Attachment 1
Council Report Attachment

York Regional Biotechnology Cluster Consortium (YRBCC) Regional Innovation Network Summary

THE BCIP PROCESS

In response to the Biotechnology Cluster Innovation Program (BCIP) process, the York Regional Biotechnology Cluster Consortium (YRBCC) was formed, under the leadership of the four founding partners. They were: York University the Regional Municipality of York, the Town of Markham, and the National Research Council. The consortium brings together companies (MNEs and SMEs), government organizations, research and education institutions, hospitals, and strategically important 4th pillar associations spread over a large geographic area. The area extends from the north-central portion of the GTA, through York Region into southern Simcoe County.

During the first Phase of BCIP, the consortium has outlined an innovation profile for the region, completed a SWOT analysis and prepared a plan to establish a Regional Innovation Network (RIN) within parameters set by Ontario's Ministry of Economic Development and Trade (MEDT). During the next four years, supported by BCIP funds matched by contributions from participating affiliates, the cluster will evolve in response to needs and opportunities identified by affiliates. The ultimate 5-year goal for YRBCC is to develop as a strategy-driven entity that provides leadership, direction, and facilitates initiatives that add value for an increasing number of affiliates.

REGIONAL STRENGTHS AND ASSETS

As outlined in the YRBCC innovation profile, the cluster's region has a vast array of assets and resources that if properly harnessed can lead to increased economic development and commercial success in the biotechnology sector.

Convergent Microclimate

- YRBC is home to a significant number of Canadian companies (MNEs and MNEs) in the area of biotechnology:
    - Pharmaceuticals (~20 companies)
    - Medical and assistive technologies, including medical and assistive devices, imaging and diagnostics (~100 companies)
    - Information and communications technologies - ICT (~700 companies).

- The proximity between these companies creates an environment for converging technologies to develop innovative products (e.g., bioinformatics, imaging and other e-health platforms).

- The cluster has a strong manufacturing sector (21% of total YRBC work by industry is in manufacturing).
- A vibrant entrepreneurial culture is demonstrated through predominance of SMEs in the cluster.

YRBC Research and Manufacturing Collaborations Build Success

- Top biopharmaceutical companies spend comparable amount for R&D as Quebec companies (~$280 million annually).
- Many of the CT companies have links to global Life Science initiatives, e.g., IBM Software Laboratory (world's largest) employs ~2500 research-related personnel (~$250 million annually).
- Sunnybrook and Women's College Health Sciences Centre (SWCHSC) is world renowned for bio-medical research (~73 million annually).
- There is a promising core of faculty members and graduate students involved in health sciences research and innovative programs at York University, Seneca College, and Georgian College ($21 million + annually).
- There is significant research on Medical and Assistive Technologies by global leaders such as MDS Sciex and Ontario Rehabilitation Technology Consortium (ORTC) (~$140 million annually).
- There is a collaborative research environment being developed as shown by several key partnerships, for example:
  - MDS Sciex-York University (Centre for Research in Mass Spectrometry at York University and MDS sponsorship of the University's Industrial Research Chair in analytical mass spectrometry).
  - SWCHSC and Phillips Medical Systems (imaging).
  - York University and IBM in computing science and software development.
  - Aventis Pasteur and SWCHSC partnering in the Cancer Vaccine Program initiated by Aventis.
- York University and hospitals in the region are partnering in a Health Research Network (HRN).

Numerous Regional Assets Fuel Economic Development

- Over 6,250 net acres of strategically-located land is available for industrialization at comparatively favourable prices.
- The cluster is a highly accessible location near the US market with extensive transportation and telecommunications infrastructure.
- Municipal governments provide strong leadership and support for economic development.

- Several organizations provide a range of business support services to support growth of companies, especially SMEs in the region (e.g. AOMM, ISCM, YTA).
- Some research facilities, e.g., wet lab and other specialized spaces, exist at various public institutions engaged in research e.g., York University, Georgian College's Industrial Research and Development Institutes, and Sunnybrook and Women's College Health Science Centre (SWCHSC).
- There is a favourable tax environment and real estate prices.
- Quality of life for prospective workers is very high – multicultural environment, fine housing and attractive physical environment.
- Excellent schools and hospitals exist throughout the cluster...

Human resources

- The cluster includes a highly diverse human resource base in terms of ethnicity, culture, and language.
- There are concentrations of employees and relatively high location quotients for related industries:
  - Over 20,100 employees in ICT sector with a location quotient of 1.65.
  - Over 880 people employed in pharmaceutical and medicine manufacturing.
  - Strong location quotient factors by occupation for natural and applied sciences, and management (1.17 and 1.34, respectively).
  - Strong location quotient factors by industry for finance and real estate sectors (1.36).
- Ready access to education and training programs for career and skill development related to biotechnology, business development and management.

NEEDS IDENTIFIED THROUGH PRIMARY RESEARCH

Through several stakeholder consultations involving representatives from academia, industry (SMEs, MNEs, and associations), local government, government organizations, and hospitals, some fundamental and common needs have become apparent to achieve common goals and growth.

Networking People

Although there are several existing mechanisms for connecting people including several 4th pillar associations in the region, all stakeholders expressed the need for enhanced networking, both face-to-face and virtual, in the cluster. Companies (SMEs and MNEs) have expressed their desire to interact more closely with researchers at universities, hospitals, and at other companies. In addition, industry association groups want to bridge the gap between them and draw upon their membership's strengths. Hospitals have also expressed their need to establish networks among themselves, as well as with government bodies, universities, and companies.

Fostering and Branding Innovation

All stakeholders in the YRBC expressed the need to raise the innovative profile of the region not only locally but also at national and international levels to foster awareness of the clusters unique strengths and economic opportunities. These efforts will leverage internal and external resources and attract leading companies, researchers and investors to the YRBC.

Mechanisms to Support Growth of Businesses

Although there are several existing services, their impact might be enhanced by aligning them with the needs of the biotechnology industry in the region and helping to make them more accessible. The cluster can act as a catalyst to bring together and reinforcing needed resources to grow and retain the numerous SMEs in the region, attract a greater number of MNEs, and develop SMEs into MNEs. Stakeholders identified several needs such as: increased access to business development support mechanisms (similar to those provided currently at the ISCM); linkages to financing opportunities; and education and training in management and business strategies.

Knowledge Exchange and Technology Transfer

Both researchers and entrepreneurs expressed the need for enhanced access to information and collective intelligence about the latest developments in bioscience and technology – who is doing what, where and with whom – that would help them with their work. Companies have expressed their desire to interact with researchers at universities, hospitals, and at other companies to exchange knowledge that will help them to develop new products and markets. On the other hand, postsecondary researchers are looking for more contact and exchange of information from the business world that will help them to commercialize their discoveries.

Supportive Life Sciences Infrastructure

SMEs in particular need economical means to access specialized equipment and other infrastructure for R&D. Academic stakeholders in the region, as well as the hospitals also raised this need. Finding ways to develop and share incubator facilities, specialized laboratory space, prototyping facilities, and other key infrastructure would contribute greatly to many research-intensive groups in the YRBC and translate into increased receptor capacity and growth of the cluster. This access would be enhanced by broadband connections creating a networked infrastructure (or virtual research park).

Opportunities for Collaborative Research and Innovation Projects

Members from the four sectors of YRBC expressed interest in collaborative development and implementation of projects that would leverage YRBC resources and sources of external funding from sources such as the federal and provincial governments. This collaboration would cut across sectors converging strengths in various technologies and make use of a blended collaborative environment featuring both face-to-face and real time online interaction through the virtual broadband network connecting various facilities in the cluster.

UNIQUE DIFFERENTIATORS OF YRBC

YRBC has several unique features that differentiate it from many other global clusters, including:

A unique convergent industry "micro-climate

This is an environment in which to focus on convergence of health technologies across biopharmaceutical, medical and assistive technologies (including medical devices, assistive devices, imaging and diagnostics) and ICT companies. We will also look for linkages with related manufacturing industries, such as auto and plastics.

Strong focus on growth of companies (especially SMEs)

The YRBC region is home to several hundred biotechnology-related SMEs that need support to develop innovative products and to become globally competitive. The Innovation Synergy Centre in Markham (ISCM) provides a useful model that can be adapted to provide better access to knowledge and services that companies need for growth. The YRBC is also committed to attracting new companies looking for an environment in which they can grow and prosper to build a critical mass for biotechnology in the area.

Ability to mobilize regional partners and resources quickly

This is evidenced by the rapid formation of this consortium where none existed, the development of collaborative working relationships and the commitment of matching funding from a broad base of affiliates to provide $2 million in financing and in-kind support for the next BCIP financing phase.

YRBCC's responsiveness to the industry's continual evolving needs

This consortium is dedicated to identifying and evaluating new emerging needs of affiliates. Over the next months the consortium will continue to work with affiliates to refine our understanding nature and the needs of biotechnology sub-sectors. For example, within Medical and Assistive Technologies, we need to differentiate the needs of companies producing medical devices, assistive technologies and others and design appropriate support measures for them.

Arm's length catalysis role

YRBCC will seek to reinforce and align rather than duplicate services from existing organizations. The consortium will invest energy to support the development and launch of strategic initiatives (e.g. development of infrastructure but the ownership of these initiatives will reside within specific partnerships.)

A thorough inventory of the region's significant life sciences assets

The inventory will allow the YRBCC to build on its existing asset base in an informed, knowledgeable and strategic manner. This bottom-up approach is combined with top-down strategic objectives for full understanding of YRBCC's competitive positioning.

Collaborative research and education

YRBC affiliates are engaged in several research partnerships (see strengths above) that can serve as models for future collaboration. The consortium will work with educational affiliates to build on the solid program base to provide education and training focused on needs of the cluster.

A VISION FOR CONVERGENCE

The YRBCC has created an overall vision of convergence between health technologies and related sectors of the YRBC (biopharmaceuticals, ICT, and medical and assistive technologies). This theme of convergence provides a framework for regional collaboration that will increase and strengthen the linkages between the cluster's main stakeholder groups in the community in several ways:

- Convergence between companies in the key commercial sectors in the cluster (biopharmaceuticals, ICT, and medical and assistive technologies).
- Convergence between research and innovation activities in post-secondary institutions, hospitals and industry.
- Convergence in the development and use of shared infrastructure and networking systems.
- Convergence in marketing and branding ideology.

Vision Statement

The vision of the YRBCC is to lead in the convergence of regional strengths and research and innovation strategies to promote the economic success of its partners and the YRBCC community and growth towards global competitiveness.

The guiding principle underlying YRBCC's vision is that the convergence of the various life sciences sectors and economic, research and government constituents requires strategic direction and the development of trust and relationships that facilitate timely exchange of knowledge, partnership and collaboration. Therefore the requisite emphasis for YRBCC is on creating strategies and facilitating and catalyzing partnerships within and outside its affiliate base.

The Regional Innovation Network - YRBCC

In order to realize its vision of convergence, the cluster will be served by its regional innovation network YRBCC.

The mission of YRBCC is to be a strategic catalyst that will support growth and convergence in the cluster's life sciences industry, focusing on:

- Promoting the economic success of its partners and community through creating partnerships between sectors (ICT, biopharmaceuticals and medical and assistive technologies) and constituents (academic, government, industry, medical and 4th pillar organizations) that will enable SMEs to grow and MNEs to grow and flourish.
- Focusing on regional economic development through attraction, retention and growth of biotechnology companies and other investments in the region.
- Continually identifying the evolving needs of the industry and creating innovative strategies to fulfill these needs.

THE VALUE PROPOSITION FOR AFFILIATES

YRBCC will focus on creating strategies that drive initiatives, which will provide value to all affiliates. Sustained growth, capacity building and economic development through convergence, collaboration and innovation is YRBC's core value proposition for its affiliates. By creating a dynamic and sustainable cluster, YRBC will catalyze, facilitate and support activities among its affiliates that:

- Promote convergence by increasing multi-directional communication and awareness of activities, products and services across sectors.
- Increase opportunities for innovative product development through continuous links to the research and innovation pipeline from early-stage companies, MNEs, academic centres and hospitals.
- Facilitate knowledge exchange and commercialization of new discoveries along the value chain from discovery to product development and patenting.
- Support the growth of companies by increasing awareness and access to the wide range of services available from affiliates in the cluster, reinforcing and building capacity where necessary.
- Reinforce and increase awareness of relevant support services that are already provided by organizations in the cluster, e.g. AOMM, ISCM, HTX.
- Catalyze the development and sharing of infrastructure and facilities needed by companies and researchers to develop innovative products.
- Reduce costs by leveraging existing facilities and services – any services provided by the cluster would complement but not compete with or duplicate existing services.
- Identify and expand partnering opportunities for collaborative research and development projects that bring new resources to the cluster.
- Seek ongoing input from affiliates to align YRBCC's strategic directions with their needs to continue to drive growth among affiliates.
- Engage all three levels of government (municipal, provincial, and federal) to play a supportive role for the industry.
- Support efforts to prepare the next generation of life sciences researchers and entrepreneurs ensuring a well-educated talent pool in the cluster.

- Enhance ability to deliver improved quality of health care through access to local innovation, products and services.
- Increase access to current information regarding research and innovation activities, equipment, services, and facilities and specialty products within and beyond YRBCC.
- Enhance opportunities for affiliates to participate in clinical trials.
- Raise the region's innovation profile and increase potential for attracting and retaining biotechnology companies.

EVOLUTION OF YRBC

Organizational Principles

The organizational model envisioned for the YRBCC is a regional strategic catalyst that links together affiliates to providing strategic leadership and support to the life sciences industry in an integrated fashion and by presenting "one voice" to other regional and international players.

YRBCC will develop as a strategic, capacity building organization that brokers and builds networks for exchanges of knowledge and services among its affiliates. YRBCC will be an organization that is flexible and nimble and focused on maximizing its facilitative capacity. One of YRBCC's functions will be to identify and bring in specialized resources as they are required to carry out the strategic initiatives of the cluster.

The ultimate 5-year goal is for YRBCC to continue as a strategy-driven organization that provides strategic direction, valuable initiatives and services for its affiliates and to become sustainable through sponsorships and other revenues from value-added events and services.

Governance

Board of Directors

The YRBCC will be incorporated as a not-for-profit entity with a Board of Directors that reflects the partnership constituency of the regions and sectors. Incorporation will also entail specified processes for electing Directors as well as transparency and accountability to YRBCC affiliates[1]. As the YRBCC enters the next phase of incorporation, the Steering Committee would evolve into a new Board of Directors to provide continued leadership. The Steering Committee will consult with the YRBCC affiliates to determine the appropriate numbers and representation on the new Board. The primary role of the Board will be to provide leadership and strategic direction, to oversee and be accountable for YRBCC activities.

[1] The process will be especially sensitive to the difficulties presented by current legislation affecting municipalities, a key sector of the cluster.

Small and adaptive organizational team:

The proposed team consists of a full-time Executive Director and Operations Assistant who support general organizational operations, administrative and operational activities related to initiative development. This small and adaptive team would be empowered to second or contract any required services to allow YRBCC to function as directed by the Board. This YRBCC team will be expected to have skill sets and experience that demonstrate strategic thinking, facilitation, and networking. As YRBCC evolves, the team will also develop to meet growing and emerging industry and affiliate needs.
The YRBCC team will look to YRBCC affiliates to provide many of the additional personnel resources, to accomplish goals and objectives approved by the Board. Where necessary, YRBCC will explore and develop a “secondment” model as a strategy to leverage existing strengths and minimize administrative and staff costs. In this inclusive and value-added model, key experts will be seconded from affiliate organizations to assist in strategy and program development.

YRBC Initiatives

In its initial stage of development (2004 – 2009) YRBCC proposes to focus on the following major areas of activity.

Networking YRBC Resources

YRBCC has a vast number of resources available through its partners, yet they have not been systematically inventoried. A comprehensive inventory, built from existing information sources, of resources in the following areas will be an important first step.

- ***Infrastructure Resources*** **–** Identification of equipment and facilities that are available for use by the partners.
- ***R&D and Business Resources*** **–** Identification of the R&D projects ongoing in public and private sector organizations, and identification of the business resources available to move them forward.

Once the resources have been identified, the YRBCC affiliates will use an informatics toolkit to keep their data current and accurate.

Partnership Facilitation Exchange

YRBCC will facilitate ongoing interactions with the partners to increase opportunities for exchange of ideas and initiating partnerships. Planned strategies include the following:

- ***Service Exchange:*** YRBCC will facilitate the exchange of services provided by affiliates that address partner needs. The majority of these services will come from existing organizations and reinforce and improve access to what they already do well. Any services provided directly by YRBCC will complement but not compete with or duplicate existing services.
- ***Interaction forums****:* YRBCC will provide leadership for a series of interaction forums for its affiliates (e.g., networking and showcasing events, roundtables, discussion forums and conferences) to learn about the available resources and knowledge within the cluster, and how that might be exploited by the partnership.

Virtual Initiatives

Because YRBC is spread over a large geographic area, affiliates need to explore networking through broadband technologies as a complement and supplement to face-to-face interaction. The following virtual initiatives are planned to address this need.

- ***The YRBC Storefront:*** This initiative will provide a one-stop, data-rich and searchable informational resource and will include the inventories described above. This portal will be a primary vehicle for the public at large to learn about the YRBCC, its offerings, and community news. This site will be comprised of secure and private resources and data exchanges, as well as public information resources. Initial plans to create this environment are well aligned with a future provincial initiative to build an ICT knowledge management system involving MaRS that would span the entire province.

- ***Interconnected R&I Infrastructure:*** YRBCC will leverage the new and existing infrastructure assets by connecting them using broadband technologies. This distributed or virtual research park will link infrastructure at academic institutions, companies, government agencies and hospitals, as well as the supportive structure that resides in stand-alone business advisory hubs such as the ISCM. For example, the current expansion of research infrastructure capacity at Sunnybrook & Women's is an important consideration in relation to this business case. The Infrastructure will connect current points of presence on the ORION and other high-speed networks including York University, Sunnybrook & Women's, ISCM, Seneca College, and Georgian College. As it develops other facilities will be added at private and public sector organizations.

- ***Virtual Convergent Research and Innovation Environment (VCRIE):*** VCRIE will provide a secure broadband environment in which partners can conduct research, product development and commercialization in real time through a spectrum of technologies that includes access grids, videoconferencing, sharing applications and high performance computing power. Initial plans to create this virtual environment add a distinct dimension to the planned provincial initiative to build an IT knowledge management system. However, based on its abundant ICT assets and advanced degree of broadband connectivity and availability, YRBC will aim to play a leading role in participating with or piloting the design of this collaborative virtual research environment.

OVERALL PERFORMANCE MEASURES TO TRACK GROWTH OF THE YRBC

The following performance measures are outlined as potential success metrics for YRBCC. YRBCC and its partnership base will determine the final prioritization of the success metrics as part of the first planning activities after formalization of the organization.

- **Science & Innovation**
  - R&D employment in the three identified strategic biotechnology sectors of biopharmaceuticals, medical and assistive devices and convergent ICT.
  - R&D funding competitiveness for bioconvergent applications of technology.
  - Number of publications per capita, focusing in on priority sectoral areas for

YRBCC.
  - Patent activity that is commercializable.
  - Technology commercialization, including in-licensing and out-licensing, number, and strategic and financial value of clinical trials, and product approvals.
  - Characterization of growth of the convergent technology industry: number of companies, R&D employment, number of products under development.
  - Increased revenues of existing companies and expansion of the product and revenue generation platforms.
  - Increased global market share of YRBCC affiliated companies.
  - Strategic alliances between companies: number and value.
  - Growth of the SMEs into large companies, as measured by R&D employment and spending and product development capacity.
  - Number of companies created.
  - Number of spin-off companies per academic institution.

- **Capital**
  - Total R&D expenditures (private and public) within the YRBC.
  - Venture capital investment (for seed, early, and late stages).
  - Key partnerships and alliances: strength of convergent alliances (number and financial value).
  - Mergers and acquisitions: number and financial value.
  - Royalties generated from license agreements and partnerships.
  - New/Greenfield investment into the region as measured by new R&D and other life sciences investment and programs from global sources, especially focusing on convergent technologies.

- **Human Resources**
  - Sector employment increase within the YRBC, emphasizing convergence.
  - Decrease in unemployment rate.
  - Expansion of human resource base, including training program capacity.

- **Business and R&D Infrastructure**
  - Amount of lab space (wet and dry) available.
  - Growth in supportive services industry, e.g. equipment and supplies vendors, contract manufacturing, etc.
  - Improved access to regional infrastructure, as measured by revenue generation for affiliated partners as well as YRBCC.
  - Improved access to information, as measured by Storefront responses/hits and use of broadband networks.
  - Improved R&D collaborations, as measured by utilization of VCRIE's virtual private network.
  - Improved brand awareness of YRBC.

Each strategic initiative will also require customized performance and success metrics in order to determine the factors that will enable the initiatives to have measurable and tangible impact.