ARTICULATION AGREEMENT
BETWEEN
SIR SANDFORD FLEMING COLLEGE
AND
HASTINGS AND PRINCE EDWARD DISTRICT SCHOOL BOARD
Effective June 2006

This document sets forth the understanding between the School of Environmental and Natural Resource Sciences (SENRS) at Sir Sandford Fleming College (Fleming College) and North Hastings Secondary School of the Hastings and Prince Edward District School Board (HPEDSB) with respect to the examination and crediting of the curriculum in the "Natural Bridges" (4 credit) enriched program offered at North Hastings Secondary School.

The curriculum assessment has been completed by SENRS faculty and the outcome of this process is the establishment of an articulation agreement between Fleming College and HPEDSB that outlines the conditions under which specific secondary school students may take advantage of this opportunity.

Students who successfully complete the enriched "Natural Bridges" Program (average grade of 70% across the program) and have completed their OSSD with the courses identified below would be awarded exemption for all first semester of courses at the SENRS. The enriched components of the Natural Bridges program are outlined in Appendix A.

Required OSSD courses:

CGR 4M Environment and Resource Management
CGO 4M Geomatics: Geotechnology in Action
CGR 4EC0/CGR4E Environment and Resource Management Co-Op Ed.
MAP 4C College and Apprenticeship Mathematics

A committee including representatives from North Hastings Secondary School (Colleen Baehre, Glen Pomerory) and SENRS (Barb Elliott, Brent Wooton) have contributed to the definition to the terms of this articulation agreement and will be responsible for ongoing communications as well as annual review.

This agreement also includes the following elements:

- Adherence to our normal admissions process to specific SENRS programs, with entrance based on availability of seats in second semester.
- Provision for an advising model for the students participating in the articulation activity
- This articulation agreement will be reviewed annually, with first date of review to be May 2007.

Both parties by signing this document are indicating their agreement and acceptance of the foregoing.

For
Sir Sandford Fleming College

June 29, 2006
Date

Signature

Rachael Donovan,
Vice President, Academic

For
Hastings and Prince Edward District School Board

July 7/06
Date

Signature

Kathy Soule
Director of Education

APPENDIX A

Additional Information Activities of 'Natural Bridges' Enriched Program

Course Assessment for Articulation Agreement

Please list the four courses eligible for assessment (name and course code):

1. CGR 4M Environment and Resource Management
2. CGO 4M Geomatics: Geotechnology in Action
3. CGR 4ECO/ CGR4E Environment and Resource Management Co-op Ed.
4. MAP 4C College and Apprenticeship Mathematics

How are these courses delivered (ie: over one semester, one year)?

The CGR4ECO/CGR4E are offered as part of a 4-credit, one-semester "Natural Bridges" program. The CGR4M, CGO4M, and MAP4C are offered as single credit, one-semester courses.

What is the grade level of courses being considered? Grade 12

How are students selected (ie: interview)?

Students are selected for the "Natural Bridges" program by application and interview. The other courses are available to all eligible students.

Course Assessment for North Hastings High School Natural Bridges Program

Ecosystem Skills

Code	Learning Outcome	Met in Course	Description of Activity	Evaluation Mechanism
ES1	Follow the prescribed lab and field health and safety guidelines in order to create a safe work environment for course activities.	CGR	WHMIS Training	Board WHMIS Quiz
		4M	Lab Safety Review	Short Answer Quiz
ES2	Record data and observations using a standardized protocol (SCAN: Specific, Complete, Accurate, Neat).	CGR	River.pond/lake study	Field and Lab Report
		4M	Timber Cruise	Woodlot Management Plan
			Lake Assessment	Report
ES3	Operate specific instruments or equipment in order to perform given tasks.	CGR	Forest mensuration: calipers, suunto, prism	Woodlot management report
		4M		Field and Lab Reports
			Water analysis: DO, pH, Secchi disk, micorscope	
ES5	In order to survey or monitor populations and habitat, identify specific examples from the following categories: - fish-rocks and minerals-trees-birds-mammals	CGR	Timber cruise/tree marking: tree ID	in-field quizzes
		4M	Lake Assessment: fish ID	in-class quiz using pictures , field report
			Birds, mammals, rocks	SSFC has provided

			and minerals - using field guides	Independent Study Units
ES6	Use a compass and Global Positioning Systems (GPS) under field conditions.	CGO 4M	Collection of field data using "Garmin Etrex" GPS units	mapping of data using DNR Garmin and Arcview
ES7	Identify specific drilling equipment and methods that can be used to address resources drilling needs in a variety of ecosystems.	N/A	SSFC Independent Study Units	SSFC has supplied multiple choice tests
ES8	Use aerial photography to identify objects and calculate scale, distance and area and to determine azimuths.	CGO 4M	lecture and practice using air photos	written test

Ecology and the Environment

Code	Learning Outcome	Met in Course	Description of Activity	Evaluation Mechanism
EE1	Apply basic knowledge of ecological principles, worldviews and the nature of science in the development of a personal perspective on humans and the environment.	CGR 4M	lecture, text reading, journal reading, summary and presentation	written summaries evaluated written test presentation
EE2	Identify landscape features and geological landforms characteristic of a given region at a basic level, under field conditions.	CGO 4M	field trip to various regional identifiable landforms	worksheet - assessed for completeness
EE3	Use introductory knowledge of earth-forming processes and geology in the identification of physiographic regions and ecosystems.	CGR 4M	very limited - touched on in biome discussion	
EE4	Apply basic knowledge of the hydrologic cycle and ecosystem processes in assessing the general impact of human activity within a given watershed.	CGR 4M	lecture and reading	included as part of unit test

EE6	Assess, at a basic level, the impact of a development issue using knowledge of ecosystem functions and interdependencies.	CGR 4M	assess possible cottage development using data from computer model	recommendations handed in as assignment
	Examine the significance of energy conservation strategies in a given environment.	CGR 4M	Discussion of energy transfer between trophic levels	part of ecology test
EE8	Assess the ways in which declining atmospheric quality could have a possible impact on human health, the environment and quality of life in the Kawartha Lakes Region (KLR) and beyond, based on data provided.	CGR 4M	lecture and discussion - more globally focussed	included as part of unit test
EE9	Given continued human population growth in the KLR and elsewhere, assess the possible impacts of this trend on ecosystem health and culture.	CGR 4M	lecture and discussion	included as part of unit test

Geospatial Techniques

Code	Learning Outcome	Met in Course	Description of Activity	Evaluation Mechanism
GT1	Design and produce an effective cartographic product (including maps, charts, figures and tables).*Apply basic design principles such as hierarchies, type placement and proper layout, accurately and consistently NOTE: Use of or introduction to Adobe Illustrator and most recent release of AutoCAD suggested.	CGO 4M	Numerous maps, charts, graphs and tables will be produced throughout course using a variety of software including Arcview, Excel, Word or Word perfect	maps, charts, tables and graphs will be assessed using a set of standard criteria provided at the beginning of the course
GT2	Select from a range of options associated with data representation in order to effectively display geographic information.	CGO 4M	as above	as above
GT3	Produce accurate survey plots using GPS and digital plotting techniques.	CGO 4M	Survey and map a section of the school property using GPS and Arcview	assessed as per standard criteria
GT4	Use GPS to record and map ecosystems in a basic GIS application.	CGO	GPS field survey to map	assessed as per

		4M	forest stands in a crown land block	standard criteria
GT5	Understand the use of Electronic Distance Measurement (EDM) to produce environmental topographic features.	CGO 4M	Guest surveyor to give demonstration Notes regarding EDM and other surveying equipment and terms	included on test relating to surveying and mapping
GT6	Use geomatics-related software for basic functions such as plotting and digital map creation.	CGO 4M	collection of field and source data to be mapped using Arcview and DNR Garmin software	assessed as per standard criteria
GT7	Use basic GIS analysis to produce new graphic and statistical information.	CGO 4M	Major term project involving the gathering of statistics, mapping these using Arcview (existing base data), analyzing the data, and researching the topic	Evaluated on the final map product as per standard criteria, as well as the written research report
GT8	Assess the application of remote sensing methods in extracting ecological and environmental data.	CGO 4M	Completion of the Canada Centre for Remote Sensing "Watching Over Our Planet" activities.	Practice followed by test for measurement and interpretation using satellite images
GT9	Assess the use of satellites in acquiring accurate positional data and in remote sensing imagery.	CGO 4M	Experimenting with GPS field work and activities using satellite images on-line	sketch maps made using GPS data collected by students and Arcview as well as activities and evaluations noted above

Environmental Leadership

Code	Learning Outcome	Met in Course	Description of Activity	Evaluation Mechanism
EL1	Assess the ways in which different occupations in the environment and natural resources industry can work together to find solutions to environmental problems.	CGR 4M and CGO 4M and CGR 4E/CO-OP	Class discussion throughout semester including forestry, mining, fish/wildlife, water/air quality careers CGO4M - career research assignment - (careers, description, work location, education required, where education obtained, salary)	Career research assignment evaluated in CGO4M NOS - wide variety of careers assessed through practical applications, including the attainment of many career-related certificates
EL2	Use the performance standards developed by the CCHREI (now ECO Canada) to help assess one's personal aptitude for a given carer path.	CHV 2OH	numerous aptitude tests and other activities are completed in the Careers course which is compulsory	part of portfolio required for completion of CHV2OH
EL3	Make an appropriate career/program choice based on an understanding of the industry sectors and the skills and performance expectations associated with each.	CGR CO-OP	numerous opportunities to observe and participate in natural resources- related career activities	
EL4	Solve simple environmental career problems in the field, by role playing the work practices of different professionals.	CGR 4M	role playing - interest groups in a fisheries issue - public meeting	evaluated on preparation and presentation of evidence and point of view in "public meeting"

EL5	Develop a personal understanding of leadership and the qualities that contribute to leadership in the environmental and natural resources field.	CGR 4M and CGO 4M	discussed throughout courses	not formally evaluated

Communicating Technical Information

Code	Learning Outcome	Met in Course	Description of Activity	Evaluation Mechanism
CT1	Apply the elements of technical style to the writing process, including memoranda and summaries.	CGR 4M	Field and lab reports for water quality analysis and forest management/timber cruise activities Precis and summaries as outlined below	Reports and precis are evaluated for content and attention to specific formats as outlined by teacher.
CT2	Research and evaluate information from a range of specialist and generalist resources including library holdings, databases, and the Internet.Elements of Performance: a. Use a computerized library system to perform searches on particular subjects; b. For a particular topic, select from and locate resources in the campus library holdings and subscription databases; c. For a particular topic, use search engines to locate the most relevant resources on the Internet; d. Assess the reliability of Internet resources based on criteria such as credibility of the author / producer, stability of the site, external review, citations, etc. e. Accurately reference all electronic resources using the author / date system; f. Understand the concept and consequences of plagiarism and take measures to avoid it in one's own work.	CGR 4M and CGO 4M	Students are required to complete 4th year English. In addition to "4C" English, students also complete a variety of research activities resulting in both written and oral final products. Prior to first research assignment a discussion and notes regarding the reliability of internet sources, appropriate	

referencing of information, and plagiarism will occur. There is a school-wide plagiarism policy in effect which is discussed and applied in all courses. A library training session is completed in Grade9 and students use the various resources of the library in many courses throughout their high school career.	please see next page
(CGR4M):	
1. Research report on an invasive species.	
2. Research report on an endangered species.	
3. Precis and presentation of a journal article that is in some way related to environment or resource management.	Reports and precis are submitted for evaluation. Summaries are not formally assessed, although information from class discussions following summaries may appear on unit tests or final exam.
4. Summaries of print sources throughout semester on a variety of topics which are then	Research reports in all

[redacted]		discussed in class.	courses must be properly referenced.

Communicating Technical Information (cont'd)

Code	Learning Outcome	Met in Course	Description of Activity	Evaluation Mechanism
CT3	Identify and correct common errors in English grammar, punctuation, and spelling.	CGR4M, CGO4M, senior English courses	All written assignments submitted for evaluation are expected to be correct with respect to spelling, grammar and punctuation.	Errors in grammar, spelling and punctuation are noted and penalized.
CT4	Present verbal and written communications to diverse audiences using appropriate media.Elements of Performance: a. Select and organize information to be presented on a given topic; b. Assess audience needs and present information at the appropriate level and according to interest; c. Select and use presentation media appropriate to audience, desired message and context.	CGR 4M and other courses	Students are required to make two formal presentations throughout the year which include both verbal and visual components. Although not a requirement, many students use power-point or similar presentation program.	Students are assessed on content, organization and effective use of visual material during presentation.

Applied Mathematics in Natural Resource Sciences

Code	Learning Outcome	Met in Course	Description of Activity	Evaluation Mechanism
AM1	Convert units in and between the metric and Imperial systems using the Unit Factor Method.	MAP	Students practise conversions between	test

		4C	metric and imperial units	
AM2	Solve for an unknown variable.	MAP 4C, CGO 4M and earlier maths	 Students practise solving for unknown variables. In CGO4M students solve map scale equations	test
AM3	Apply principles of ratio and direct and inverse proportion to calculate map scale and solve resource related problems.	MAP 4C and other maths	Students practise applying principles of ratio and direct and inverse proportion.	test
AM4	Use a Metric Ratio Scale to determine scale measurement	MAP 4C	students practice determining scale measurement	test
AM5	Organize data, use a scientific calculator to obtain common statistical parameters including mean and standard deviation and create graphics using Excel		Students use scientific calculators to obtain common statistical parameters, and create graphics using Excel	test
AM6	Calculate compass declination and azimuth	CGO 4M	Orienteering using map and compass Use of map and compass in conjunction with GPS and trail mapping	Observation of students in field
AM7	Use basic geometric principles to solve resource related problems	MAP	Students practise basic	test

		4C	geometric principles to solve problems	
AM8	Calculate the representative fraction of an air photo and make accurate measurements of ground distance and area	CGO 4M	Students practise calculating representative fractions of air photos to make accurate measurements of ground distance and area	Worksheet to be handed in
AM9	Use primary trigonometric functions to find sides and missing angles of triangles	MAP 4C	Students practise using primary trigonometric functions to find sides and missing angle of triangles	test
AM10	For a given natural resource application, calculate logarithms	MAP 4C	SSFC has provided math manual	
AM11	Use a scientific calculator to enter data in order to obtain a regression line (slope and y-intercept)and the correlation coefficient	MAP 4C	Students practise using both scientific and graphing (TI83) calculators to enter data, obtain regression line and correlation coefficient	test
AM12	Read and interpret graphs related to environmental study	CGO 4M CGR 4M MAP	A variety of graphical information is read or created and analysed in these courses.	Some graphs are handed in. Written analysis of graphical information is submitted (eg. Fisheries data) Graphs also appear on some tests for

		4C		evaluation
AM13	Use a scientific calculator in order to solve a variety of Natural Resource based mathematical problems	MAP 4C	Scientific calculators are widely used in this course	tests and assignments
AM14	Use scientific notation, significant digits and apply mathematical terminology appropriately eg. PPM	numerous curses	Practised in a variety of different courses at different grade levels	tests and assignments
AM15	Use a Dot Grid to estimate surface area.	Many earlier math courses and CGO	Students should be familiar with use of Dot Grid to estimate surface area	
		4M	Use Dot Grid to estimate areas with satellite imagery in CGO4M	

Additional Information Activities of Environmental Program

Course:	**Description of Activities** (outside of Classroom)	**Learning Outcome Met** (include code)	**Additional Evaluation**
Northern Outdoor Studies Four-credit "Natural Bridges" program	The focus of "NOS" is to give students hands-on job-related **skills and qualifications related to the Natural Resources industry**. The **certifications** obtained include: First Aid/CPR, ORCA Canoe Tripping, PCO Chainsaw and Clearing Saw, Firearms and Hunter Safety, Trapper and Fur Conservation, Service Excellence, Boating proficiency, Search and Rescue., Working in Bear Country Safety Training , Radio Operators Aeronautical Licence, S102 Fire Fighting Course	ES1, ES2, ES3	Attainment of certifications through standard industry or organization testing programs

	Resource Management Activities include: Lake Trout Spawning Survey, Woodlot Management, Timber Cruising, Tree Identification, Deer Harvest Survey, Deer Hunt Economic Impact Study.	ES1, ES2, ES3, ES4, ES5, EL1, EL3, EL4, EL5	Written reports, field observation and testing

Course:	**Description of Activities** (outside of Classroom)	**Learning Outcome Met** (include code)	**Additional Evaluation**
CGR4M	**Course Text:** Draper, Dianne, 2002. Our Environment: A Canadian Perspective, 2nd Edition Nelson Thomson: Scarborough NOTE: SSFC currently using Cunningham et al text: Environmental Science: A Global Concern	Material from this text is used to address aspects of the following learning outcomes: EE1, EE4, EE5, EE6, EE8, EE9 EL1, EL5	SEE TABLES ABOVE

CGR4M	**Summary of Out-of-class Activities:** (included in tables above) 1. Water Quality Analysis/ Lake Assessment : biological, chemical, physical	ES1, ES2, ES3, ES4, (ES5 - fish and other aquatic organisms), ES6 EE5, EE6, EL5 CT1	SEE TABLES ABOVE
	2. Forest Management Activities: - tree ID - timber cruising: compass, calipers, prism, suunto, increment bore - long term woodlot management planning	ES1, ES2, ES3, ES5 (trees), ES6, EE6 EL5	SEE TABLES ABOVE

Course:	**Description of Activities** (outside of Classroom)	**Learning Outcome Met** (include code)	**Additional Evaluation**
CGR4M (Continued)	3. Field Trip: sawmill/chip mill tour and sustainable logging operation tour	EL1, EL3 , EL5	evaluated along with in-class discussion of forest management on written test.)
CGO4M	Numerous field activites using GPS units to track and mark trails, landmarks and physical featuress	GT4	
MAP4C	Where MAP4C is indicated in the "Met in Course" section, the topics are covered extensively. Generally speaking they do not have specific resource management examples, however, they would be happy to use resource-related material if provided. For example - deer harvest data for graphing.		