor	CGSM	Remarks
		in Core	in Core			
	2 0	7 4	14 9	1 3	19 3	
	1 0	346 1	346 1	1 3	449 9	
		in Micro	in Micro			enclosed platform only
	1 0	7 0	7 0	1 3	9 1	
		in Micro	in Micro			
	2 0	7 4	14 9	1 3	19 3	
	1 0	5 6	5 6	1 3	7 2	
	2 0	4 5	8 9	1 3	11 6	8 workstations
	1 0	124 9	124 9	1 3	162 4	
	1 0	325 5	325 5	1 3	423 1	
	1 0	58 3	58 3	1 3	75 8	
	1 0	37 2	37 2	1 3	48 3	
	1 0	15 3	15 3	1 3	19 9	
		in AP	in AP			
		in AP	in AP			
		in AP	in AP			
		in AP	in AP			
	Subtotal		**1556.6**		**2023.6**	
	1 0	18 6	18 6	1 3	24 2	
	1 0	7 4	7 4	1 3	9 7	
	1 0	7 4	7 4	1 3	9 7	
	1 0	7 4	7 4	1 3	9 7	
	1 0	7 4	7 4	1 3	9 7	
	1 0	7 4	7 4	1 3	9 7	
2024/2025						

	units	nsm/ unit	nsm	Planning Factor	CGSM	Remarks
Flammable drum storage	1 0	7 4	7 4	1 3	9 7	
Biohazard Waste closet	1 0	4 6	4 6	1 3	6 0	
Trash closet	1 0	4 6	4 6	1 3	6 0	
Shred bin storage	1 0	2 8	2 8	1 3	3 6	
Bulk Storage	1 0	74 3	74 3	1 3	96 7	
Logistics workstation	1 0	5 6	5 6	1 3	7 2	
RT reagent storage	1 0	in Bulk	in Bulk			
n use lab coat storage		in labs	in labs			in labs
Clean lab coat storage	1 0	4 6	4 6	1 3	6 0	
Gas tank closet	1 0	4 6	4 6	1 3	6 0	
Block and slide storage	1 0	55 8	55 8	1 3	72 5	
Air compressor closet	1 0	7 4	7 4	1 3	9 7	for automation and walk-ins
Loading dock	1 0	27 9	27 9	1 3	36 2	
		Subtotal	**255.6**		**332.2**	
EMPLOYEE SUPPORT						
Respite Room	1 0	8 6	8 6	1 3	11 1	
Toilet rooms	8 0	5 6	44 6	1 3	58 0	8 rooms
Shower	2 0	8 4	16 7	1 3	21 7	2 rooms
First Aid room	1 0	9 3	9 3	1 3	12 1	
First Aid room toilet facility	1 0	5 6	5 6	1 3	7 2	
Lounge	1 0	41 8	41 8	1 3	54 4	24 people
Lockers	1 0	45 2	45 2	1 3	58 7	144 1/2 sz lockers
		Subtotal	**171.7**		**223.3**	
MORGUE/ AUTOPSY						
Autopsy room	1 0	72 0	72 0	1 3	93 6	2 tables
	2014/2015					

	units	nsm/ unit	nsm	Planning Factor	CGSM	Remarks
Flammable drum storage	1 0	7 4	7 4	1 3	9 7	
Biohazard Waste closet	1 0	4 6	4 6	1 3	6 0	
Trash closet	1 0	4 6	4 6	1 3	6 0	
Shred bin storage	1 0	2 8	2 8	1 3	3 6	
Bulk Storage	1 0	92 9	92 9	1 3	120 8	inc to support inc workload
Logistics workstation	1 0	5 6	5 6	1 3	7 2	
RT reagent storage	1 0	in Bulk	in Bulk			
n use lab coat storage		in labs	in labs			
Clean lab coat storage	1 0	4 6	4 6	1 3	6 0	
Gas tank closet	1 0	4 6	4 6	1 3	6 0	
Block and slide storage	1 0	74 3	74 3	1 3	96 7	inc to support inc workload
Air compressor closet	1 0	7 4	7 4	1 3	9 7	
Loading dock	1 0	27 9	27 9	1 3	36 2	
		Subtotal	**292.8**		**380.6**	
Respite Room	1 0	8 6	8 6	1 3	11 1	
Toilet rooms	8 0	5 6	44 6	1 3	58 0	8 rooms
Shower	2 0	8 4	16 7	1 3	21 7	2 rooms
First Aid room	1 0	9 3	9 3	1 3	12 1	
First Aid room toilet facility	1 0	5 6	5 6	1 3	7 2	
Lounge	1 0	41 8	41 8	1 3	54 4	24 people
Lockers	1 0	66 5	66 5	1 3	86 4	212 1/2 sz lockers
		Subtotal	**193.1**		**251.0**	
Autopsy room	1 0	72 0	72 0	1 3	93 6	2 tables
	2024/2025					

	units	nsm/ unit	nsm	Planning Factor	CGSM	Remarks
Viewing room	1 0	9 3	9 3	1 3	12 1	
Ante Room	1 0	12 6	12 6	1 3	16 4	
Body cooler	1 0	23 0	23 0	1 3	30 0	20 body cooler
Shower	1 0	8 4	8 4	1 3	10 9	
Subtotal			**125.4**		**163.0**	
PHLEBOTOMY						
Waiting	1 0	8 9	8 9	1 3	11 6	3 to 4 people
Phlebotomy	1 0	10 4	10 4	1 3	13 5	1 chair baby table
Toilet room	1 0	5 6	5 6	1 3	7 2	1 room
Subtotal			**24.9**		**32.4**	

	units	nsm/ unit	nsm	Planning Factor	CGSM	Remarks
Viewing room	1 0	9 3	9 3	1 3	12 1	
Ante Room	1 0	19 3	19 3	1 3	25 1	
Body cooler	1 0	23 0	23 0	1 3	30 0	20 body cooler
Shower	1 0	8 4	8 4	1 3	10 9	
Subtotal			**132.1**		**171.7**	
	1 0	8 9	8 9	1 3	11 6	3 to 4 people
	1 0	10 4	10 4	1 3	13 5	1 chair baby table
	1 0	5 6	5 6	1 3	7 2	1 room
Subtotal			**24.9**		**32.4**	

TOTAL PROGRAMMED SPACE	**2583.7**	**3358.9**

	2859.1	**3716.8**

OPTION 3 - VJH RRL

	2014/2015					
	units	nsm/ unit	nsm	Planning Factor	CGSM	Remarks
ADMINISTRATION						
Rotational Pathology offices	1 0	13 9	13 9	1 3	18 1	1 office
Section head workstations						in shared offices
RRL	1 0	5 6	5 6	1 3	7 2	1 workstation
Blood Bank	1 0	5 6	5 6	1 3	7 2	1 workstation
Subtotal			**25.1**		**32.6**	
	2014/2015					

	2024/2025					
	units	nsm/ unit	nsm	Planning Factor	CGSM	Remarks
	1 0	13 9	13 9	1 3	18 1	1 office
	1 0	5 6	5 6	1 3	7 2	
	1 0	5 6	5 6	1 3	7 2	
Subtotal			**25.1**		**32.6**	
	2024/2025					

	units	nsm/ unit	nsm	Planning Factor	CGSM	Remarks
LABORATORIES						
Rapid Response lab	1 0	293 9	293 9	1 3	382 0	
Specimen Processing/ Receiving		in RRL	in RRL			
Send outs		in RRL	in RRL			
Chemistry/ mmunology		in RRL	in RRL			
Hematology/ Coagulation/Urines		in RRL	in RRL			
POC workstation		in RRL	in RRL			
Frozen Section		0 0	0 0		0 0	Part of the Diagnostic Treatment Building
Blood Bank	1 0	65 4	65 4	1 3	85 1	
		Subtotal	**359.3**		**467.1**	
LABORATORY SUPPORT						
D water	1 0	in RRL	in RRL			POU system
Old Chemical storage	1 0	2 8	2 8	1 3	3 6	
Flammable storage	1 0	2 8	2 8	1 3	3 6	
Shred bin storage	1 0	2 8	2 8	1 3	3 6	
Bulk/ Phlebotomy Storage	1 0	27 9	27 9	1 3	36 2	
Walk in refrigerator	1 0	7 4	7 4	1 3	9 7	
RT reagent storage	1 0	in bulk	in bulk			
	2014/2015					

	units	nsm/ unit	nsm	Planning Factor	CGSM	Remarks
Rapid Response lab	1 0	293 9	293 9	1 3	382 0	increase in instrumentation to support workload
Specimen Processing/ Receiving		in RRL	in RRL			
Send outs		in RRL	in RRL			
Chemistry/ mmunology		in RRL	in RRL			
Hematology/ Coagulation/Urines		in RRL	in RRL			
POC workstation		in RRL	in RRL			
Frozen Section		0 0	0 0		0 0	Part of the Diagnostic Treatment Building
Blood Bank	1 0	65 4	65 4	1 3	85 1	
		Subtotal	**359.3**		**467.1**	
D water	1 0	in RRL	in RRL			
Old Chemical storage	1 0	2 8	2 8	1 3	3 6	
Flammable storage	1 0	2 8	2 8	1 3	3 6	
Shred bin storage	1 0	2 8	2 8	1 3	3 6	
Bulk/ Phlebotomy Storage	1 0	32 5	32 5	1 3	42 3	inc size for larger workload
Walk in refrigerator	1 0	7 4	7 4	1 3	9 7	
RT reagent storage	1 0	in bulk	in bulk			
	2024/2025					

	units	nsm/ unit	nsm	Planning Factor	CGSM	Remarks	units	nsm/ unit	nsm	Planning Factor	CGSM	Remarks
n use lab coat storage	1 0	in labs	in labs			in labs	1 0	in labs	in labs			
Clean lab coat storage	1 0	4 6	4 6	1 3	6 0		1 0	4 6	4 6	1 3	6 0	
		Subtotal	**48.3**		**62.8**			**Subtotal**	**53.0**		**68.9**	
EMPLOYEE SUPPORT												
Respite Room	1 0	8 6	8 6	1 3	11 1		1 0	8 6	8 6	1 3	11 1	
Toilet rooms	2 0	11 2	22 3	1 3	29 0	2 rooms	2 0	11 2	22 3	1 3	29 0	2 rooms
Lounge	1 0	13 9	13 9	1 3	18 1	5 people	1 0	13 9	13 9	1 3	18 1	5 people
Lockers	1 0	12 5	12 5	1 3	16 3	40 1/2 sz lockers	1 0	27 6	27 6	1 3	35 9	88 1/2 sz lockers
		Subtotal	**57.3**		**74.5**			**Subtotal**	**72.4**		**94.1**	
MORGUE/ AUTOPSY												
Viewing room	1 0	9 3	9 3	1 3	12 1		1 0	9 3	9 3	1 3	12 1	
Ante Room	1 0	13 4	13 4	1 3	17 4		1 0	13 4	13 4	1 3	17 4	
Body cooler	1 0	13 4	13 4	1 3	17 4	10 body cooler	1 0	13 4	13 4	1 3	17 4	10 body cooler
		Subtotal	**36.1**		**46.9**			**Subtotal**	**36.1**		**46.9**	
PHLEBOTOMY												
Waiting	1 0	8 9	8 9	1 3	11 6	3 to 4 people	1 0	8 9	8 9	1 3	11 6	3 to 4 people
Phlebotomy	1 0	10 4	10 4	1 3	13 5	1 chair baby table	1 0	10 4	10 4	1 3	13 5	1 chair baby table
Toilet room	1 0	5 6	5 6	1 3	7 2	1 room	1 0	5 6	5 6	1 3	7 2	1 room
		Subtotal	**24.9**		**32.4**			**Subtotal**	**24.9**		**32.4**	
TOTAL PROGRAMMED SPACE			**551.0**		**716.3**				**570.7**		**741.9**	

Note building net to gross to include stairs elevators columns shafts emergency generator mechanical rooms housekeeping electrical and telecommunication closets

OPTION 3 - PRH RRL

	2014/2015						2024/2025					
	units	nsm/ unit	nsm	Planning Factor	CGSM	Remarks	units	nsm/ unit	nsm	Planning Factor	CGSM	Remarks
ADMINISTRATION												
Rotational Pathology offices	1 0	13 9	13 9	1 3	18 1	1 office	1 0	13 9	13 9	1 3	18 1	1 office
Section head workstations						in shared offices						
RRL	1 0	5 6	5 6	1 3	7 2	1 workstation	1 0	5 6	5 6	1 3	7 2	
Blood Bank	1 0	5 6	5 6	1 3	7 2	1 workstation	1 0	5 6	5 6	1 3	7 2	
		Subtotal	**25.1**		**32.6**			**Subtotal**	**25.1**		**32.6**	
LABORATORIES												
Rapid Response lab	1 0	303 3	303 3	1 3	394 3		1 0	312 8	312 8	1 3	406 7	
Specimen Processing/ Receiving		in RRL	in RRL					in RRL	in RRL			
Send outs		in RRL	in RRL					in RRL	in RRL			
Chemistry/ mmunology		in RRL	in RRL					in RRL	in RRL			
Hematology/ Coagulation/Urines		in RRL	in RRL					in RRL	in RRL			
POC workstation		in RRL	in RRL					in RRL	in RRL			
Frozen Section		in RRL	in RRL					in RRL	in RRL			
Blood Bank	1 0	65 4	65 4	1 3	85 1		1 0	65 4	65 4	1 3	85 1	
		Subtotal	**368.8**		**479.4**			**Subtotal**	**378.3**		**491.7**	
LABORATORY SUPPORT												
D water	1 0	in RRL	in RRL			POU system	1 0	in RRL	in RRL			
Old Chemical storage	1 0	2 8	2 8	1 3	3 6		1 0	2 8	2 8	1 3	3 6	
Flammable storage	1 0	2 8	2 8	1 3	3 6		1 0	2 8	2 8	1 3	3 6	
Shred bin storage	1 0	2 8	2 8	1 3	3 6		1 0	2 8	2 8	1 3	3 6	
Bulk/ Phlebotomy Storage	1 0	27 9	27 9	1 3	36 2		1 0	32 5	32 5	1 3	42 3	inc size for larger workload
	2014/2015						2024/2025					

	units	nsm/ unit	nsm	Planning Factor	CGSM	Remarks
RT reagent storage	1 0	in bulk	in bulk			
Walk in refrigerator	1 0	7 4	7 4	1 3	9 7	
n use lab coat storage	1 0	in labs	in labs			in labs
Clean lab coat storage	1 0	4 6	4 6	1 3	6 0	
		Subtotal	**48.3**		**62.8**	
EMPLOYEE SUPPORT						
Respite Room	1 0	8 6	8 6	1 3	11 1	
Toilet rooms	2 0	11 2	22 3	1 3	29 0	2 rooms
Lounge	1 0	13 9	13 9	1 3	18 1	5 people
Lockers	1 0	8 2	8 2	1 3	10 6	26 1/2 sz lockers
		Subtotal	**53.0**		**68.8**	
MORGUE/ AUTOPSY						
Viewing room	1 0	9 3	9 3	1 3	12 1	
Ante Room	1 0	13 4	13 4	1 3	17 4	
Body cooler	1 0	13 4	13 4	1 3	17 4	10 body cooler
		Subtotal	**36.1**		**46.9**	
PHLEBOTOMY						
Waiting	1 0	15 3	15 3	1 3	19 9	10 chairs
Reception	1 0	5 6	5 6	1 3	7 2	1 workstations
Phlebotomy	1 0	31 2	31 2	1 3	40 6	3 chairs
Phleb storage/ workroom	1 0	31 6	31 6	1 3	41 1	
Toilet room	1 0	5 6	5 6	1 3	7 2	1 room
		Subtotal	**89.3**		**116.1**	
TOTAL PROGRAMMED SPACE			**620.5**		**806.7**	

	units	nsm/ unit	nsm	Planning Factor	CGSM	Remarks
RT reagent storage	1 0	in bulk	in bulk			
Walk in refrigerator	1 0	7 4	7 4	1 3	9 7	
n use lab coat storage	1 0	in labs	in labs			
Clean lab coat storage	1 0	4 6	4 6	1 3	6 0	
		Subtotal	**53.0**		**68.9**	
Respite Room	1 0	8 6	8 6	1 3	11 1	
Toilet rooms	2 0	11 2	22 3	1 3	29 0	2 rooms
Lounge	1 0	13 9	13 9	1 3	18 1	5 people
Lockers	1 0	15 1	15 1	1 3	19 6	48 1/2 sz lockers
		Subtotal	**59.9**		**77.8**	
Viewing room	1 0	9 3	9 3	1 3	12 1	
Ante Room	1 0	13 4	13 4	1 3	17 4	
Body cooler	1 0	13 4	13 4	1 3	17 4	10 body cooler
		Subtotal	**36.1**		**46.9**	
Waiting	1 0	15 3	15 3	1 3	19 9	10 chairs
Reception	1 0	5 6	5 6	1 3	7 2	1 workstations
Phlebotomy	1 0	31 2	31 2	1 3	40 6	3 chairs
Phleb storage/ workroom	1 0	31 6	31 6	1 3	41 1	
Toilet room	1 0	5 6	5 6	1 3	7 2	1 room
		Subtotal	**89.3**		**116.1**	
			641.5		**834.0**	

Note building net to gross to include stairs elevators columns shafts emergency generator mechanical rooms housekeeping electrical and telecommunication closets

Equ pment

- The equipment needs were based on the following
  - "Existing to be relocated" Equipment that is presently existing in the three laboratories that could possibly be reused in a new lab This should be viewed as a generic type of instrument as there may be differences in the three laboratories and the items could change before the laboratories are constructed
  - "2014 and 2024 opinion of equip needs" These items are the Consultants opinion of equipment quantities and types that could be necessary to operate the new laboratory models New projected equipment and technology changes noted in the meetings and to support increased workloads were determined based on the existing pieces and items used in similar laboratories All the equipment should be viewed as generic as there will be changes that cannot be anticipated by manufacturers by the laboratory needs and by availability

OPTION 1 - CONSOLIDATED LABORATORY

Equipment Number	Room Number	Existing to be relocated	2014 opinion of equip needs	2024 opinion of equip needs	Type/ Manufacturer/ Model Number
Accessioning - to be done mainly at RRL labs					
		2	2	3	Computer CPU (data entry stations)
		2	2	3	Computer monitor/ 19" flat screen
		1	2	3	Printer label/ Datamax/ 4208
		1	1	1	Refrigerator / GE/
Send outs					
		2	2	2	Computer CPU
		2	2	2	Computer monitor/ 19" flat screen
		1	1	1	Printer/ HP/ Laserjet 4100N
		1	1	1	Refrigerator/ Frigidaire/ FRT18DRH
			1	1	Freezer/ Frigidaire/ MFU21M36W1
		1	1	1	Centrifuge/ Heraeus/ Megafuge 1 0
			1	1	Centrifuge/ Heraeus/ Megafuge 1 0R
Couriers					
		1	1	2	Computer CPU/ DC7700 (dispatch)
		1	1	2	Computer monitor/ hp-e-pc 19" flat screen
			1	1	Dry ce Machine

Equipment Number	Room Number	Existing to be relocated	2014 opinion of equip needs	2024 opinion of equip needs	Type/ Manufacturer/ Model Number
			6	6	Gas tanks Style G
Chemistry					
		12	12	13	Computer CPU
		12	12	13	Computer monitor/ 19" flat screen
			1	1	Kidney stone analyzer/ Thermo/ Nicolet iS10 FT- R Spectrometer
			1	1	monitor
			1	1	Electrophoresis/ Sebia/ Capillarys 2
			1	1	computer
			1	1	printer
			1	1	UPS
		1	1	1	Electrophoresis/ Sebia/ Hydrasys
		1	1	1	surge protector
		1	1	1	computer
		1	1	1	scanner Epson 1680
		1	1	1	printer
		1	1	1	reagent packs
			1	1	ANA analyzer/ DiaSorin/ Liaison
			1	1	PC
			1	1	monitor
			1	1	printer
			1	1	Automation/ Ortho J&J/ enGen System combined rack entry and exit module
			2	2	centrifuge module
			1	1	decapper module
			1	1	aliquotter and labeler module
			1	1	buffer module
			1	1	recapper module

Equipment Number	Room Number	Existing to be relocated	2014 opinion of equip needs	2024 opinion of equip needs	Type/ Manufacturer/ Model Number
			1	1	exit and sorting module
			2	3	Vitros 5600 Chem module
			2	3	mmuno module
			2	3	printer on stand
			1	1	Osmometer/ Advanced/ 3320
			1	1	printer
		1	1	1	Chem analyzer/ Adeza/ TLiQ
		1	1	1	printer
			1	1	Walk-in refrigerator
		2	2	2	Freezer general
			4	5	UC refrigerator/ LG/ GR-151R
			1	1	Ref triple door/ Jordan/ FT-3-TR
			1	1	Refrigerator triple door/ Revco/
			1	1	Refrigerator/ Kenmore/ Series 21
			1	1	Fume Hood/ Thermo Hamilton/ Safeaire HM54L6000B
			1	1	BSC/ Baker/ Class B2 SterilGARD Advance SG603A
			1	1	pH meter/ Corning/ 125
			2	2	Balance/ Sartorius/
			1	1	Scales/ Mars/ MS-6
			1	1	Balance/ AND/
			2	2	Printer/ HP/ printer 4300dtn
			1	1	RO water/ Millipore/ 750g
			1	1	Rotator/ Spectroderm/ VSR-1
		1	1	1	TDxFLx/ Abbott
			1	1	Centrifuge/ Abbott/ x Series 3531
		1	1	1	UPS/ Powerware/ 9120
		1	1	1	UPS/ Powerware/ 9125

			2	2	Rocker/ Coulter/ MX
Equipment Number	Room Number	Existing to be relocated	2014 opinion of equip needs	2024 opinion of equip needs	Type/ Manufacturer/ Model Number
			1	1	Triage Meter Plus/ Biosite
			1	1	Stirrer hot plate/ Corning/ PC320
		1	1	1	Hot plate stirrer/ Corning/ PC353
			1	1	Rotator/ Eberbach/
			3	3	Centrifuge/ Heraeus/ Megafuge 1 0
			1	1	Centrifuge/ EC/ Centra CL2
		1	1	1	Centrifuge/ EC Damon/ DPR-6000
		1	1	1	Oven/ Lab-Line
			1	1	Microscope/ Leitz/
		1	1	1	Spectrophotometer/ Pharmacia/ Ultrospec 3000
		1	1	1	Power supply / Powervar/ ABCE600
		1	1	1	UPS/ Powerware/ Prestige 9120
			2	2	Heat block/ VWR/ VWR 3 dri-bath DB16525
		1	1	1	Sweat test/ Wescor/ Sweat-Chek 3100
Hematology					
			1	1	Urine analyzer/ Sysmex/ UF-100
			1	1	samples
			1	1	laser amplifier
			1	1	laser transformer
			1	1	pneumatic unit
			1	1	report printer
			1	1	Urine Analyzer/ Bayer/ Clinitek 500
		5	9	10	Computer CPU
		5	9	10	Computer monitor/ 19" flat screen
			1	1	Diff analyzer/ Cellavision/ Micro21 Model 200
			1	1	cpu
			1	1	monitor

			1	1	printer
Equipment Number	Room Number	Existing to be relocated	2014 opinion of equip needs	2024 opinion of equip needs	Type/ Manufacturer/ Model Number
			1	1	barcode
			1	1	Sperm Analyzer/ DPC/ Spermalite SQA-V
		1	1	1	Printer/ HP/ Laserjet 4100N
		1	1	2	Printer/ HP/ LaserJet 2430dtn
		1	1	1	diff counter/ Tek-Pro/ Tektally
			1	2	Rocker/ Ames/ Mixer 4651
		1	1	2	Centrifuge/ Baxter Sepertion/ Stat-60
			1	1	Slide Stainer/ Bayer/ Hema-tek 2000
		1	2	2	Hem Analyzer/ Beckman/ LH780
		1	2	2	Hem Analyzer/ Beckman/ LH780 power supply
		1	2	2	Hem analyzer/ Beckman/ LH 780 monitor
		1	2	2	Hem analyzer/ Beckman/ LH 780 printer
			1	2	Hem Analyzer/ Beckman/ LH780 slide maker
			1	2	Hem Analyzer/ Beckman/ LH780 slide stainer
		1	1	1	Autoimmune Testing/ BioRad/ PhD System
		1	1	1	Autoimmune Testing/ BioRad/ PhD System computer
		1	1	1	Autoimmune Testing/ BioRad/ PhD System printer
		1	1	1	Refrigerator/ Frigidaire/ FRT18
		1	1	1	Centrifuge/ Heraeus/ Megafuge 1 0
			1	1	Microscope/ Nikon Eclipse 50i
		1	1	1	Centrifuge/ Shandon/Cytospin 3
		2	2	3	Coag Analyzer/ Beckman Coulter L/ ACL TOP 500
		2	2	3	CPU
		2	2	3	monitor
		2	2	3	Printer
		2	2	3	UPS
		1	1	1	Stainer cytocentrifuge/ Wescor/Aerospray7150

Equipment Number	Room Number	Existing to be relocated	2014 opinion of equip needs	2024 opinion of equip needs	Type/ Manufacturer/ Model Number
		1	1	1	Waterbath/VWR/1201
			3	3	Microscope/ Zeiss/ Axioskop 40
Microbiology					
		13	13	13	Computer CPU
		13	13	13	Computer monitor/ 19" flat screen
		1	1	1	Printer label/ Datamax/ 4208
		1	1	1	Printer/ HP/ Laserjet 4000N
		1	1	1	Printer/ HP/ Laserjet 4100N
		1	1	1	Refrigerator/ Concept / CRTW1800VR-1
		1	1	1	Anaerobic System/ Spiral Biotech/Anoxomat
		1	1	1	Anaerobic System/ Spiral Biotech/Anoxomat printer
			1	1	Blood Culture System/ Biomerieux/ BacT Alert 3D controller
			4	6	ncubator module
			1	1	UPS
			1	2	computer
			1	1	printer
			2	3	Biosafety cabinet/ Microzone/ BioKlone 2 (plating)
			1	1	Biosafety cabinet/ Microzone/ BioKlone 2 (mycology)
			1	1	Biosafety cabinet/ Microzone/ BioKlone 2 (BC)
			1	1	Biosafety cabinet/ Microzone/ BioKlone 2 (parasit)
			1	1	Slide stainer/EM Diagnostic System/ Midas
		2	3	5	Vitek 2/ BioMerieux
		2	3	5	Vitek 2/ BioMerieux/ smart carrier
		2	2	2	Vitek 2/ BioMerieux/ computer
		2	2	2	Vitek 2/ BioMerieux/ printer
		2	2	2	Vitek 2/ BioMerieux/ filler sealer incubator reader
		2	3	3	Vitek 2/ BioMerieux/ Densi-cheks
		2	2	2	Vitek 2/ BioMerieux/ bar code reader

		2	2	2	Vitek 2/ BioMerieux/Power conditioner
Equipment Number	**Room Number**	**Existing to be relocated**	**2014 opinion of equip needs**	**2024 opinion of equip needs**	**Type/ Manufacturer/ Model Number**
		1	1	1	Refrigerator/ Danby/ Designer DAR1102W
		1	2	2	Dry Bath ncubator/ Fisher/ sotemp 147
		1	2	2	ncubator/ Fisher sotemp (one 42d one 30d)
		1	2	2	ncubator CO2 water jacketed/ Fisher/ 55D
		1	1	1	CO2 ncubator/ Forma/ 3956
		1	1	1	CO2 ncubator/Thermo Forma/ 3950
		1	1	1	Centrifuge/ Heraeus /Megafuge 2 0
		1	1	1	Centrifuge/ EC Centra-8
		1	1	1	Filtered Enclosure/ Labconco/ Paramount 6910100
		2	4	6	Microscope/ Leitz/ Laborlux S
		1	1	1	Microscope/ N kon/ Eclipse E400
		1	1	1	Microscope/ Nikon Eclipse 50i
		1	1	1	Freezer -20/ Revco/ UFP3030-A
		1	1	2	Freezer -80/ Revco Thermo/ Ultima ULT1386-9A
		1	1	1	Centrifuge/ Shandon/Cytospin 3
		1	1	1	Refrigerator triple door/ True VWR/GDM-72
		1	1	1	Heat block/ VWR/ Heat block
		1	1	1	Hot plate stirrer/ VWR/ 500
		1	1	1	ncubator diurnal low temp BOD/ VWR/Precision 818
		2	2	2	Mini Vortex/ VWR/ MV1
			1	1	Laminar Flow hood/ Nuaire/ Clean Bench 301-630 (molecular)
			1	2	Thermocycler/ Cepheid/ GeneXpert processing unit GX4
			2	2	processing block
			1	1	computer
				1	Automated Microbiology platforms - TBD
Anatomic Pathology					
			4	4	Elevating Grossing Station/ Mopec/ MB600

		1	1	1	Biosafety Cabinet 6'/ Labconco/ Purifer 36214-00 B2
Equipment Number	**Room Number**	**Existing to be relocated**	**2014 opinion of equip needs**	**2024 opinion of equip needs**	**Type/ Manufacturer/ Model Number**
		1	2	2	Microscope/ Leitz/
		1	1	2	Slide printer
		1	2	3	Cassette Printer/ Leica/ PC
		6	9	10	Computer CPU
		6	9	10	Computer monitor/ 19" flat screen
		2	2	2	Printer label/ Datamax/ 4208
		1	1	1	Printer/ HP/ LaserJet 2430dtn
		6	8	8	Tissue Proc/ Miles Sakura/ V P-3000 Floor
		6	8	8	UPS
		4	4	4	Embedder/ Sakura/ 4586 Tissue Tek 3 Cryo Console
		4	4	4	Dispensing
		4	4	4	Thermal console
		1	2	2	Stainer Coverslipper/ Sakura/ TissueTek Prisma Film coverslipper
		1	2	2	stainer
		1	2	2	monitor
		1	2	2	Coverslipper/ Hacker/ RCM3660
		8	8	9	Microtome/ Microm/ HM355S
		5	8	9	Tissue floatation bath/ TBS/ H-TFB
			1	1	Fume Hood/ Thermo Hamilton/ Safeaire HM54L6000B
		1	1	1	Freezer/ Frigidaire/ MFU21M36W1
		1	1	1	Refrigerator/ Frigidaire/ commercial
		1	1	1	Microscope/ Meiji/Sterioscopic ENZ
		1	1	1	Scale/ Chatillion
		1	1	2	Slide scanner/ Aperio/ ScanScope CS
		1	1	2	Slide scanner/ Aperio/ ScanScope CS monitor
		1	1	1	Balance/ Denver/ MXX-5
		1	1	1	Scales/ Mars/ MS-6

		1	1	1	Refrigerator/ sotemp Lab
Equipment Number	Room Number	Existing to be relocated	2014 opinion of equip needs	2024 opinion of equip needs	Type/ Manufacturer/ Model Number
		1	1	1	Refrigerator/ Frigidaire/ FRT18
		1	1	1	Filtered Enclosure/ Labconco/ Paramount 6910100
		1	1	1	Balance/ Mettler/PN 163
		1	1	1	Microscope/ Nikon/ Optiphot-2
		1	1	1	Slide Dryer/Biocare/10AF-CCS
		3	3	3	Para-Trimmer/ Shandon/
		1	1	1	Visual presenter/ Elmo/ P10s
		1	1	1	Cast Saw/ Stryker/ 848 Cast Cutter
		2	2	2	Autopsy Saw/ Stryker/ 810
		1	1	1	Paraffin Dispenser/ TBS/ H-PD
		1	1	1	Hotplate-stirrer/ Thermolyne Nuova
		1	1	1	Autostainer/ Ventana/ Nexes staining module
		1	1	1	Autostainer/ Ventana/ Nexes staining fluid module
		1	1	1	Autostainer/ Ventana/ Nexes staining monitor
		1	1	1	Autostainer/ Ventana/ Nexes staining CPU
		1	1	1	Autostainer/ Ventana/ Nexes staining Printer
		1	1	1	Autostainer/ Ventana/ Nexes staining UPS
			1	2	Autostainer/ Ventana/Benchmark Ultra
			1	2	monitor
		2	2	2	Staining System/ Ventana/ Benchmark
		2	2	2	Staining System/ Ventana/ Benchmark fluid module
		2	2	2	Staining System/ Ventana/ Benchmark cabinet module
		2	2	2	Staining System/ Ventana/ Benchmark CPU
		2	2	2	Staining System/ Ventana/ Benchmark Printer
		1	1	1	Oven forced air/ VWR/
		1	1	1	Biosafety cabinet/ Microzone/ BioKlone 2
		1	1	1	Autostainer/ Sakura/ DRS-2000

		1	1	1	Coverslipper/ Hacker/ RCM3660
Equipment Number	Room Number	Existing to be relocated	2014 opinion of equip needs	2024 opinion of equip needs	Type/ Manufacturer/ Model Number
		1	1	1	Refrigerator
		1	1	1	Printer/ HP/ LaserJet 2430dtn
		1	1	1	Thin prep 2000/ Cytyc
		1	1	1	Thin prep 2000/ Cytyc waste bottle
		1	1	1	Centrifuge/ Heraeus/ Multifuge 3s
		1	1	1	Vortex/ KA/ Vibrax VXR Vorlexor
		1	1	1	Vortex mixer/ VWR/
		2	2	2	Microscope/ N kon/ Eclipse E400
		2	2	2	Computer CPU/ DC7700
		2	2	2	Computer monitor/ hp-e-pc 19" flat screen
Autopsy					
		1	1	1	Computer/
		1	1	1	monitor
		1	1	1	Ref double door/ Lab-Line/ 3784
			2	2	Overhead OR light with camera mount/ Paragon Medical/ Trio
			2	2	Autopsy table elevating rotating/ Mopec/ CE210
			1	1	Cadaver lift power/ Mopec/ JD105 (2000# capacity)
			1	1	photo stand
			1	1	4 body refrigerator/ Mopec/ KA400 End opening
			1	1	Dictaphone transcriber/ Lanier/ DTP-2752

OPTION 1 - RAPID RESPONSE LABS

Equipment Number	Room Number	Existing to be relocated KGH	Existing to be relocated VJH	Existing to be relocated PRH	2014 opinion of equip needs	2024 opinion of equip needs	Type/Manufacturer/ Model Number
Accessioning							
		3	3	3	3	4	Computer CPU/ DC7700 (data entry stations)
		3	3	3	3	4	Computer monitor/ hp-e-pc 19" flat screen
		3		3	3	4	Printer label/ Datamax/ 4208
Send outs							
		1	1		1	1	Computer CPU/ DC7100
		1	1		1	1	Computer/ Dell/ monitor Viewsonic VG150
		1	1		1	1	Centrifuge/ Heraeus/ Megafuge 1 0
		1	1		1	1	Centrifuge/ StatSpin/ StatSpin Express 3 M502-22
		1	1		1	1	Printer/ HP/ Laserjet 4100N
		1	1		1	1	Refrigerator/ Frigidaire/ FRT18DRH
			1	1	1	1	Freezer biomedical/ Sanyo/ MDF-U537
Blood Gases							
		1	1		1	1	Computer CPU/ DC7100
		1	1		1	1	Computer/ Dell/ monitor Viewsonic VG150
		1		1	1	1	Blood Gas/Radiometer ABL/ 720
		1		1	1	1	Blood Gas/Radiometer ABL/ 725
Chemistries							
		1	1	1	1	1	Computer CPU/ DC7100
		1	1	1	1	1	Computer/ Dell/ monitor Viewsonic VG150
			1		2	2	Chem analyzer/ Ortho/ Vitros 350
			1		2	2	PC workstation
			1		2	2	printer
			1		2	2	UPS/ Powerware/ 9120
		2			2	2	Centrifuge/ Heraeus/ Megafuge 1 0

Equipment Number	Room Number	Existing to be relocated KGH	Existing to be relocated VJH	Existing to be relocated PRH	2014 opinion of equip needs	2024 opinion of equip needs	Type/Manufacturer/ Model Number
		1			1	1	Ref triple door/ Jordan/ FT-3-TR
		1	1		1	1	RO water/ Millipore/ 750g
		1	1	1	1	1	Osmometer/ Advanced/ 3320
		1	1	1	1	1	parallel printer
		2			2	2	Printer/ HP/ printer 4300dtn
		2	1		2	2	Rocker/ Coulter/ MX
		1			1	1	Triage Meter Plus/ Biosite
Immunology							
		2	1	1	2	2	mmuno Analyzer/Bayer/ Advia Centaur
		2	1	1	2	2	computer
		2	1	1	2	2	printer
Urinalysis							
		1	1		1	1	Computer CPU/ DC7100
		1	1		1	1	Computer/ Dell/ monitor Viewsonic VG150
		1	1		1	1	Urine Analyzer/ Bayer/ Clinitek 500
		1	1		1	1	Microscope/ Leitz/
		1			1	1	Centrifuge/ EC/ Centra CL2
		1			1	1	UC refrigerator/ LG/ GR-151R
Kit Testing							
			1		1	1	Heat Block/ Lab-Line/
		1			1	1	Rotator/ Spectroderm/ VSR-1
		1	1	1	1	1	Centrifuge/ Abbott/ x Series 3531
		1			1	1	Stirrer hot plate/ Corning/ PC320
		1			1	1	Rotator/ Eberbach/
		2			2	2	Heat block/ VWR/ VWR 3 dri-bath DB16525
Reagent Prep/ Other							
		1		1	1	1	Fume hood/ Fisher/ Conserv-Air
		1		1	1	1	Balance/ AND/

Equipment Number	Room Number	Existing to be relocated KGH	Existing to be relocated VJH	Existing to be relocated PRH	2014 opinion of equip needs	2024 opinion of equip needs	Type/Manufacturer/ Model Number
		1			1	1	pH meter/ Corning/ 125
		1		1	1	1	Scales/ Mars/ MS-6
		1		1	1	1	Refrigerator / GE/
		2		1	2	2	Balance/ Sartorius/
Hematology							
		1	1	1	1	1	Computer CPU/ DC7100
		1	1	1	1	1	Computer/ Dell/ monitor Viewsonic VG150
		1	1	1	1	1	Hem Analyzer/ Beckman/ LH780
		1	1	1	1	1	power supply
		1	1	1	1	1	monitor
		1	1	1	1	1	printer
			1	1	1	1	Hem analyzer/ Coulter/ LH 500
			1	1	1	1	diluter
			1	1	1	1	power supply
			1	1	1	1	computer monitor
			1	1	1	1	printer
			1	1	1	1	UPS
		2		2	2	2	Computer CPU/ DC7100
		2		2	2	2	Computer/ Dell/ monitor Viewsonic VG150
		2	2	2	2	2	Microscope/ Zeiss/ Axioskop 40
		1	1		1	1	Rocker/ Ames/ Mixer 4651
		1		1	1	1	Slide Stainer/ Bayer/ Hema-tek 2000
Coagulation							
			1		1	1	Coag Analyzer/ Behnk Elektronik/ Compact
			1		1	1	Coag Analyzer/ Behnk Elektronik/ Compact XR
		1	1	1	1	1	Computer CPU/ DC7100
		1	1	1	1	1	Computer/ Dell/ monitor Viewsonic VG150
		1	1	1	1	1	Freezer/ Frigidaire/ MFU21M36W1

Equipment Number	Room Number	Existing to be relocated KGH	Existing to be relocated VJH	Existing to be relocated PRH	2014 opinion of equip needs	2024 opinion of equip needs	Type/Manufacturer/ Model Number
Microbiology/ Fluids							
		1	1	1	1	1	Bacti- incinerator
		1	1	1	1	1	Computer CPU/ DC7600
		1	1	1	1	1	Computer monitor/ hp-e-pc 19" flat screen
		1			1	1	Biosafety cabinet/ Microzone/ BioKlone 2
		1	1	1	1	1	Microscope/ Nikon Eclipse 50i
					1	1	Slide stainer/EM Diagnostic System/ Midas
Frozen Section (PRH and KGH only							
		1		1	1	1	Computer CPU/ DC7600
		1		1	1	1	Computer monitor/ hp-e-pc 19" flat screen
		1			1	1	Printer label/ Datamax/ 4208
				1	1	1	Slide scanner/ Aperio/ ScanScope CS
				1	1	1	Slide scanner/ Aperio/ ScanScope CS monitor
		1		1	1	1	Cryostat/ Leica CM1850
		1		1	1	1	Cryostat/Reichert Jung/ Frigocut 1800
				1	1	1	Microscope/ Leitz/
		1			1	1	Grossing Station/ Ebco/
Autopsy							
					2	2	8 body refrigerator/ Mopec/ KA700 End opening (KGH only)
					1	1	8 body refrigerator/ Mopec/ KA700 End opening (Vernon & Penticton)
Blood Bank - KGH							
		7			7	9	Computer CPU/ DC7700
		7			7	9	Computer monitor/ hp-e-pc 19" flat screen
		1			1	2	Printer/ HP/ Laserjet 4100N
		2			2	2	Printer/ HP/ LaserJet 2430dtn
		1			1	2	Printer label/ Datamax/ 4208
		1			1	1	Freezer/ Revco/ UFP3030A16 Ultracold
		3			3	2	Centrifuge/ Dade Baxter/ mmufuge (B50553)

Equipment Number	Room Number	Existing to be relocated KGH	Existing to be relocated VJH	Existing to be relocated PRH	2014 opinion of equip needs	2024 opinion of equip needs	Type/Manufacturer/ Model Number
		1			1	1	Platelet Rotator/ Fenwal/ PR-1
		3			3	1	Dry Bath ncubator/ Fisher/ sotemp 145D
		2			2	1	Cell Washer/ Helmer/ Ultra CW
		1			1	3	Plasma Thawer/ Helmer/ DH4
		1			1	3	Platelet flatbed aggitator/ Helmer/ PF 84
		1			1	2	Platelet incubator/ Helmer/ PC1200i
		1			2	1	BB Refrigerator/ Helmer/ iB256
		1			2	1	Freezer/ Helmer/ i series PF 125-8
		1			1	2	Centrifuge/ Heraeus/ Megafuge 1 0
		1			1	2	Refrigerator/ Jewett/ T100-1 double door
		1			1	2	Heat Block/ Labnet/ D1100
		2			2	2	Microscope/ Leitz/
		1			2	2	Automated Gel System/ Ortho/ ProVue
		1			2	4	Automated Gel System/ Ortho/ ProVue computer
		1			2	4	Automated Gel System/ Ortho/ ProVue printer
		1			2	1	Automated Gel System/ Ortho/ ProVue UPS
		1			2	1	Gel centrifuge/ Ortho/ MTS 5150-60
		1			2	2	Gel incubator/ Ortho/ MTS DG-225
		1			1	1	Freezer/ Revco/ Fisher (-80)
		1			1	2	Heat Block/ Thermolyne/ DB12215e
					1	1	BSC/ Baker/ Class B2 SterilGARD Advance SG603A
					1	1	Blood Cell Processor/ BM Cobe/ Spectra Gambro BCT
					1	1	Tube sealer/ BM Cobe/ Seal Safe System
					1	1	Sterile connector/ DuPont/ 312
Blood Bank - Vernon							
			2		2	2	Computer CPU/ DC7100
			2		2	2	Computer monitor/ hp-e-pc 19" flat screen
			1		1	1	Printer label/ Datamax/ 4208

Equipment Number	Room Number	Existing to be relocated KGH	Existing to be relocated VJH	Existing to be relocated PRH	2014 opinion of equip needs	2024 opinion of equip needs	Type/Manufacturer/ Model Number
			1		1	1	Printer/ HP/ LaserJet 3005
			2		2	2	Agglutination viewer/ Fisher BD Clay Adams/420630
			2		2	2	Centrifuge/ Clay Adams BD / Serofuge 2001
			1		1	1	Cell Washer/ Helmer/ Ultra CW
			1		1	1	Plasma Thawer/ Helmer/ DH4
			1		1	1	Platelet flatbed aggitator/ Helmer/ PF 48i
			1		1	1	BB Refrigerator/ Helmer/ iB256
			1		1	1	Gel centrifuge/ Ortho/ MTS 5150-60
			1		1	1	Gel incubator/ Ortho/ MTS DG-225
			1		1	1	Waterbath/ Fisher/ sotemp 205
			1		1	1	Centrifuge/ StatSpin/ StatSpin Express 3 M502-22
			1		1	1	Centrifuge/ Heraeus/ Clinifuge 3538
			1		1	1	Freezer/ Jewett/ HemaPro 2000 BPL 317
			2		2	2	Microscope/ Zeiss/ Standard
			1		1	1	Microscope/ Olympus/ CK2
			1		1	1	Refrigerator/ Jordon/ SPSAKT-22
Blood Bank Penticton							
				2	2	3	Computer CPU/ DC7100
				2	2	3	Computer monitor/ hp-e-pc 19" flat screen
				1	1	1	Printer label/ Datamax/ 4208
				1	1	1	Printer/ HP/ LaserJet 2430dtn
				1	1	1	Printer/ HP/ Laserjet 4200N
					2	2	Agglutination viewer/ Fisher BD Clay Adams/420630
				1	2	3	Centrifuge/ Dade Baxter/ mmufuge (B50553)
				1	1	2	Cell Washer/ Helmer/ Ultra CW
				1	1	1	Plasma Thawer/ Helmer/ DH4
				1	1	1	Platelet flatbed aggitator/ Helmer/ PF 96i
				1	1	1	Refrigerator double/ Revco/ REB5004A

Equipment Number	Room Number	Existing to be relocated KGH	Existing to be relocated VJH	Existing to be relocated PRH	2014 opinion of equip needs	2024 opinion of equip needs	Type/Manufacturer/ Model Number
				1	1	2	Gel centrifuge/ Ortho/ MTS 5150-60
				1	1	2	Gel incubator/ Ortho/ MTS DG-225
					1	1	Centrifuge/ StatSpin/ StatSpin Express 3 M502-22
					1	1	Centrifuge/ Heraeus/ Clinifuge 3538
				1	1	1	Freezer -30/ Sanyo/ MDF U536
				1	1	2	Microscope/ Olympus/ CK2
					1	1	Refrigerator/ Jordon/ SPSAKT-22

OPTION 2 - KELOWNA GENERAL HOSPITAL - new laboratory

Equipment Number	Room Number	Existing to be relocated KGH	2014 opinion of equip needs	2024 opinion of equip needs	Type/ Manufacturer/ Model Number
Accessioning					
		6	3	6	Computer CPU/ DC7700 (data entry stations)
			3	6	Computer monitor/ hp-e-pc 19" flat screen
		3	3	6	Printer label/ Datamax/ 4208
		1	1	1	Refrigerator / GE/
Send outs -					
		2	2	2	Computer CPU/ DC7600
		2	2	2	Computer monitor/ hp-e-pc 19" flat screen
		1	1	2	Printer/ HP/ Laserjet 4100N
		1	1	1	Refrigerator/ Frigidaire/ FRT18DRH
		1	1	1	Freezer/ Frigidaire/ MFU21M36W1
		1	1	1	Centrifuge/ Heraeus/ Megafuge 1 0
		1	1	1	Centrifuge/ Heraeus/ Megafuge 1 0R
Chemistry					
		12	10	12	Computer CPU/ DC7600
		12	10	12	Computer monitor/ hp-e-pc 19" flat screen
		2	2	2	Printer/ HP/ printer 4300dtn
		2	2	2	Freezer general
		1	1	1	Fume hood/ Fisher/ Conserv-Air
		1	1	1	RO water/ Millipore/ 750g
		1	1	1	Rotator/ Spectroderm/ VSR-1
		1	1	1	Chemistry analyzer/ Abbott/ Axsym
		1	1	1	Chemistry analyzer/ Abbott/ Axsym printer
		1	1	1	Chemistry analyzer/ Abbott/ Axsym PC workstation
		1	1	1	Chemistry analyzer/ Abbott/ Axsym UPS

Equipment Number	Room Number	Existing to be relocated KGH	2014 opinion of equip needs	2024 opinion of equip needs	Type/ Manufacturer/ Model Number
		2	2	2	mmuno Analyzer/Bayer/ Advia Centaur
		2	2	2	mmuno Analyzer/Bayer/ Advia Centaur computer
		2	2	2	mmuno Analyzer/Bayer/ Advia Centaur printer
		1	1	1	TDxFLx/ Abbott
		1	1	1	Centrifuge/ Abbott/ x Series 3531
		1	1	1	Blood Gas/Radiometer ABL/ 725
		1	1	1	Blood Gas/Radiometer ABL/ 720
		1	1	1	Osmometer/ Advanced/ 3320
		1	1	1	Osmometer/ Advanced/ 3320 parallel printer
		1	1	1	Chem analyzer/ Adeza/ TLiQ
		1	1	1	Chem analyzer/ Adeza/ TLiQ printer
		1	1	1	UPS/ Powerware/ 9120
		1	1	1	UPS/ Powerware/ 9125
		1	1	1	Balance/ AND/
		2	2	2	Rocker/ Coulter/ MX
		1	1	1	Triage Meter Plus/ Biosite
		1	1	1	Stirrer hot plate/ Corning/ PC320
		1	1	1	pH meter/ Corning/ 125
		1	1	1	Hot plate stirrer/ Corning/ PC353
		1	1	1	Rotator/ Eberbach/
		1	1	1	Scales/ Mars/ MS-6
		1	1	1	Refrigerator / GE/
		3	3	4	Centrifuge/ Heraeus/ Megafuge 1 0
		1	1	1	Centrifuge/ EC/ Centra CL2
		1	1	1	Centrifuge/ EC Damon/ DPR-6000
		1	1	1	Ref triple door/ Jordan/ FT-3-TR
		1	1	1	Refrigerator/ Kenmore/ Series 21

Equipment Number	Room Number	Existing to be relocated KGH	2014 opinion of equip needs	2024 opinion of equip needs	Type/ Manufacturer/ Model Number
		1	1	1	Oven/ Lab-Line
		1	1	1	Microscope/ Leitz/
			2	3	Chem analyzer/ Ortho J&J/Fusion 5 1
			2	3	printer tally and stand
			2	3	PC Workstation
		1	1	1	Spectrophotometer/ Pharmacia/ Ultrospec 3000
		1	1	1	Power supply / Powervar/ ABCE600
		1	1	1	UPS/ Powerware/ Prestige 9120
		1	1	1	Refrigerator triple door/ Revco/
		2	2	2	Balance/ Sartorius/
		2	2	2	Heat block/ VWR/ VWR 3 dri-bath DB16525
		1	1	1	Sweat test/ Wescor/ Sweat-Chek 3100
			1	1	Kidney stone analyzer/ Thermo/ Nicolet iS10 FT- R Spectrometer
			1	1	monitor
			1	1	Electrophoresis/ Sebia/ Capillarys 2
			1	1	computer
			1	1	printer
			1	1	UPS
			1	1	ANA analyzer/ DiaSorin/ Liaison
			1	1	PC
			1	1	monitor
			1	1	printer
		1	4	5	UC refrigerator/ LG/ GR-151R
			1	1	UC Dishwasher/ FlaskScrubber/ 44203-00
Hematology					
			1	1	Urine analyzer/ Sysmex/ UF-100

Equipment Number	Room Number	Existing to be relocated KGH	2014 opinion of equip needs	2024 opinion of equip needs	Type/ Manufacturer/ Model Number
			1	1	samples
			1	1	laser amplifier
			1	1	laser transformer
			1	1	pneumatic unit
			1	1	report printer
		1	1	1	Urine Analyzer/ Bayer/ Clinitek 500
		8	8	9	Computer CPU/ DC7700
		8	8	9	Computer monitor/ hp-e-pc 19" flat screen
		1	1	2	Printer/ HP/ Laserjet 4100N
		1	1	1	Printer/ HP/ LaserJet 2430dtn
		1	1	2	Rocker/ Ames/ Mixer 4651
		1	1	2	Centrifuge/ Baxter Sepertion/ Stat-60
		1	1	1	Slide Stainer/ Bayer/ Hema-tek 2000
		2	2	2	Hem Analyzer/ Beckman/ LH780
		2	2	2	Hem Analyzer/ Beckman/ LH780 power supply
		2	2	2	Hem analyzer/ Beckman/ LH 780 monitor
		2	2	2	Hem analyzer/ Beckman/ LH 780 printer
		1	1	1	Autoimmune Testing/ BioRad/ PhD System
		1	1	1	Autoimmune Testing/ BioRad/ PhD System computer
		1	1	1	Autoimmune Testing/ BioRad/ PhD System printer
		1	1	2	Refrigerator/ Frigidaire/ FRT18
		1	1	1	Centrifuge/ Heraeus/ Megafuge 1 0
		1	1	1	Microscope/ Nikon Eclipse 50i
		1	1	1	Centrifuge/ Shandon/Cytospin 3
		2	2	2	Coag Analyzer/ Beckman Coulter L/ ACL TOP 500
		2	2	2	CPU
		2	2	2	monitor

Equipment Number	Room Number	Existing to be relocated KGH	2014 opinion of equip needs	2024 opinion of equip needs	Type/ Manufacturer/ Model Number
		2	2	2	Printer
		2	2	2	UPS
		1	1	1	Stainer cytocentrifuge/ Wescor/Aerospray7150
		1	1	1	Waterbath/VWR/1201
		2	3	3	Microscope/ Zeiss/ Axioskop 40 (diffs)
		1	1	1	diff counter/ Tek-Pro/ Tektally
Blood Bank					
		7	7	7	Computer CPU/ DC7700
		7	7	7	Computer monitor/ hp-e-pc 19" flat screen
		1	1	1	Printer/ HP/ Laserjet 4100N
		2	2	2	Printer/ HP/ LaserJet 2430dtn
		1	1	1	Printer label/ Datamax/ 4208
		1	1	1	Centrifuge/ Heraeus/ Megafuge 1 0
			1	2	Plasma Thawer/ Helmer/ DH4
		1	1	1	Platelet Rotator/ Fenwal/ PR-1
		1	1	1	Platelet flatbed aggitator/ Helmer/ PF 84
		1	1	1	Platelet incubator/ Helmer/ PC1200i
		3	3	3	Centrifuge/ Dade Baxter/ mmufuge (B50553)
		3	3	3	Dry Bath ncubator/ Fisher/ sotemp 145D
		2	2	2	Cell Washer/ Helmer/ Ultra CW
		1	1	1	Heat Block/ Thermolyne/ DB12215e
		1	1	1	Heat Block/ Labnet/ D1100
		2	2	2	Microscope/ Leitz/
		1	2	2	Automated Gel System/ Ortho/ ProVue
		1	2	2	Automated Gel System/ Ortho/ ProVue computer
		1	2	2	Automated Gel System/ Ortho/ ProVue printer
		1	2	2	Automated Gel System/ Ortho/ ProVue UPS

Equipment Number	Room Number	Existing to be relocated KGH	2014 opinion of equip needs	2024 opinion of equip needs	Type/ Manufacturer/ Model Number
		1	2	2	Gel centrifuge/ Ortho/ MTS 5150-60
		1	2	2	Gel incubator/ Ortho/ MTS DG-225
		2	1	1	Freezer/ Revco/ Fisher (-80)
		1	2	2	Freezer/ Helmer/ i series PF 125-8
		1	1	1	Refrigerator/ Jewett/ T100-1 double door
		1	2	2	BB Refrigerator/ Helmer/ iB256
			1	1	BSC/ Baker/ Class B2 SterilGARD Advance SG603A
			1	1	Blood Cell Processor/ BM Cobe/ Spectra Gambro BCT
			1	1	Tube sealer/ BM Cobe/ Seal Safe System
			1	1	Sterile connector/ DuPont/ 312
				1	Walk in refrigerator
Microbiology					
		7	9	9	Computer CPU/ DC7700
		7	9	9	Computer monitor/ hp-e-pc 19" flat screen
		1	1	1	Printer label/ Datamax/ 4208
		1	1	1	Printer/ HP/ Laserjet 4000N
		1	1	1	Printer/ HP/ Laserjet 4100N
		1	1	1	Refrigerator/ Concept / CRTW1800VR-1
		1	1	1	Anaerobic System/ Spiral Biotech/Anoxomat
		1	1	1	Anaerobic System/ Spiral Biotech/Anoxomat printer
			1	1	Blood Culture System/ Biomerieux/ BacT Alert 3D controller
			2	2	ncubator module
			1	1	UPS
			1	1	computer
			1	1	printer
		1	1	1	Vitek 2/ BioMerieux

		1	1	1	Vitek 2/ BioMerieux/ smart carrier
Equipment Number	Room Number	Existing to be relocated KGH	2014 opinion of equip needs	2024 opinion of equip needs	Type/ Manufacturer/ Model Number
		1	1	1	Vitek 2/ BioMerieux/ computer
		1	1	1	Vitek 2/ BioMerieux/ printer
		1	1	1	Vitek 2/ BioMerieux/ filler sealer incubator reader
		1	1	1	Vitek 2/ BioMerieux/ Densi-cheks
		1	1	1	Vitek 2/ BioMerieux/ bar code reader
		1	1	1	Vitek 2/ BioMerieux/Power conditioner
		1	1	1	Refrigerator/ Danby/ Designer DAR1102W
		2	2	2	Dry Bath ncubator/ Fisher/ sotemp 147
		1	1	1	ncubator CO2 water jacketed/ Fisher/ 55D
		1	1	1	ncubator/ Fisher sotemp
		1	1	1	CO2 ncubator/ Forma/ 3956
		1	1	1	Centrifuge/ Heraeus /Megafuge 2 0
		1	1	1	Centrifuge/ EC Centra-8
		1	2	2	Biosafety cabinet/ Microzone/ BioKlone 2
			1	1	Slide stainer/EM Diagnostic System/ Midas
		1	1	1	Filtered Enclosure/ Labconco/ Paramount 6910100
		2	2	2	Microscope/ Leitz/ Laborlux S
		1	1	1	Microscope/ N kon/ Eclipse E400
		1	1	1	Microscope/ Nikon Eclipse 50i
		1	1	1	Freezer -30/ Revco/ UFP3030-A
		1	1	1	Freezer Upright/ Revco Thermo/ Ultima ULT1386-9A
		1	1	1	Centrifuge/ Shandon/Cytospin 3
		1	1	1	Refrigerator triple door/ True VWR/GDM-72
		1	1	1	Heat block/ VWR/ Heat block
		1	1	1	Hot plate stirrer/ VWR/ 500
		1	1	1	ncubator diurnal low temp BOD/ VWR/Precision 818

		2	2	2	Mini Vortex/ VWR/ MV1
Equipment Number	**Room Number**	**Existing to be relocated KGH**	**2014 opinion of equip needs**	**2024 opinion of equip needs**	**Type/ Manufacturer/ Model Number**
			1	1	Laminar Flow hood/ Nuaire/ Clean Bench 301-630
			1	2	Thermocycler/ Cepheid/ GeneXpert processing unit GX4
			1	2	processing block
			1	1	computer
Anatomic Pathology					
			2	2	Elevating Grossing Station/ Mopec/ MB600
		1	1	1	Cryostat/Reichert Jung/ Frigocut 1800
		1	1	1	Cryostat/ Leica CM1850
		1	1	1	Biosafety Cabinet 6'/ Labconco/ Purifer 36214-00 B2
		1	2	2	Microscope/ Leitz/
		1	1	2	Slide printer
		1	1	2	Cassette Printer/ Leica/ PC
		6	6	6	Computer CPU/ DC7700
		6	6	6	Computer monitor/ hp-e-pc 19" flat screen
		2	2	2	Printer label/ Datamax/ 4208
		1	1	1	Printer/ HP/ LaserJet 2430dtn
		1	1	1	Tissue Proc/ Miles Sakura/ V P 5A-B1
		1	2	2	Tissue Proc/ Miles Sakura/ V P-3000 Floor
		1	2	2	UPS
		2	2	2	Embedder/ Sakura/ 4586 Tissue Tek 3 Cryo Console
		2	2	2	Dispensing
		2	2	2	Thermal console
		1	1	1	Stainer Coverslipper/ Sakura/ TissueTek Prisma Film coverslipper
		1	1	1	stainer
		1	1	1	monitor
		6	5	5	Microtome/ Microm/ HM355S

		3	5	5	Tissue floatation bath/ TBS/ H-TFB
Equipment Number	Room Number	Existing to be relocated KGH	2014 opinion of equip needs	2024 opinion of equip needs	Type/ Manufacturer/ Model Number
			1	1	Fume Hood/ Thermo Hamilton/ Safeaire HM54L6000B
		1	1	1	Refrigerator/ Frigidaire/ commercial
		1	1	1	Microscope/ Meiji/Sterioscopic ENZ
		1	1	1	Scale/ Chatillion
		1	1	1	Slide scanner/ Aperio/ ScanScope CS
		1	1	1	Slide scanner/ Aperio/ ScanScope CS monitor
		1	1	1	Balance/ Denver/ MXX-5
			1	1	Scales/ Mars/ MS-6
		1	1	1	Refrigerator/ sotemp Lab
		1	1	1	Refrigerator/ Frigidaire/ FRT18
		1	1	1	Filtered Enclosure/ Labconco/ Paramount 6910100
		1	1	1	Balance/ Mettler/PN 163
		1	1	1	Microscope/ Nikon/ Optiphot-2
		1	1	1	Slide Dryer/Biocare/10AF-CCS
			3	3	Para-Trimmer/ Shandon/
		1	1	1	Visual presenter/ Elmo/ P10s
		1	1	1	Cast Saw/ Stryker/ 848 Cast Cutter
		2	2	2	Autopsy Saw/ Stryker/ 810
		1	1	1	Paraffin Dispenser/ TBS/ H-PD
		1	1	1	Hotplate-stirrer/ Thermolyne Nuova
		1	1	1	Autostainer/ Ventana/ Nexes staining module
		1	1	1	Autostainer/ Ventana/ Nexes staining fluid module
		1	1	1	Autostainer/ Ventana/ Nexes staining monitor
		1	1	1	Autostainer/ Ventana/ Nexes staining CPU
		1	1	1	Autostainer/ Ventana/ Nexes staining Printer
		1	1	1	Autostainer/ Ventana/ Nexes staining UPS

			1	2	Autostainer/ Ventana/Benchmark Ultra
Equipment Number	**Room Number**	**Existing to be relocated KGH**	**2014 opinion of equip needs**	**2024 opinion of equip needs**	**Type/ Manufacturer/ Model Number**
			1	2	monitor
		2	2	2	Staining System/ Ventana/ Benchmark
		2	2	2	Staining System/ Ventana/ Benchmark fluid module
		2	2	2	Staining System/ Ventana/ Benchmark cabinet module
		2	2	2	Staining System/ Ventana/ Benchmark CPU
		2	2	2	Staining System/ Ventana/ Benchmark Printer
		1	1	1	Oven forced air/ VWR/
		1	1	1	Biosafety cabinet/ Microzone/ BioKlone 2
			1	1	Autostainer/ Sakura/ DRS-2000
			1	1	Coverslipper/ Hacker/ RCM3660
			1	1	Refrigerator
		1	1	1	Printer/ HP/ LaserJet 2430dtn
		1	1	1	Thin prep 2000/ Cytyc
		1	1	1	Thin prep 2000/ Cytyc waste bottle
		1	1	1	Centrifuge/ Heraeus/ Multifuge 3s
		1	1	1	Vortex/ KA/ Vibrax VXR Vorlexor
		1	1	1	Vortex mixer/ VWR/
		2	2	2	Microscope/ N kon/ Eclipse E400
		2	2	2	Computer CPU/ DC7700
		2	2	2	Computer monitor/ hp-e-pc 19" flat screen
Autopsy					
			1	1	Computer/
			1	1	monitor
			1	1	Ref double door/ Lab-Line/ 3784
			2	2	Overhead OR light with camera mount/ Paragon Medical/ Trio
			2	2	Autopsy table elevating rotating/ Mopec/ CE210

			1	1	Cadaver lift power/ Mopec/ JD105 (2000# capacity)
Equipment Number	**Room Number**	**Existing to be relocated KGH**	**2014 opinion of equip needs**	**2024 opinion of equip needs**	**Type/ Manufacturer/ Model Number**
			1	1	photo stand
			2	2	8 body refrigerator/ Mopec/ KA700 End opening
			1	1	Dictaphone transcriber/ Lanier/ DTP-2752

OPTION 3- CONSOLIDATED LABORATORY AT KGH SITE

Equipment Number	Room Number	Existing to be relocated	2014 opinion of equip needs	2024 opinion of equip needs	Type/ Manufacturer/ Model Number
Accessioning					
		6	6	8	Computer CPU/ DC7700 (data entry stations)
			6	8	Computer monitor/ hp-e-pc 19" flat screen
		3	6	8	Printer label/ Datamax/ 4208
		1	1	1	Refrigerator / GE/
Send outs					
		2	2	2	Computer CPU
		2	2	2	Computer monitor/ 19" flat screen
		1	1	2	Printer/ HP/ Laserjet 4100N
		1	1	1	Refrigerator/ Frigidaire/ FRT18DRH
		1	1	1	Freezer/ Frigidaire/ MFU21M36W1
		1	1	1	Centrifuge/ Heraeus/ Megafuge 1 0
		1	1	1	Centrifuge/ Heraeus/ Megafuge 1 0R
Couriers					
		1	1	2	Computer CPU/ DC7700 (dispatch)
		1	1	2	Computer monitor/ hp-e-pc 19" flat screen
			1	1	Dry ce Machine
			6	6	Gas tanks Style G
Chemistry					
		12	12	13	Computer CPU
		12	12	13	Computer monitor/ 19" flat screen
			1	1	Kidney stone analyzer/ Thermo/ Nicolet iS10 FT- R Spectrometer
			1	1	monitor
			1	1	Electrophoresis/ Sebia/ Capillarys 2

Equipment Number	Room Number	Existing to be relocated	2014 opinion of equip needs	2024 opinion of equip needs	Type/ Manufacturer/ Model Number
			1	1	computer
			1	1	printer
			1	1	UPS
		1	1	1	Electrophoresis/ Sebia/ Hydrasys
		1	1	1	surge protector
		1	1	1	computer
		1	1	1	scanner Epson 1680
		1	1	1	printer
		1	1	1	reagent packs
			1	1	ANA analyzer/ DiaSorin/ Liaison
			1	1	PC
			1	1	monitor
			1	1	printer
			1	1	Automation/ Ortho J&J/ enGen System combined rack entry and exit module
			2	2	centrifuge module
			1	1	decapper module
			1	1	aliquotter and labeler module
			1	1	buffer module
			1	1	recapper module
			1	1	exit and sorting module
			2	3	Vitros 5600 Chem module
			2	3	mmuno module
			2	3	printer on stand
		1	1	1	Osmometer/ Advanced/ 3320
		1	1	1	printer

Equipment Number	Room Number	Existing to be relocated	2014 opinion of equip needs	2024 opinion of equip needs	Type/ Manufacturer/ Model Number
		1	1	1	Chem analyzer/ Adeza/ TLiQ
		1	1	1	printer
		2	2	2	Freezer general
		1	4	5	UC refrigerator/ LG/ GR-151R
		1	1	1	Ref triple door/ Jordan/ FT-3-TR
		1	1	1	Refrigerator triple door/ Revco/
		1	1	1	Refrigerator/ Kenmore/ Series 21
			1	1	Fume Hood/ Thermo Hamilton/ Safeaire HM54L6000B
			1	1	BSC/ Baker/ Class B2 SterilGARD Advance SG603A
		1	1	1	pH meter/ Corning/ 125
		2	2	2	Balance/ Sartorius/
		1	1	1	Scales/ Mars/ MS-6
		1	1	1	Balance/ AND/
		2	2	2	Printer/ HP/ printer 4300dtn
		1	1	1	RO water/ Millipore/ 750g
		1	1	1	Rotator/ Spectroderm/ VSR-1
		1	1	1	TDxFLx/ Abbott
		1	1	1	Centrifuge/ Abbott/ x Series 3531
		1	1	1	UPS/ Powerware/ 9120
		1	1	1	UPS/ Powerware/ 9125
		2	2	2	Rocker/ Coulter/ MX
		1	1	1	Triage Meter Plus/ Biosite
		1	1	1	Stirrer hot plate/ Corning/ PC320
		1	1	1	Hot plate stirrer/ Corning/ PC353
		1	1	1	Rotator/ Eberbach/
		3	3	3	Centrifuge/ Heraeus/ Megafuge 1 0
		1	1	1	Centrifuge/ EC/ Centra CL2

		1	1	1	Centrifuge/ EC Damon/ DPR-6000
Equipment Number	**Room Number**	**Existing to be relocated**	**2014 opinion of equip needs**	**2024 opinion of equip needs**	**Type/ Manufacturer/ Model Number**
		1	1	1	Oven/ Lab-Line
		1	1	1	Microscope/ Leitz/
		1	1	1	Spectrophotometer/ Pharmacia/ Ultrospec 3000
		1	1	1	Power supply / Powervar/ ABCE600
		1	1	1	UPS/ Powerware/ Prestige 9120
		2	2	2	Heat block/ VWR/ VWR 3 dri-bath DB16525
		1	1	1	Sweat test/ Wescor/ Sweat-Chek 3100
Hematology					
			1	1	Urine analyzer/ Sysmex/ UF-100
			1	1	samples
			1	1	laser amplifier
			1	1	laser transformer
			1	1	pneumatic unit
			1	1	report printer
			1	1	Urine Analyzer/ Bayer/ Clinitek 500
		5	9	10	Computer CPU
		5	9	10	Computer monitor/ 19" flat screen
			1	1	Diff analyzer/ Cellavision/ Micro21 Model 200
			1	1	cpu
			1	1	monitor
			1	1	printer
			1	1	barcode
			1	1	Sperm Analyzer/ DPC/ Spermalite SQA-V
		1	1	1	Printer/ HP/ Laserjet 4100N
		1	1	2	Printer/ HP/ LaserJet 2430dtn

		1	1	1	diff counter/ Tek-Pro/ Tektally
			1	2	Rocker/ Ames/ Mixer 4651
Equipment Number	**Room Number**	**Existing to be relocated**	**2014 opinion of equip needs**	**2024 opinion of equip needs**	**Type/ Manufacturer/ Model Number**
		1	1	2	Centrifuge/ Baxter Sepertion/ Stat-60
			1	1	Slide Stainer/ Bayer/ Hema-tek 2000
		1	2	2	Hem Analyzer/ Beckman/ LH780
		1	2	2	Hem Analyzer/ Beckman/ LH780 power supply
		1	2	2	Hem analyzer/ Beckman/ LH 780 monitor
		1	2	2	Hem analyzer/ Beckman/ LH 780 printer
			1	2	Hem Analyzer/ Beckman/ LH780 slide maker
			1	2	Hem Analyzer/ Beckman/ LH780 slide stainer
		1	1	1	Autoimmune Testing/ BioRad/ PhD System
		1	1	1	Autoimmune Testing/ BioRad/ PhD System computer
		1	1	1	Autoimmune Testing/ BioRad/ PhD System printer
		1	1	1	Refrigerator/ Frigidaire/ FRT18
		1	1	1	Centrifuge/ Heraeus/ Megafuge 1 0
			1	1	Microscope/ Nikon Eclipse 50i
		1	1	1	Centrifuge/ Shandon/Cytospin 3
		2	2	3	Coag Analyzer/ Beckman Coulter L/ ACL TOP 500
		2	2	3	CPU
		2	2	3	monitor
		2	2	3	Printer
		2	2	3	UPS
		1	1	1	Stainer cytocentrifuge/ Wescor/Aerospray7150
		1	1	1	Waterbath/VWR/1201
			3	3	Microscope/ Zeiss/ Axioskop 40
Blood Bank					
		7	7	9	Computer CPU/ DC7700
		7	7	9	Computer monitor/ hp-e-pc 19" flat screen

		1	1	2	Printer/ HP/ Laserjet 4100N
		2	2	2	Printer/ HP/ LaserJet 2430dtn
Equipment Number	**Room Number**	**Existing to be relocated**	**2014 opinion of equip needs**	**2024 opinion of equip needs**	**Type/ Manufacturer/ Model Number**
		1	1	2	Printer label/ Datamax/ 4208
		1	1	1	Freezer/ Revco/ UFP3030A16 Ultracold
		3	3	2	Centrifuge/ Dade Baxter/ mmufuge (B50553)
		1	1	1	Platelet Rotator/ Fenwal/ PR-1
		3	3	1	Dry Bath ncubator/ Fisher/ sotemp 145D
		2	2	1	Cell Washer/ Helmer/ Ultra CW
		1	1	3	Plasma Thawer/ Helmer/ DH4
		1	1	3	Platelet flatbed aggitator/ Helmer/ PF 84
		1	1	2	Platelet incubator/ Helmer/ PC1200i
		1	2	1	BB Refrigerator/ Helmer/ iB256
		1	2	1	Freezer/ Helmer/ i series PF 125-8
		1	1	2	Centrifuge/ Heraeus/ Megafuge 1 0
		1	1	2	Refrigerator/ Jewett/ T100-1 double door
		1	1	2	Heat Block/ Labnet/ D1100
		2	2	2	Microscope/ Leitz/
		1	2	2	Automated Gel System/ Ortho/ ProVue
		1	2	4	Automated Gel System/ Ortho/ ProVue computer
		1	2	4	Automated Gel System/ Ortho/ ProVue printer
		1	2	1	Automated Gel System/ Ortho/ ProVue UPS
		1	2	1	Gel centrifuge/ Ortho/ MTS 5150-60
		1	2	2	Gel incubator/ Ortho/ MTS DG-225
		1	1	1	Freezer/ Revco/ Fisher (-80)
		1	1	2	Heat Block/ Thermolyne/ DB12215e
			1	1	BSC/ Baker/ Class B2 SterilGARD Advance SG603A
			1	1	Blood Cell Processor/ BM Cobe/ Spectra Gambro BCT

			1	1	Tube sealer/ BM Cobe/ Seal Safe System
			1	1	Sterile connector/ DuPont/ 312
Equipment Number	**Room Number**	**Existing to be relocated**	**2014 opinion of equip needs**	**2024 opinion of equip needs**	**Type/ Manufacturer/ Model Number**
Microbiology					
		13	13	13	Computer CPU
		13	13	13	Computer monitor/ 19" flat screen
		1	1	1	Printer label/ Datamax/ 4208
		1	1	1	Printer/ HP/ Laserjet 4000N
		1	1	1	Printer/ HP/ Laserjet 4100N
		1	1	1	Refrigerator/ Concept / CRTW1800VR-1
		1	1	1	Anaerobic System/ Spiral Biotech/Anoxomat
		1	1	1	Anaerobic System/ Spiral Biotech/Anoxomat printer
			1	1	Blood Culture System/ Biomerieux/ BacT Alert 3D controller
			4	6	ncubator module
			1	1	UPS
			1	2	computer
			1	1	printer
			2	3	Biosafety cabinet/ Microzone/ BioKlone 2 (plating)
			1	1	Biosafety cabinet/ Microzone/ BioKlone 2 (mycology)
			1	1	Biosafety cabinet/ Microzone/ BioKlone 2 (BC)
			1	1	Biosafety cabinet/ Microzone/ BioKlone 2 (parasit)
			1	1	Slide stainer/EM Diagnostic System/ Midas
		2	3	5	Vitek 2/ BioMerieux
		2	3	5	Vitek 2/ BioMerieux/ smart carrier
		2	2	2	Vitek 2/ BioMerieux/ computer
		2	2	2	Vitek 2/ BioMerieux/ printer
		2	2	2	Vitek 2/ BioMerieux/ filler sealer incubator reader
		2	3	3	Vitek 2/ BioMerieux/ Densi-cheks

Equipment Number	Room Number	Existing to be relocated	2014 opinion of equip needs	2024 opinion of equip needs	Type/ Manufacturer/ Model Number
		2	2	2	Vitek 2/ BioMerieux/ bar code reader
		2	2	2	Vitek 2/ BioMerieux/Power conditioner
		1	1	1	Refrigerator/ Danby/ Designer DAR1102W
		1	2	2	Dry Bath ncubator/ Fisher/ sotemp 147
		1	2	2	ncubator/ Fisher sotemp (one 42d one 30d)
		1	2	2	ncubator CO2 water jacketed/ Fisher/ 55D
		1	1	1	CO2 ncubator/ Forma/ 3956
		1	1	1	CO2 ncubator/Thermo Forma/ 3950
		1	1	1	Centrifuge/ Heraeus /Megafuge 2 0
		1	1	1	Centrifuge/ EC Centra-8
		1	1	1	Filtered Enclosure/ Labconco/ Paramount 6910100
		2	4	6	Microscope/ Leitz/ Laborlux S
		1	1	1	Microscope/ N kon/ Eclipse E400
		1	1	1	Microscope/ Nikon Eclipse 50i
		1	1	1	Freezer -20/ Revco/ UFP3030-A
		1	1	2	Freezer -80/ Revco Thermo/ Ultima ULT1386-9A
		1	1	1	Centrifuge/ Shandon/Cytospin 3
		1	1	1	Refrigerator triple door/ True VWR/GDM-72
		1	1	1	Heat block/ VWR/ Heat block
		1	1	1	Hot plate stirrer/ VWR/ 500
		1	1	1	ncubator diurnal low temp BOD/ VWR/Precision 818
		2	2	2	Mini Vortex/ VWR/ MV1
			1	1	Laminar Flow hood/ Nuaire/ Clean Bench 301-630 (molecular)
			1	2	Thermocycler/ Cepheid/ GeneXpert processing unit GX4
			2	2	processing block
			1	1	computer
				1	Automated Microbiology platforms - TBD
Anatomic Pathology					

		1	1	1	Computer CPU/ DC7600 (frozens)
		1	1	1	Computer monitor/ hp-e-pc 19" flat screen
Equipment Number	**Room Number**	**Existing to be relocated**	**2014 opinion of equip needs**	**2024 opinion of equip needs**	**Type/ Manufacturer/ Model Number**
		1	1	1	Printer label/ Datamax/ 4208
			1	1	Slide scanner/ Aperio/ ScanScope CS
			1	1	Slide scanner/ Aperio/ ScanScope CS monitor
		1	1	1	Cryostat/ Leica CM1850
		1	1	1	Cryostat/Reichert Jung/ Frigocut 1800
			1	1	Microscope/ Leitz/
		1	1	1	Grossing Station/ Ebco/
			4	6	Elevating Grossing Station/ Mopec/ MB600
		1	1	1	Biosafety Cabinet 6'/ Labconco/ Purifer 36214-00 B2
		1	2	2	Microscope/ Leitz/
		1	1	2	Slide printer
		1	2	3	Cassette Printer/ Leica/ PC
		6	9	11	Computer CPU
		6	9	11	Computer monitor/ 19" flat screen
		2	2	3	Printer label/ Datamax/ 4208
		1	1	1	Printer/ HP/ LaserJet 2430dtn
		6	8	8	Tissue Proc/ Miles Sakura/ V P-3000 Floor
		6	8	8	UPS
		4	4	4	Embedder/ Sakura/ 4586 Tissue Tek 3 Cryo Console
		4	4	4	Dispensing
		4	4	4	Thermal console
		1	2	4	Stainer Coverslipper/ Sakura/ TissueTek Prisma Film coverslipper
		1	2	4	stainer
		1	2	4	monitor
		1	2		Coverslipper/ Hacker/ RCM3660

		8	8	10	Microtome/ Microm/ HM355S
		5	8	10	Tissue floatation bath/ TBS/ H-TFB
Equipment Number	Room Number	Existing to be relocated	2014 opinion of equip needs	2024 opinion of equip needs	Type/ Manufacturer/ Model Number
			1	1	Fume Hood/ Thermo Hamilton/ Safeaire HM54L6000B
		1	1	1	Freezer/ Frigidaire/ MFU21M36W1
		1	1	1	Refrigerator/ Frigidaire/ commercial
		1	1	1	Microscope/ Meiji/Sterioscopic ENZ
		1	1	1	Scale/ Chatillion
		1	1	2	Slide scanner/ Aperio/ ScanScope CS
		1	1	2	Slide scanner/ Aperio/ ScanScope CS monitor
		1	1	1	Balance/ Denver/ MXX-5
		1	1	1	Scales/ Mars/ MS-6
		1	1	2	Refrigerator/ sotemp Lab
		1	1	1	Refrigerator/ Frigidaire/ FRT18
		1	1	1	Filtered Enclosure/ Labconco/ Paramount 6910100
		1	1	1	Balance/ Mettler/PN 163
		1	1	1	Microscope/ Nikon/ Optiphot-2
		1	1	2	Slide Dryer/Biocare/10AF-CCS
		3	3	3	Para-Trimmer/ Shandon/
		1	1	1	Visual presenter/ Elmo/ P10s
		1	1	1	Cast Saw/ Stryker/ 848 Cast Cutter
		2	2	2	Autopsy Saw/ Stryker/ 810
		1	1	1	Paraffin Dispenser/ TBS/ H-PD
		1	1	1	Hotplate-stirrer/ Thermolyne Nuova
		1	1	2	Autostainer/ Ventana/ Nexes staining module
		1	1	2	Autostainer/ Ventana/ Nexes staining fluid module
		1	1	2	Autostainer/ Ventana/ Nexes staining monitor
		1	1	2	Autostainer/ Ventana/ Nexes staining CPU
		1	1	2	Autostainer/ Ventana/ Nexes staining Printer

		1	1	2	Autostainer/ Ventana/ Nexes staining UPS
			1	2	Autostainer/ Ventana/Benchmark Ultra
Equipment Number	**Room Number**	**Existing to be relocated**	**2014 opinion of equip needs**	**2024 opinion of equip needs**	**Type/ Manufacturer/ Model Number**
			1	2	monitor
		2	2	2	Staining System/ Ventana/ Benchmark
		2	2	2	Staining System/ Ventana/ Benchmark fluid module
		2	2	2	Staining System/ Ventana/ Benchmark cabinet module
		2	2	2	Staining System/ Ventana/ Benchmark CPU
		2	2	2	Staining System/ Ventana/ Benchmark Printer
		1	1	1	Oven forced air/ VWR/
		1	1	1	Biosafety cabinet/ Microzone/ BioKlone 2
		1	1	1	Autostainer/ Sakura/ DRS-2000
		1	1	1	Coverslipper/ Hacker/ RCM3660
		1	1	1	Refrigerator
		1	1	1	Printer/ HP/ LaserJet 2430dtn
		1	1	1	Thin prep 2000/ Cytyc
		1	1	1	Thin prep 2000/ Cytyc waste bottle
		1	1	1	Centrifuge/ Heraeus/ Multifuge 3s
		1	1	1	Vortex/ KA/ Vibrax VXR Vorlexor
		1	1	1	Vortex mixer/ VWR/
		2	2	2	Microscope/ N kon/ Eclipse E400
		2	2	2	Computer CPU/ DC7700
		2	2	2	Computer monitor/ hp-e-pc 19" flat screen
Autopsy					
		1	1	1	Computer/
		1	1	1	monitor
		1	1	1	Ref double door/ Lab-Line/ 3784
			2	2	Overhead OR light with camera mount/ Paragon Medical/ Trio
			2	2	Autopsy table elevating rotating/ Mopec/ CE210

			1	1	Cadaver lift power/ Mopec/ JD105 (2000# capacity)
			1	1	photo stand
Equipment Number	**Room Number**	**Existing to be relocated**	**2014 opinion of equip needs**	**2024 opinion of equip needs**	**Type/ Manufacturer/ Model Number**
			2	2	8 body refrigerator/ Mopec/ KA700 End opening
			1	1	Dictaphone transcriber/ Lanier/ DTP-2752

OPTION 3 - RAPID RESPONSE LABS

Equipment Number	Room Number	Existing to be relocated VJH	Existing to be relocated PRH	2014 opinion of equip needs	2024 opinion of equip needs	Type/ Manufacturer/ Model Number
Accessioning						
		3	3	3	4	Computer CPU/ DC7700 (data entry stations)
		3	3	3	4	Computer monitor/ hp-e-pc 19" flat screen
			3	3	4	Printer label/ Datamax/ 4208
Send Outs						
		1		1	1	Computer CPU/ DC7100
		1		1	1	Computer/ Dell/ monitor Viewsonic VG150
		1		1	1	Centrifuge/ Heraeus/ Megafuge 1 0
		1		1	1	Centrifuge/ StatSpin/ StatSpin Express 3 M502-22
		1		1	1	Printer/ HP/ Laserjet 4100N
		1		1	1	Refrigerator/ Frigidaire/ FRT18DRH
		1	1	1	1	Freezer/ Frigidaire/ MFU21M36W1
Blood Gases						
		1		1	1	Computer CPU/ DC7100
		1		1	1	Computer/ Dell/ monitor Viewsonic VG150
			1	1	1	Blood Gas/Radiometer ABL/ 720
			1	1	1	Blood Gas/Radiometer ABL/ 725
Chemistries						
		1	1	1	1	Computer CPU/ DC7100
		1	1	1	1	Computer/ Dell/ monitor Viewsonic VG150
		1		2	2	Chem analyzer/ Ortho/ Vitros 350
		1		2	2	PC workstation
		1		2	2	printer
		1		2	2	UPS/ Powerware/ 9120

Equipment Number	Room Number	Existing to be relocated VJH	Existing to be relocated PRH	2014 opinion of equip needs	2024 opinion of equip needs	Type/ Manufacturer/ Model Number
				2	2	Centrifuge/ Heraeus/ Megafuge 1 0
				1	1	Ref triple door/ Jordan/ FT-3-TR
		1		1	1	RO water/ Millipore/ 750g
		1	1	1	1	Osmometer/ Advanced/ 3320
		1	1	1	1	parallel printer
				2	2	Printer/ HP/ printer 4300dtn
		1		2	2	Rocker/ Coulter/ MX
				1	1	Triage Meter Plus/ Biosite
Immunology						
		1	1	2	2	mmuno Analyzer/Bayer/ Advia Centaur
		1	1	2	2	computer
		1	1	2	2	printer
Urinalysis						
		1		1	1	Computer CPU/ DC7100
		1		1	1	Computer/ Dell/ monitor Viewsonic VG150
		1		1	1	Urine Analyzer/ Bayer/ Clinitek 500
		1		1	1	Microscope/ Leitz/
				1	1	Centrifuge/ EC/ Centra CL2
				1	1	UC refrigerator/ LG/ GR-151R
Kit Testing						
		1		1	1	Heat Block/ Lab-Line/
				1	1	Rotator/ Spectroderm/ VSR-1
		1	1	1	1	Centrifuge/ Abbott/ x Series 3531
				1	1	Stirrer hot plate/ Corning/ PC320
				1	1	Rotator/ Eberbach/
				2	2	Heat block/ VWR/ VWR 3 dri-bath DB16525
Reagent Prep/ Other						

Equipment Number	Room Number	Existing to be relocated VJH	Existing to be relocated PRH	2014 opinion of equip needs	2024 opinion of equip needs	Type/ Manufacturer/ Model Number
			1	1	1	Fume hood/ Fisher/ Conserv-Air
			1	1	1	Balance/ AND/
				1	1	pH meter/ Corning/ 125
			1	1	1	Scales/ Mars/ MS-6
			1	1	1	Refrigerator / GE/
			1	2	2	Balance/ Sartorius/
Hematology						
		1	1	1	1	Computer CPU/ DC7100
		1	1	1	1	Computer/ Dell/ monitor Viewsonic VG150
		1	1	1	1	Hem Analyzer/ Beckman/ LH780
		1	1	1	1	power supply
		1	1	1	1	monitor
		1	1	1	1	printer
		1	1	1	1	Hem analyzer/ Coulter/ LH 500
		1	1	1	1	diluter
		1	1	1	1	power supply
		1	1	1	1	computer monitor
		1	1	1	1	printer
		1	1	1	1	UPS
			2	2	2	Computer CPU/ DC7100
			2	2	2	Computer/ Dell/ monitor Viewsonic VG150
		2	2	2	2	Microscope/ Olympus/ BX45
		1		1	1	Rocker/ Ames/ Mixer 4651
			1	1	1	Stainer cytocentrifuge/ Wescor/Aerospray7150
				1	1	Refrigerator triple door/ Revco/
Coagulation						
		1		1	1	Coag Analyzer/ Behnk Elektronik/ Compact

Equipment Number	Room Number	Existing to be relocated VJH	Existing to be relocated PRH	2014 opinion of equip needs	2024 opinion of equip needs	Type/ Manufacturer/ Model Number
		1		1	1	Coag Analyzer/ Behnk Elektronik/ Compact XR
		1	1	1	1	Computer CPU/ DC7100
		1	1	1	1	Computer/ Dell/ monitor Viewsonic VG150
		1	1	1	1	Freezer/ Frigidaire/ MFU21M36W1
Microbiology/ Fluids						
		1	1	1	1	Bacti- incinerator
		1	1	1	1	Computer CPU/ DC7600
		1	1	1	1	Computer monitor/ hp-e-pc 19" flat screen
				1	1	Biosafety cabinet/ Microzone/ BioKlone 2
		1	1	1	1	Microscope/ N kon/ Eclipse E400
				1	1	Slide stainer/EM Diagnostic System/ Midas
Frozen Section (PRH only)						
			1	1	1	Computer CPU/ DC7600
			1	1	1	Computer monitor/ hp-e-pc 19" flat screen
				1	1	Printer label/ Datamax/ 4208
			1	1	1	Slide scanner/ Aperio/ ScanScope CS
			1	1	1	Slide scanner/ Aperio/ ScanScope CS monitor
			1	1	1	Cryostat/ Leica CM1850
			1	1	1	Cryostat/Reichert Jung/ Frigocut 1800
			1	1	1	Microscope/ Leitz/
				1	1	Grossing Station/ Ebco/
Autopsy						
				1	1	8 body refrigerator/ Mopec/ KA700 End opening (Vernon & Penticton)
Blood Bank VJH						
		2		2	4	Computer CPU/ DC7100
		2		2	4	Computer monitor/ hp-e-pc 19" flat screen
		1		1	2	Printer label/ Datamax/ 4208

Equipment Number	Room Number	Existing to be relocated VJH	Existing to be relocated PRH	2014 opinion of equip needs	2024 opinion of equip needs	Type/ Manufacturer/ Model Number
		1		1	1	Printer/ HP/ LaserJet 3005
		2		2	2	Agglutination viewer/ Fisher BD Clay Adams/420630
		2		2	2	Centrifuge/ Clay Adams BD / Serofuge 2001
		1		1	1	Cell Washer/ Helmer/ Ultra CW
		1		1	2	Plasma Thawer/ Helmer/ DH4
		1		1	2	Platelet flatbed aggitator/ Helmer/ PF 48i
		1		1	2	BB Refrigerator/ Helmer/ iB256
		1		1	4	Gel centrifuge/ Ortho/ MTS 5150-60
		1		1	4	Gel incubator/ Ortho/ MTS DG-225
		1		1	1	Waterbath/ Fisher/ sotemp 205
		1		1	1	Centrifuge/ StatSpin/ StatSpin Express 3 M502-22
		1		1	1	Centrifuge/ Heraeus/ Clinifuge 3538
		1		1	2	Freezer/ Jewett/ HemaPro 2000 BPL 317
		2		2	2	Microscope/ Zeiss/ Standard
		1		1	1	Microscope/ Olympus/ CK2
		1		1	1	Refrigerator/ Jordon/ SPSAKT-22
Blood Bank PRH						
			2	2	2	Computer CPU/ DC7100
			2	2	2	Computer monitor/ hp-e-pc 19" flat screen
			1	1	1	Printer label/ Datamax/ 4208
			1	1	1	Printer/ HP/ LaserJet 2430dtn
			1	1	1	Printer/ HP/ Laserjet 4200N
			1	1	1	Centrifuge/ Dade Baxter/ mmufuge (B50553)
			1	1	1	Cell Washer/ Helmer/ Ultra CW
			1	1	1	Plasma Thawer/ Helmer/ DH4
			1	1	1	Microscope/ Olympus/ CK2
			1	1	1	Refrigerator double/ Revco/ REB5004A

			1	1	1	Freezer -30/ Sanyo/ MDF U536
Equipment Number	**Room Number**	**Existing to be relocated VJH**	**Existing to be relocated PRH**	**2014 opinion of equip needs**	**2024 opinion of equip needs**	**Type/ Manufacturer/ Model Number**
			1	1	1	Gel centrifuge/ Ortho/ MTS 5150-60
			1	1	1	Gel incubator/ Ortho/ MTS DG-225
			1	1	1	Platelet flatbed aggitator/ Helmer/ PF 96i

SCHEDULE 14

FACILITY SPACE REQUIREMENTS

Attached is a copy of the Facility Space Requirements referred to in this Agreement, including Schedule 1 – Statement of Requirements. For greater certainty, references to the Facility Space Requirements, including references in Schedule 1 to a data room or RFP, are deemed to be references to the attached Facility Space Requirements.

Room Number		Units	nsm/ unit	nsm	Planning Factor	CGSM	Remarks
153	Frozen Section		in AP	in AP			
154	Histology		in AP	in AP			
155	Cytology		in AP	in AP			
156	Development/ Teaching		in AP	in AP			
157	Tissue Processing		in AP	in AP			
158	Microtomes/ Embedding Stations		in AP	in AP			
159	Cytology Screening	3	4.5	13.5	1 3	17.6	3 workstations (shifted on sheet)
	Subtotal		**Subtotal**	**1,134.7**		**1475.1**	
	LABORATORY SUPPORT						
160	Walk-In Refrigerator, Reagents	1	13	13.0	1 3	16.9	2 doors - access from Core & Bld Bk
161	Walk-In Refrigerator, Media	1	9.3	9.3	1 3	12.1	2 doors - access from Micro & corridor
162	RO Water	1	5.6	5.6	1 3	7.3	Changed name from DI
164	Old Chemical Storage	1	7.4	7.4	1 3	9.6	
165	Flammable Storage	1	7.4	7.4	1 3	9.6	contains xylene storage
166	Shred Bin Storage	1	4.6	4.6	1 3	6.0	
167A	Bulk Storage Core/Blood, Wet	1	17	17.0	1 3	22.1	Split from Bulk Main
167B	Bulk Storage Micro	1	30	30.0	1 3	39.0	Split from Bulk Main
167C	Bulk Storage Histology	1	15	15.0	1 3	19.5	
167D	Storage Core/Blood, Dry	1	16	16.0	1 3	20.8	
167E	Shelled, Future Storage	1	48	48.0	1 3	62.4	
169	In -Use Lab Coat Storage		in labs	in labs			
170A	Clean Lab Coat Storage	1	2.3	2.3	1 3	3.0	Split into two rooms, 1 per floor
170B	Clean Lab Coat Storage	1	2.3	2.3	2 3	5.3	Split into two rooms, 1 per floor
171	Gas Tank Closet	1	4.6	4.6	1 3	6.0	
172	Block and Slide Storage	1	55.8	55.8	1 3	72.5	
173	Wet Tissue Storage	1	27.9	27.9	1 3	36.3	
174	Wash-Up	2	10.5	21	1 3	27.3	
175	Housekeeping	2	12	24	1 3	31.2	
176	QC/ POC Core Lab	1	15	15	1 3	19.5	
	Subtotal		**Subtotal**	**326.2**		**426.4**	
	EMPLOYEE SUPPORT						
180	Respite Room	1	8.6	8.6	1 3	11.2	
181	Toilet Rooms	7	4.5	31.5	1 3	41.0	7 toilet rooms
182	Shower	2	8.4	16.8	1 3	21.8	two rooms, toilets (1 male, 2 female)
183	Lounge	1	37.2	37.2	1 3	48.4	20 people
184	Lockers (Male)	1	17.8	17.8	1 3	23.1	70 1/2 sz lockers
185	Lockers (Female)	1	49	49.0	1 3	63.7	140 1/2 sz lockers
	Subtotal		**Subtotal**	**160.9**		**209.2**	
	AUTOPSY						
190	Autopsy Room	2	30	60.0	1 3	78.0	2 tables
191	Body Cooler	1	3	3.0	1 3	3.9	2 body cooler
192	Shower	1	8.4	8.4	1 3	10.9	
193	Autopsy Loading	1	43.5	43.5	1 3	56.6	
194	Housekeeping Closet	1	6	6.0	1 3	7.8	
195	Autopsy Prep & Workstation	1	14	14.0	1 3	18.2	
196	Autopsy Anteroom	1	23	23.0	1 3	29.9	

Clinical Support Building - Facility Space Requirements

Room Number		units	nsm/ unit	nsm	Planni ng Factor	CGSM	Remarks
	ADMINISTRATION						
100	Clinical Director Office	1	13.9	13.9	1 3	14.5	1 office
101	Pathologist Office	15	11.15	167 3	1 3	217.4	15 offices
102	Pathology Student Workstation	1	2.8	2.8	1 3	3.6	1 carrel
103	PA Coordinator Workstation	1	5.6	5.6	1 3	7.3	1 workstation
104	Multihead Scope/ Telemedicine	1	13.9	13.9	1 3	18.1	5 head scope
105	Pathology Resident Office	1	11.15	11.2	1 3	14.5	1 office
106	Workstation,Lab Assist/Receptionist	1	4.5	4.5	1 3	5.9	1 workstation/ reception desk
	Section Head Workstations					0.0	
110	Histology	1	5.6	5.6	1 3	7.3	1 workstation
111	Accessioning	1	5.6	5.6	1 3	7.3	1 workstation
112	Chemistry	1	5.6	5.6	1 3	7.3	1 workstation
113	Hematology	1	5.6	5.6	1 3	7.3	1 workstation
114	Microbiology	1	5.6	5.6	1 3	7.3	1 workstation
115	Blood Bank	1	5.6	5.6	1 3	7.3	1 workstation
116	Transcription	4	4.5	18.0	1 3	23.4	4 workstations
117	Chief Technologist Office	1	11.15	11.2	1 3	14.5	1 office
118	Student Coordinator	1	5.6	5.6	1 3	7.3	1 workstation
119	POC	2	5.6	11.2	1 3	14.6	2 workstations
120	Administrative Assistant	1	5.6	5.6	1 3	7.3	1 workstation
121	Secretary	1	5.6	5.6	1 3	7.3	1 workstation
122	Lab Manager	1	11.15	11.2	1 3	14.5	1 office
123	Administrative Director	1	13.9	13.9	1 3	18.1	1 office
124	QA Coordinator	1	5.6	5.6	1 3	7.3	1 workstation
125	Call Center	4	4.5	18.0	1 3	23.4	4 workstations
126	Mail/ Copy Room	1	10.2	10.2	1 3	13.3	
127	Conference Room	1	44.6	44.6	1 3	58.0	24 people
128	Iatrics	1	5.6	5.6	1 3	7.3	Removed from core category
	Subtotal		**Subtotal**	**418.9**		**541.0**	
	LABORATORIES						
	Core Laboratory	1	455.4	455.4	1 3	592.0	Recalc due to remove QC, POC, Iatrics
130	Specimen Processing/ Receiving		in Core	in Core			
131	Courier Drop-Off/ Send Out		in Core	in Core			
132	Chemistry/ Immunology		in Core	in Core			
133	Hematology/ Coagulation/ Urines		in Core	in Core			
134	Development/ Teaching		in Core	in Core			
135	Maintenance		in Core	in Core			Removed QC / POC from group
136	Blood Bank	1	124 9	124 9	1 3	162.4	
137	Microbiology	1	203	203.0	1 3	263 9	
138	Microbio Accessioning		in Micro	in Micro			
139	Molecular Testing		in Micro	in Micro			(PCR area)
140	Development/ Teaching		in Micro	in Micro			
141	Fluorescent Scope - Future WI Incu.	1	3.5	3.5	1 3	4.6	
142	Shelled, Future Lab	1	95	95.0	1 3	123.5	
150	Anatomic Pathology	1	239.4	239.4	1 3	311 2	
151	AP Accessioning		in AP	in AP			
152	Gross Anatomy		in AP	in AP			

Room Number		Units	nsm/ unit	nsm	Planning Factor	CGSM	Remarks
	Subtotal		**Subtotal**	**157.9**		**205.3**	
	PHLEBOTOMY - AFTER HOURS						
200	Waiting	1	8.9	8.9	1 3	11.6	3 to 4 people
201	Phlebotomy	1	20.8	20.8	1 3	27.0	1 cot, 1 chair
	Subtotal		**Subtotal**	**29.7**		**38.6**	
	PHLEBOTOMY - OUTPATIENT						
202	Reception / Workstation	1	6	6.0	1 3	7.8	
203A	Waiting Area	1	15	15.0	1 3	19.5	
203B	Extra Waiting Area	1	10	10.0	1 3	13.0	
204	Phlebotomy Cubicle	4	6	24.0	1 3	31.2	
205	Phlebotomy / ECG	1	9	9.0	1 3	11.7	
206	Work Area	1	7	7.0	1 3	9.1	
207	Toilet Rooms - Patient	1	5.5	5.5	1 3	7.2	pass-thru window
208	Toilet Rooms - Staff	1	4.3	4.3	1 3	5.6	
209	Shelled, Future Lab	1	40	40	1 3	52.0	
	Subtotal		**Subtotal**	**120.8**		**157.0**	
	CLINICAL OFFICES						
210	Office - Standard	35	11.15	390 3	1 3	507.3	
211	Exam Room - Standard	24	10	240.0	1 3	312.0	
212	Staff Lunch Room	1	25	25.0	1 3	32.5	
213	Meeting Room	1	15	15.0	1 3	19.5	
214	Reception	1	8	8.0	1 3	10.4	
215	Toilet Rooms - Staff	5	4	20.0	1 3	26.0	
216	Toilet Rooms - Patient	4	4	16.0	1 3	20.8	
217A	Storage	1	19.5	19.5	1 3	25.4	
217B	Storage	1	6.2	6.2	1 3	8.1	
218	General Workstations	6	5	30.0	1 3	39.0	
219	M.O A.	3	4	12.0	1 3	15.6	
220	Waiting Area	3	12	36.0	1 3	46.8	
221	Clean Utility	1	8.7	8.7	1 3	11.3	
222	Soiled Utility	1	8.7	8.7	1 3	11.3	
	Subtotal		**Subtotal**	**835.4**		**1086.0**	
	TOTAL PROGRAMMED SPACE			**3,184.5**		**4138.5**	

Note; building net to gross to include stairs, elevators, columns, shafts, emergency generator, mechanical rooms, electrical and telecommunication closets

SCHEDULE 15

SWISSLOG PNEUMATIC TUBE SYSTEM STATEMENT OF WORK – CSB

swisslog Pneumatic Tube System Statement of Work – CSB

Background

This Statement of Work is not an exhaustive summary of terms and conditions in which swisslog will carry out its work. The Design Builder will develop a final agreement in which swisslog is engaged to undertake the work defined below. The purpose of this document is to provide guidance to Proponents of the Clinical Support Building RFP as to the scope of swisslog's responsibilities as it pertains to the cash allowance provided under the Design Build Agreement.

Objective

To have a functioning pneumatic tube system – designed to operate in a modern healthcare facility – within the Clinical Support Building that is linked to the Centennial Building pneumatic tube infrastructure.

Cash Allowance Value

For the swisslog work defined herein, the cash allowance is $240,000, plus tax.

Business and Technical Environment

The work will be completed under the direction of the Design Builder of the Clinical Support Building and in consultation with the Authority and swisslog to develop the final design. The location and performance requirements of the tube stations will be determined through the Design Builder's design process. It is anticipated the work will be undertaken during construction and will be fully operational prior to final building commissioning. Access and linkages to the Centennial Building will need to be coordinated with the Authority.

Description and Scope of Work

swisslog has provided a cost estimate for the materials and labour to supply and install the pneumatic tube system in the Clinical Support Building and tie-in to the pneumatic tube infrastructure in the Centennial Building. This estimate was based on the Indicative Design posted in the Data Room.
swisslog will provide the following as part of its installation:

- Shipment of all required materials
- Installation of the pipe
- Installation of station housings and motors
- Installation of transfer unit
- Installation includes any tubes, anchors, rods and supports, hoisting pipe and seismic support required
- Provision of Shop Drawings to Design Builder
- Commissioning of Pneumatic Tube System (provided that power to the stations and transfer unit is installed inside the station as per shop drawings to the swisslog supplied outlet and provided data jacks are provided and installed for the equipment)

The DB is responsible within their base bid price for any costs associated with the installation of the complete system as described above that is not included as a swisslog requirement in the list above.

Deliverables

swisslog will supply materials and labour to tie-in to the Centennial Building pneumatic tube infrastructure and install: 3 tubes from the Centennial Building going into the Clinical Support Building to five stations, three on floor 3 and one on each of the other floors of the Building (one Ultrastation, three recessed stations and one four-port transfer unit).
Cash allowance includes supply of 20 carriers (4 per standard recessed station and 8 for Ultrastation).

Approach and Methodology

The Design Builder will include swisslog in its construction schedule development and swisslog will work on the Site as a subtrade of the Design Builder.
The Authority will provide the cash allowance to the Design Builder and expect a full reconciliation of the actual payments made to swisslog. Any increase to the costs will require prior approval of the Authority. Any reduction in costs will return to the Authority. The final work of swisslog will be encompassed within the final building commissioning responsibility of the Design Builder under the Design Build Agreement.