Empire We!

Alternative Community Living in Rural Manitoba.

by

Rebekah Brubacher

A Practicum submitted to the Faculty of Graduate Studies of the University of Manitoba in partial fulfillment of the degree in

MASTER OF LANDSCAPE ARCHITECTURE

Department of Landscape Architecture

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UNIVERSITY OF MANITOBA | FACULTY OF ARCHITECTURE |

MASTERS PRACTICUM

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ABSTRACT

This practicum will use Myriad Village Marketing Cooperative Ltd. [Myriad Village] community and property in Manitoba as a framework.

Included in the work are the vision and mission of Myriad Village, the theory of ecovillages and ecovillages as precedents. Consideration for future development of Myriad Village property, will be analyzed as follows: regarding areas to implement the residential, grazing, garden and camping development, then concluding with a site design.

DEDICATION

For my mom.

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I would like to say a big thank you to my family for the continued support throughout this process. I greatly appreciate the encouragement and understanding.

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Myriad Village, thank you for the welcome, and collaboration.

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CONTENTS

p.

ABSTRACT ii

ACKNOWLEDGEMENTS iii

DEDICATION iv

COPYRIGHT v

CONTENTS iv-ix

FIGURES x-xxi

CHAPTER 1.0 INTRODUCTION: GOALS 1

CHAPTER 2.0 WHO IS MYRIAD VILLAGE? 2

2.1 MYRIAD VILLAGE BACKGROUND 3

2.2 MYRIAD VILLAGE PROPERTY 4

2.3 VISION MEETING WITH MYRIAD VILLAGE MEMBERS 7

CHAPTER 2.0 CONCLUSION 9

CHAPTER 3.0 WHAT IS AN ECOVILLAGE? 9

3.1 THEORETICAL BACKGROUND OF ECOVILLAGES 10

3.1.1 THREE CORE ELEMENTS OF AN ECOVILLAGE 10

3.1.2 HISTORICAL OVERVIEW 10

3.1.3 CO-HOUSING 11

3.1.4 EXISTING ECOVILLAGES 12

3.2 SPATIAL ELEMENTS OF AN ECOVILLAGE 17

3.2.1 ECOVILLAGE DESIGN GUIDELINES 17

3.2.2 PERMACULTURE 19
3.2.3 PASSIVHAUS SITE DESIGN 21
3.3 PRECEDENTS 24
3.3.1 RESIDENCE DESIGN INFLUENCE 24
3.3.2 DWELLING SIZE 25
3.3.3 ROW HOMES 25
CHAPTER 3.0 CONCLUSION 29

CHAPTER 4.0 SITE SURVEY 29
4.0.1 WATERSHED 30
4.0.2 SOIL 30
4.0.3 TOPOGRAPHY 33
4.0.4 SURFACE WATER DRAINAGE 34
4.0.5 HYDROLOGY 35
4.0.6 VEGETATION 36
4.0.7 INFRASTRUCTURE 38
4.0.8 WELL AND SOIL PROFILE 39
CHAPTER 4.0 CONCLUSION 41

CHAPTER 5.0 SITE CHARACTER 41
5.1 EXPERIENTIAL SITE CHARACTER MAP 48
CHAPTER 5.0 CONCLUSION 50

CHAPTER 6.0 WEATHER: SUN, SHADOW, WIND AND SNOW DRIFT STUDIES 50
6.1 SUN STUDIES 51

6.2 SHADOW STUDIES 53
6.3 WIND STUDIES 55
6.4 SNOW DRIFT STUDIES 56
6.4.1 ACROSS TERRAIN 56
6.4.2 AROUND OBJECTS 59
6.4.3 SNOW DRIFT MAP 61
6.4.4 NEXT TO A WOODLOT 62
6.4.5 SHELTERBELT DESIGN 63
CHAPTER 6.0 CONCLUSION 66

CHAPTER 7.0 SITE REGULATIONS 66
7.1 LAND AREA CONSERVATION 67
7.2 WATER PROTECTION IN MANITOBA 67
7.2.1 BUILDING 69
7.2.2 ANIMAL KEEPING 69
7.2.3 ANIMAL WASTE MANAGEMENT 70
7.2.4 RESIDENT WASTE AND GREYWATER MANAGEMENT 71
CHAPTER 7.0 CONCLUSION 72

CHAPTER 8.0 SITE ANALYSIS 72
8.1 CONFLICT MAPPING 73
8.1.1 SURFACE WATER FILTRATION 73
8.1.2 MANURE SPREADING 74
8.1.3 GRAZING 75
8.1.4 GARDEN 75

8.1.5 CAMPING 77
8.1.6 BUILDING 79
8.2 LANDUSE SUITABILITY 81
CHAPTER 8.0 CONCLUSION 84

CHAPTER 9.0 CONCLUSION FOR MYRIAD VILLAGE 84
9.1 CRITERIA FOR CONCEPTUAL IDEAS 85
9.2 HOUSING 86
9.3 CAMPING 87
9.4 TREES, GARDENS, AND GRAZING 89
9.5 TRAILS 92
CHAPTER 9.0 CONCLUSION 93

CHAPTER 10.0 IDEAS FOR MYRIAD VILLAGE 93
10.1 CRITERIA FOR SITE DESIGN 94
10.2 VILLAGE RESIDENCE 98
10.3 BIRD SANCTUARY 109
10.4 ANIMAL HAVEN 109

CHAPTER 11.0 CONCLUSION: LOOK FORWARD/ LOOKING BACK 113

BIBLIOGRAPHY 116

FIGURES

Figure 2.1 | Brubacher, R., 2017b. *Winter Landscape*. [photograph]. p. 2

Figure 2.2 | *Property location overview*. [map]. Scale 1:250,000. Data Layers: MLI: Basemap World Imagery: trn_lrs_highway_network_2016_shp [computer files]. Winnipeg, MB: Generated by Rebekah Brubacher, March 2018. Using: ArcGIS for Desktop Advanced [GIS]. Version 10.4.1. Redlands, CA: ESRI, 2015. p. 5

Figure 2.3 | *Road turn off*. [map]. Scale 1:50,000. Data Layers: MLI: Basemap World Imagery: trn_lrs_highway_network_2016_shp [computer files]. Winnipeg, MB: Generated by Rebekah Brubacher, March 2018. Using: ArcGIS for Desktop Advanced [GIS]. Version 10.4.1. Redlands, CA: ESRI, 2015. p. 5

Figure 2.4 | *Community Amenities*. [map]. Scale 1:250,000. Data Layers: MLI: 062i11_shp bdy_municipality_py_shp: bmp_20k_hyd_li_shp: bmp_20k_hyd_py_shp: [computer files]. Winnipeg, MB: Generated by Rebekah Brubacher, March 2018. Using: ArcGIS for Desktop Advanced [GIS]. Version 10.4.1. Redlands, CA: ESRI, 2015. p. 6

Figure 2.5 | Myriad Village Marketing Coop Ltd., 2018. *Vision meeting illustration*. [illustration]. p. 7

Figure 2.6 | ** *Collage of practicum design intent*. [map]. Scale 1:250,000. Data Layers: MLI: bmp_20k_hyd_li_shp: bmp_20k_hyd_py_shp [computer files]. Winnipeg, MB: Generated by Rebekah Brubacher, March 2018. Using: ArcGIS for Desktop Advanced [GIS]. Version 10.4.1. Redlands, CA: ESRI, 2015. p. 8

Figure 3.1 | Brubacher, R., 2018a. *Exploration of Ecovillages*. [illustration]. p. 10

Figure 3.2 | Brubacher, R., 2018b. *Water tower cold storage at Northern Sun farm Coop*. [photograph]. p. 15

Figure 3.3 | ** *Location of Northern Sun Farm*. Data derived from Google Earth Pro 7.3.1.4507 (64-bit), 2018. p. 16

Northern Sun Farm Coop N 49 22.424 W96 44.061, elevation 288m. Copernicus Landsat: Google Earth.

Figure 3.4 | ** *Permaculture zones*. Data derived from Jackson, H. and Svensson, K. eds., 2002. *Ecovillage Living: Restoring the Earth and Her People*. Foxhole: Green Books Ltd. p. 20

Figure 3.5 | ** *Passivhaus South sun access*. Data derived from Page, D., 2016. *PassiveDesign.org*. [online] Available at: <https://passivedesign.org/> [Accessed 27 April 2018]. p. 21

Figure 3.6 | ** *Passivhaus orientation*. Data derived from Friedman, A., 2012. *Fundamentals of Sustainable Dwellings*. [pdf] Washington: Island Press. Available through: University of Manitoba Library website <http://umanitoba.ca/libraries/> [Accessed 10 February 2018]. p. 22

Figure 3.7 | ** *Passivhaus shape ratio*. Data derived from Friedman, A., 2012. *Fundamentals of Sustainable Dwellings*. [pdf] Washington: Island Press. Available through: University of Manitoba Library website <http://umanitoba.ca/libraries/> [Accessed 10 February 2018]. p. 22

Figure 3.8 | ** *Passivhaus spacing*. Data derived from Friedman, A., 2012. *Fundamentals of Sustainable Dwellings*. [pdf] Washington: Island Press. Available through: University of Manitoba Library website <http://umanitoba.ca/libraries/> [Accessed 10 February 2018]. p. 23

Figure 3.9 | *Wohnsiedlung Oepfelbaum, Stetten, Schweiz*. *Data* Source: Bayerisches Staatsministerium des Innern, ed., 1991. Wohnmodelle Bayern 1984 - 1990 / Beispiele des sozialen Wohnungsbaus Erfahrungen aus der Vergangenheit - Wege in die Zukunft. 2nd ed. Munich: Georg D. W. Callwey, p. 24

Figure 3.10 | ** *Row home heat sharing*. Data derived from Page, D., 2016. *PassiveDesign.org*. [online] Available at: <https://passivedesign.org/> [Accessed 27 April 2018]. p. 26

Figure 3.11 | *Falkenweg onsite photograph*. Data source: Pfeifer, G. and Brauneck, P., 2008. *Row Houses: A Housing Typology*. Boston: Birkhaeuser Verlag AG. p. 27

Figure 3.12 | *Falkenweg staircase orientation*. Data Source: Pfeifer, G. and Brauneck, P., 2008. *Row Houses: A Housing Typology*. Boston: Birkhaeuser Verlag AG. p. 28

Figure 3.13 | *Falkenweg section view*. Data source: Pfeifer, G. and Brauneck, P., 2008. *Row Houses: A Housing Typology*. Boston: Birkhaeuser Verlag AG. p. 28

Figure 3.14 | *Falkenweg roof, upper floor and ground floor views*. Data Source: Pfeifer, G. and Brauneck, P., 2008. *Row Houses: A Housing Typology*. Boston: Birkhaeuser Verlag AG. . p. 28

Figure 4.1 | ** *Glacial Lake Agassiz deglaciation*. [map]. Scale Data Layers: MLI: Of_1574, GEOBASE: Canadian Geopolitical Boundaries [computer files]. Winnipeg, MB: Generated by Rebekah Brubacher, March 2018. Using: ArcGIS for Desktop Advanced [GIS]. Version 10.4.1. Redlands, CA: ESRI, 2015. p. 30

Figure 4.2 | *Willow Creek Wahtershed*. [map]. Scale 1:200,000. Data Layers: MLI: bmp_20k_hyd_li_shp, bmp_20k_hyd_py_shp, dem_090107_mn_final_dem [computer files]. Winnipeg, MB: Generated by Rebekah Brubacher, March 2018. Using: ArcGIS for Desktop Advanced [GIS]. Version 10.4.1. Redlands, CA: ESRI, 2015. p. 30

Figure 4.3 | ***Dennis Lake and Myriad Village Property*. [map]. Scale 1:25,000. Data Layers: Basemap World Imagery [computer files]. Winnipeg, MB: Generated by Rebekah Brubacher, March 2018. Using: ArcGIS for Desktop Advanced [GIS]. Version 10.4.1. Redlands, CA: ESRI, 2015. p. 31

Figure 4.4 | ***Soils*. [map]. Scale 1:3000. Data Layer: MLI: armstrong_shp [computer files]. Winnipeg, MB: Generated by Rebekah Brubacher, March 2018. Using: ArcGIS for Desktop Advanced [GIS]. Version 10.4.1. Redlands, CA: ESRI, 2015. p. 32

Figure 4.5 | Brubacher, R., 2017c. *Wet spot 1*. [photograph]. p. 33

Figure 4.6 | Brubacher, R., 2017d. *Wet spot 2*. [photograph]. p. 33

Figure 4.7 | Brubacher, R., 2017e. *Wet spot 3*. [photograph]. p. 33

Figure 4.8 |	Brubacher, R., 2017f. *Wet spot 4*. [photograph].	p. 33
Figure 4.9 |	** *Topography* [map]. Scale 1:3000. Data Layers: MLI: Basemap World Imagery, contours_25cm_smooth25m, Projection: UTM Zone 14N (from *cdem_062I)*[computer files]. Winnipeg, MB: Generated by Rebekah Brubacher, March 2018. Using: ArcGIS for Desktop Advanced [GIS]. Version 10.4.1. Redlands, CA: ESRI, 2015.	p. 33
Figure 4.10 |	** *Surface Water Drainage*. [map]. Scale 1:3000. Data Layers: MLI: Basemap World Imagery, contours_25cm_smooth25m, Projection: UTM Zone 14N (from cdem_062I), b154_mb.shp [computer files]. Winnipeg, MB: Generated by Rebekah Brubacher, March 2018. Using: ArcGIS for Desktop Advanced [GIS]. Version 10.4.1. Redlands, CA: ESRI, 2015.	p. 35
Figure 4.11 |	Brubacher, R., 2017g. *Hyrdology 1*. [photograph].	p. 36
Figure 4.12 |	Brubacher, R., 2017h. *Hyrdology 2*. [photograph].	p. 36
Figure 4.13 |	Brubacher, R., 2017i. *Hyrdology 3*. [photograph].	p. 36
Figure 4.14 |	Brubacher, R., 2017j. *Hyrdology 4*. [photograph].	p. 36
Figure 4.15 |	Brubacher, R., 2017k. *Hyrdology 5*. [photograph].	p. 36
Figure 4.16 |	*Hydrology*. [map]. Scale 1:3000. Data Layers: MLI: Basemap World Imagery, bmp_20k_hyd_py_shp, contours_25cm_smooth25m, Projection: UTM Zone 14N (from cdem_062I) [computer files]. Winnipeg, MB: Generated by Rebekah Brubacher, March 2018. Using: ArcGIS for Desktop Advanced [GIS]. Version 10.4.1. Redlands, CA: ESRI, 2015.	p. 36
Figure 4.17 |	** *Vegetation*. [map]. Scale 1:3000. Data Layers: MLI: Basemap World Imagery, contours_25cm_smooth25m, Projection: UTM Zone 14N (from cdem_062I) [computer files]. Winnipeg, MB: Generated by Rebekah Brubacher, March 2018. Using: ArcGIS for Desktop Advanced [GIS]. Version 10.4.1. Redlands, CA: ESRI, 2015.	p. 37

Figure 4.18 | ** *Infrastructure.* [map]. Scale 1:3000. Data Layers: MLI: contours_25cm_smooth25m, Projection: UTM Zone 14N (from cdem_062I) [computer files]. Winnipeg, MB: Generated by Rebekah Brubacher, March 2018. Using: ArcGIS for Desktop Advanced [GIS]. Version 10.4.1. Redlands, CA: ESRI, 2015. p. 39

Figure 4.19 | ** *Location of the domestic well.* [map]. Scale 1:3000. Data Layers: MLI: contours_25cm_smooth25m, Projection: UTM Zone 14N (from cdem_062I) [computer files]. Winnipeg, MB: Generated by Rebekah Brubacher, March 2018. Using: ArcGIS for Desktop Advanced [GIS]. Version 10.4.1. Redlands, CA: ESRI, 2015. p. 40

Figure 4.20 | ** *Illustration of existing domestic well.* [illustration]. Data derived from Myriad Village computer files. Used with permission. p. 40

Figure 5.1 | ** *Site character map.* [illustration]. Data derived from Myriad Village computer files. Used with permission. p. 42

Figure 5.2 | ** *Site Character A - Map.* [map]. Scale 1:3000. Data Layers: MLI: bmp_20k_hyd_py_shp, contours_25cm_smooth25m, Projection: UTM Zone 14N (from cdem_062I) [computer files]. Winnipeg, MB: Generated by Rebekah Brubacher, March 2018. Using: ArcGIS for Desktop Advanced [GIS]. Version 10.4.1. Redlands, CA: ESRI, 2015. p. 43

Figure 5.3 | Brubacher, R., 2017l. *Site Character A.* [photograph]. p. 43

Figure 5.4 | ** *Site Character B - Map.* [map]. Scale 1:3000. Data Layers: MLI: bmp_20k_hyd_py_shp, contours_25cm_smooth25m, Projection: UTM Zone 14N (from cdem_062I) [computer files]. Winnipeg, MB: Generated by Rebekah Brubacher, March 2018. Using: ArcGIS for Desktop Advanced [GIS]. Version 10.4.1. Redlands, CA: ESRI, 2015. p. 44

Figure 5.5 | Brubacher, R., 2017m. *Site Character B.* [photograph]. p. 44

Figure 5.6 | ** *Site Character C - Concept Map.* [map]. Scale 1:3000. Data Layers: MLI: bmp_20k_hyd_py_shp, contours_25cm_smooth25m, Projection: UTM Zone 14N (from cdem_062I) [computer files]. Winnipeg, p. 45

MB: Generated by Rebekah Brubacher, March 2018. Using: ArcGIS for Desktop Advanced [GIS]. Version 10.4.1. Redlands, CA: ESRI, 2015.

Figure 5.7 | Brubacher, R., 2017n. *Site Character C*. [photograph]. p. 45

Figure 5.8 | ** *Site Character D - Map*. [map]. Scale 1:3000. Data Layers: MLI: bmp_20k_hyd_py_shp, contours_25cm_smooth25m, Projection: UTM Zone 14N (from cdem_062l) [computer files]. Winnipeg, MB: Generated by Rebekah Brubacher, March 2018. Using: ArcGIS for Desktop Advanced [GIS]. Version 10.4.1. Redlands, CA: ESRI, 2015. p. 46

Figure 5.9 | Brubacher, R., 2017o. *Site Character D*. [photograph]. p. 46

Figure 5.10 | ** *Site Character E - Map*. [map]. Scale 1:3000. Data Layers: MLI: bmp_20k_hyd_py_shp, contours_25cm_smooth25m, Projection: UTM Zone 14N (from cdem_062l) [computer files]. Winnipeg, MB: Generated by Rebekah Brubacher, March 2018. Using: ArcGIS for Desktop Advanced [GIS]. Version 10.4.1. Redlands, CA: ESRI, 2015. p. 47

Figure 5.11 | Brubacher, R., 2017p. *Site Character E*. [photograph]. p. 47

Figure 5.12 | Brubacher, R., 2018c. *Experiential Site Character Map*. [illustration]. p. 49

Figure 6.1 | ** *Sun Studies*. [illustration]. Data derived from Sun Earth Tools, 2018. *Sun Position at Longtitude: 50.5728259, -97.3191452 50 34 22.173 N , Lattitude: 97 19 8.923 W.* [online interface] Available at: <https://www.sunearthtools.com/dp/tools/pos_sun.php?lang=en> [Accessed 02 February 2018]. pp. 51 & 52

Figure 6.2 | ** *Shadow Studies*. [illustration]. Data derived from Austen, M., 2018. *How to Determine the Length of a Shadow*. [online] Available at: <https://sciencing.com/determine-length-shadow-8767657.html> [Accessed 27 April 2018] and Sun Earth Tools, 2018. *Sun Position at Longtitude: 50.5728259, -97.3191452 50 34 22.173 N , Lattitude: 97 19 8.923 W.* [online interface] Available at: <https://www.sunearthtools.com/dp/tools/pos_sun.php?lang=en> [Accessed 02 February 2018]. p. 54

Figure 6.3 |	** *Wind Studies*. [illustration]. Data derived from Windfinder, 2018. *Wind Statistics: Gimli Airport*. [online] Available at: ‚https://www.windfinder.com/windstatistics/gimli--industrial-park-airport> [Accessed 27 April 2018].	p. 55
Figure 6.4 |	** *North Wind*. [map]. Scale 1:3000. Data Layers: MLI: bmp_20k_hyd_py_shp, contours_25cm_ smooth25m, Projection: UTM Zone 14N (from cdem_062l) [computer files]. Winnipeg, MB: Generated by Rebekah Brubacher, March 2018. Using: ArcGIS for Desktop Advanced [GIS]. Version 10.4.1. Redlands, CA: ESRI, 2015.	p. 56
Figure 6.5 |	** *South Wind*. [map]. Scale 1:3000. Data Layers: MLI: bmp_20k_hyd_py_shp, contours_25cm_ smooth25m, Projection: UTM Zone 14N (from cdem_062l) [computer files]. Winnipeg, MB: Generated by Rebekah Brubacher, March 2018. Using: ArcGIS for Desktop Advanced [GIS]. Version 10.4.1. Redlands, CA: ESRI, 2015.	p. 56
Figure 6.6 |	** *Depressions and other rough terrain*. [illustration]. Data derived from Brown, G.Z. and Dekay, M., 2001. *Sun, Wind and Light: Architectural Design Strategies*. 2nd ed. New York: John Wiley and Sons, Inc.	p. 57
Figure 6.7 |	** *Drops, Slopes, Cliffs, Edge of Dugout*. [illustration]. Data derived from Brown, G.Z. and Dekay, M., 2001. *Sun, Wind and Light: Architectural Design Strategies*. 2nd ed. New York: John Wiley and Sons, Inc..	p. 57
Figure 6.8 |	** *Crater, Road Eg, Tire tracks in snow*. [illustration]. Data derived from Brown, G.Z. and Dekay, M., 2001. *Sun, Wind and Light: Architectural Design Strategies*. 2nd ed. New York: John Wiley and Sons, Inc.	p. 57
Figure 6.9 |	Brubacher, R., 2018d. *Snow drift depression*. [photograph].	p. 58
Figure 6.10 |	Brubacher, R., 2018e. *Snow drift slope*. [photograph].	p. 58
Figure 6.11 |	Brubacher, R., 2018f. *Snow drift crater*. [photograph].	p. 58

Figure 6.12 |	****Snow drifts locations*. [map]. Scale 1:3000. Data Layers: MLI: bmp_20k_hyd_py_shp, contours_25cm_smooth25m, Projection: UTM Zone 14N (from cdem_062l) [computer files]. Winnipeg, MB: Generated by Rebekah Brubacher, March 2018. Using: ArcGIS for Desktop Advanced [GIS]. Version 10.4.1. Redlands, CA: ESRI, 2015.	p. 58
Figure 6.13 |	** *Snow difts - Around a solid object*. [illustration]. Data derived from Agriculture Canada, 1978. *Snow and Wind Control*. Ottawa: Agriculture Canada.	p. 59
Figure 6.14 |	** *Snow drifts - Around a permeable object*. [illustration]. Data derived from Agriculture Canada, 1978. *Snow and Wind Control*. Ottawa: Agriculture Canada.	p. 60
Figure 6.15 |	***Experiential Snow Drift Map.* [map]. Scale 1:3000. Data Layers: MLI: bmp_20k_hyd_py_shp, contours_25cm_smooth25m, Projection: UTM Zone 14N (from cdem_062l) [computer files]. Winnipeg, MB: Generated by Rebekah Brubacher, March 2018. Using: ArcGIS for Desktop Advanced [GIS]. Version 10.4.1. Redlands, CA: ESRI, 2015.	p. 62
Figure 6.16 |	** *Snow drifts next to a woodlot*. [illustration]. Data derived from Agriculture and Agri-Food Canada, 2010. *Shelterbelts: Design Guidelines for Farmyard, Field, Roadside, Livestock, Wildlife, and Riparian Buffer Plantings on the Prairies*. [pdf] Indian Head: Agriculture and Agri-Food Canada. Available at: <http://publications.gc.ca/collections/collection_2010/agr/A125-2-2010-eng.pdf> [Accessed 28 April 2018].	pp. 63 & 64
Figure 6.17 |	** *Shelterbelt spacing between rows*. [illustration]. Data derived from Agriculture and Agri-Food Canada, 2010. *Shelterbelts: Design Guidelines for Farmyard, Field, Roadside, Livestock, Wildlife, and Riparian Buffer Plantings on the Prairies*. [pdf] Indian Head: Agriculture and Agri-Food Canada. Available at: <http://publications.gc.ca/collections/collection_2010/agr/A125-2-2010-eng.pdf> [Accessed 28 April 2018]	p. 65
Figure 8.1 |	***Conflict Maps - Surface Water Filtration.* [map]. Scale 1:3000. Data Layers: MLI: bmp_20k_hyd_py_shp, contours_25cm_smooth25m, Projection: UTM Zone 14N (from cdem_062l) [computer files]. Winnipeg, MB: Generated by Rebekah Brubacher, March 2018. Using: ArcGIS for Desktop Advanced	p. 73

[GIS]. Version 10.4.1. Redlands, CA: ESRI, 2015.

Figure 8.2 | **_Conflict Maps - Manure_. [map]. Scale 1:3000. Data Layers: MLI: bmp_20k_hyd_py_shp, contours_25cm_smooth25m, Projection: UTM Zone 14N (from cdem_062I) [computer files]. Winnipeg, MB: Generated by Rebekah Brubacher, March 2018. Using: ArcGIS for Desktop Advanced [GIS]. Version 10.4.1. Redlands, CA: ESRI, 2015. p. 74

Figure 8.3 | **_Conflict Maps - Grazing_. [map]. Scale 1:3000. Data Layers: MLI: bmp_20k_hyd_py_shp, contours_25cm_smooth25m, Projection: UTM Zone 14N (from cdem_062I) [computer files]. Winnipeg, MB: Generated by Rebekah Brubacher, March 2018. Using: ArcGIS for Desktop Advanced [GIS]. Version 10.4.1. Redlands, CA: ESRI, 2015. p. 76

Figure 8.4 | **_Conflicts Map - Garden_. [map]. Scale 1:3000. Data Layers: MLI: bmp_20k_hyd_py_shp. contours_25cm_smooth25m, Projection: UTM Zone 14N (from cdem_062I) [computer files]. Winnipeg, MB: Generated by Rebekah Brubacher, March 2018. Using: ArcGIS for Desktop Advanced [GIS]. Version 10.4.1. Redlands, CA: ESRI, 2015. p. 77

Figure 8.5 | **_Conflicts Map - Camping_. [map]. Scale 1:3000. Data Layers: MLI: bmp_20k_hyd_py_shp. contours_25cm_smooth25m, Projection: UTM Zone 14N (from cdem_062I) [computer files]. Winnipeg, MB: Generated by Rebekah Brubacher, March 2018. Using: ArcGIS for Desktop Advanced [GIS]. Version 10.4.1. Redlands, CA: ESRI, 2015. p. 78

Figure 8.6 | **_Conflicts Map - Building_. [map]. Scale 1:3000. Data Layers: MLI: bmp_20k_hyd_py_shp. contours_25cm_smooth25m, Projection: UTM Zone 14N (from cdem_062I) [computer files]. Winnipeg, MB: Generated by Rebekah Brubacher, March 2018. Using: ArcGIS for Desktop Advanced [GIS]. Version 10.4.1. Redlands, CA: ESRI, 2015. p. 80

Figure 8.7 | **_Site Analysis - Landuse Suitability_. [map]. Scale 1:3000. Data Layer: bmp_20k_hyd_py_shp [computer files]. Winnipeg, MB: Generated by Rebekah Brubacher, March 2018. Using: ArcGIS for Desktop Advanced [GIS]. Version 10.4.1. Redlands, CA: ESRI, 2015. p. 81

Figure 9.1 |	** *Conceptual Ideas - Site Designs Overview*. [map]. Scale 1:3000. Data Layers: MLI: bmp_20k_hyd_py_shp: contours_25cm_smooth25m, Projection: UTM Zone 14N (from cdem_062l) [computer files]. Winnipeg, MB: Generated by Rebekah Brubacher, March 2018. Using: ArcGIS for Desktop Advanced [GIS]. Version 10.4.1. Redlands, CA: ESRI, 2015.	p. 85
Figure 9.2 |	***Camping at the Village -Concept Map*. [map]. Scale 1:3,000 Layers: MLI: bmp_20k_hyd_py_shp. [computer files]. Winnipeg, MB: Generated by Rebekah Brubacher, March 2018. Using: ArcGIS for Desktop Advanced [GIS]. Version 10.4.1. Redlands, CA: ESRI, 2015	p. 88
Figure 9.3 |	Brubacher, R., 2018x. The *Village Camping Perspective*. [Illustration].***Conceptual Ideas - Winter Trails*. [map]. Scale 1:3000. Data Layer: MLI: bmp_20k_hyd_py_shp [computer files]. Winnipeg, MB: Generated by Rebekah Brubacher, March 2018. Using: ArcGIS for Desktop Advanced [GIS]. Version 10.4.1. Redlands, CA: ESRI, 2015.	p. 88
Figure 9.4 |	***Conceptual Ideas - Proposed Vegetation Plan*. [map]. Scale 1:3000. Data Layer: MLI: bmp_20k_hyd_py_shp [computer files]. Winnipeg, MB: Generated by Rebekah Brubacher, March 2018. Using: ArcGIS for Desktop Advanced [GIS]. Version 10.4.1. Redlands, CA: ESRI, 2015.	p. 90
Figure 9.5 |	***Conceptual Ideas - Winter Trails*. [map]. Scale 1:3000. Data Layer: MLI: bmp_20k_hyd_py_shp [computer files]. Winnipeg, MB: Generated by Rebekah Brubacher, March 2018. Using: ArcGIS for Desktop Advanced [GIS]. Version 10.4.1. Redlands, CA: ESRI, 2015.	p. 92
Figure 9.6 |	***Conceptual Ideas - All Trails*. [map]. Scale 1:3000. Data Layer: MLI: bmp_20k_hyd_py_shp [computer files]. Winnipeg, MB: Generated by Rebekah Brubacher, March 2018. Using: ArcGIS for Desktop Advanced [GIS]. Version 10.4.1. Redlands, CA: ESRI, 2015.	p. 92
Figure 10.1 |	Brubacher, R., 2018g. *Village Residence - Phase One Plan*. [Illustration}.	pp. 94 & 95
Figure 10.2 |	Brubacher, R., 2018h. *Village Residence - Phase Two Plan*. [Illustration].	pp. 96 & 97
Figure 10.3 |	Brubacher, R., 2018i. *Village Residence - Phase Two Proposed Vegetation Plan*. [Illustration].	pp. 98 & 99

Figure 10.4 |	Brubacher, R., 2018j. *Design Concept Map Village Center Winter*. [Illustration].	p. 101
Figure 10.5 |	Brubacher, R., 2018k. *Village Center Winter Perspective*. [Illustration].	p. 101
Figure 10.6 |	Brubacher, R., 2018l. *Design Concept Map Village Center Summer*. [Illustration].	p. 102
Figure 10.7 |	Brubacher, R., 2018m. *Village Center Summer Perspective*. [Illustration].	p. 102
Figure 10.8	Brubacher, R., 2018n. *Design Concept Map - Village Residnce Phase Two Perspective*. [Illustration].	p. 104
Figure 10.9	Brubacher, R., 2018o. *Village Residence - Phase Two Perspective*. [Illustration].	p. 104
Figure 10.10 |	Brubacher, R., 2018p. *Village Residence - Phase Two Hard Surface Plan*. [Illustration].	pp. 105 & 106
Figure 10.11 |	Brubacher, R., 2018q *Village Residence - Phase Two Proposed Trails Plan*. [Illustration].	pp. 107 & 108
Figure 10.12 |	***Bird Sanctuary - Concept Map*. [map]. Scale 1:3,000 Layers: Data Layer: MLI: bmp_20k_hyd_py_shp [computer files]. Winnipeg, MB: Generated by Rebekah Brubacher, March 2018. Using: ArcGIS for Desktop Advanced [GIS]. Version 10.4.1. Redlands, CA: ESRI, 2015.	p. 109
Figure 10.13 |	Brubacher, R., 2018r. *Bird Sanctuary Plan*. [Illustration].	p. 109
Figure 10.14 |	Brubacher, R., 2018s. *Bird Sanctuary Perspective*. [Illustration].	p. 110
Figure 10.15 |	***Animal Haven - Concept Map*. [map]. Scale 1:3000. Data Layers: MLI: bmp_20k_hyd_py_shp, contours_25cm_smooth25m, Projection: UTM Zone 14N (from cdem_062I) [computer files]. Winnipeg, MB: Generated by Rebekah Brubacher, March 2018. Using: ArcGIS for Desktop Advanced [GIS]. Version 10.4.1. Redlands, CA: ESRI, 2015.	p. 111
Figure 10.16 |	Brubacher, R., 2018t. *Animal Haven Plan*. [Illustration	p. 111

Figure 10.17 | Brubacher, R., 2018v. *Animal Haven Perspective*. [Illustration]. p. 112

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CHAPTER 1.0
INTRODUCTION: GOALS

This practicum is centered around the following research question: How to develop and cultivate 320 acres of the Myriad Village Marketing Co-op [Myriad Village] land as a new Ecovillage in Manitoba - a place of vision and growth. The question was explored through examining components such as; the property of Myriad Village, objectives [vision and mission] of Myriad Village, ecovillages [theory, historical overview, precedents], environmental and economic housing options, site conditions [survey and character] and site regulations. The components were analyzed and synthesized into proposed site designs. The proposed site design for a new alternative community in Manitoba integrates residence, natural succession, community, camping, and agriculture.

This practicum investigates Myriad Village Marketing Cooperative Ltd. [Myriad Village] community and property. It is the intention to provide the cooperative with precedent studies, to illustrate spatial elements of an ecovillage, to analyze the property, including a background study, and to illustrate one of the many possibilities of a proposed site design for an alternative community in Manitoba.

The research of this practicum began with determining the background of Myriad Village, followed by a study of ecovillages. The study included examining theory, precedents, and spatial elements of ecovillages with the perspective of Landscape Architecture. Following the ecovillage and Myriad Village background exercise, a site analysis entailing site character, survey and studies

CHAPTER 2.0
WHO IS MYRIAD VILLAGE?

[wind and snow drift] was investigated. The conclusion of the ecovillage study and site analysis was applied to the property of Myriad Village as site designs. As an outcome, the design is presented through text and mixed media illustrations.

As written by the members:
"A co-op eco-village/campground project located in the Interlake. Establishing roots for a joyful transition to sustainable rural living."

fig 2.1 Winter Landscape.

MYRIAD VILLAGE MISSION:

Our Vision: A world that celebrates harmonious living in nature, nourishing creativity, sense of place, and sustainable housing for folks and families for generations to come.

Our Mission: To foster community, healing, opportunity and education while functioning as a seasonal campground with potential for permanent housing.

Housing members, as well as campers can access land for agricultural, residential, educational, business and recreational purposes.

This will be carried out using diverse growing methods that focus on living in harmony with the environment, educational workshops, thematic retreats, and recreational activities that support each others path in a mindful way and foster healthy relationships with adults and children.

- Myriad Village Facebook page
(Myriad Village, 2016)

2.1 MYRIAD VILLAGE BACKGROUND

Members of the Myriad Village are friends of mine. Currently, the growing community is approximately 14 members strong with further interest from their friends, and families. Members range from individuals to families and their children. The community strives toward creating an ecovillage integrated with a campground on their 320 acres of property in the Interlake of Manitoba.

Myriad Village purchased a former agricultural property in the Municipality of Armstrong during the summer of 2016. The property was funded through shares and donations made by the members to the cooperative. Armstrong welcomes Myriad Village into the community as the population of the municipality has been declining since the 1950's (Goldsborough and Morgan, 2017).

At this time Myriad Village has put forth a mission and vision statement and have passed their by-laws

demonstrating the openness and commitment of the community. The community aspires to expand in members, and transition from a primarily camping into a permanent community.

There are few ecovillages in Manitoba. Prior to the cooperative purchasing the property, ecovillage zoning did not exist in Manitoba. At the time of purchase, Myriad Village's property zoning designation was *Ag-Agriculture General* area (Government of Manitoba, 2018). Agriculture general area zoning does not meet the needs of the community to develop residential, camping, community and agriculture on the property. This zoning does not allow for permanent structures; therefore the community has communicated with the Municipality to achieve Ecovillage zoning. Ecovillage zoning in Canada has been achieved by O.U.R Ecovillage in British Columbia. An extensive ecovillage zoning document has been compiled and is utilized by O.U.R Ecovillage. The ecovillage zoning document has been forwarded to the Armstrong Municipal council with aims of obtaining similar ecovillage zoning status.

In order to connect the surrounding community, throughout the year multiple events are held on the property often with open invitations to the public. Information regarding the invitations and their ongoing initiative may be found at their Facebook page @MyriadVillage .

2.2 MYRIAD VILLAGE PROPERTY

The Myriad Village property [*fig. 2.2 and 2.3*] is located West off Highway 7 between the town of Teulon [29 km South] and Gimli [32 km East]. The property is on the corner of Dowaney Road and 107 N Road. In the planning of a new community, core management and services to be addressed include access to education, services health and fire, wastewater management and waste disposal.

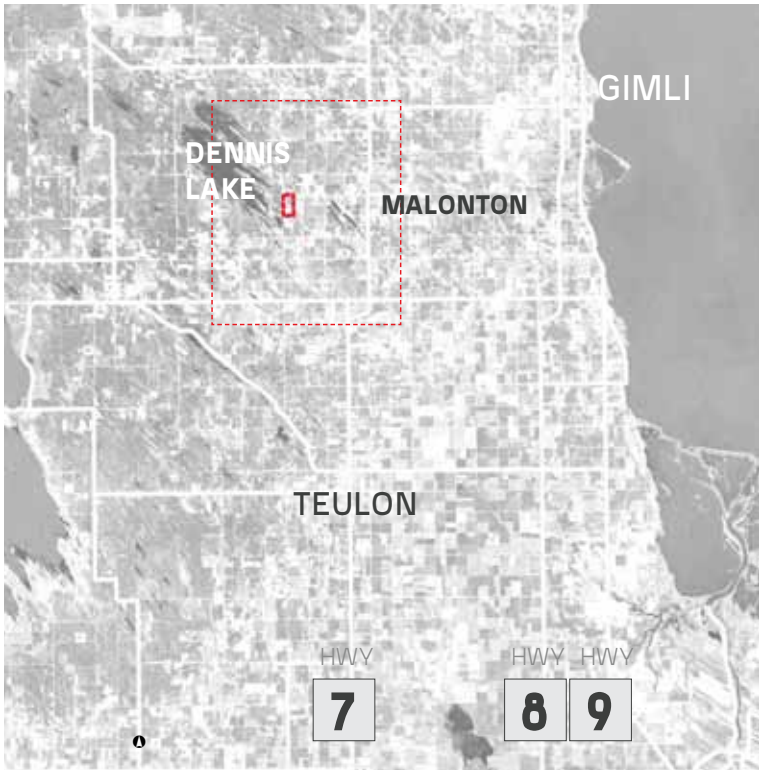


fig. 2.2 Property location overview.

Amenities [*fig. 2.4*] that are within the 35 km radius include two hospitals, one in Teulon - Hunter Memorial hospital and the other in Gimli - Johnson Memorial Hospital, a fire hall in Fraserwood - Fraserwood Hall, a school in Inwood - Inwood School, a waste, recycling and disposal services at Chatfield Transfer Station , Inwood

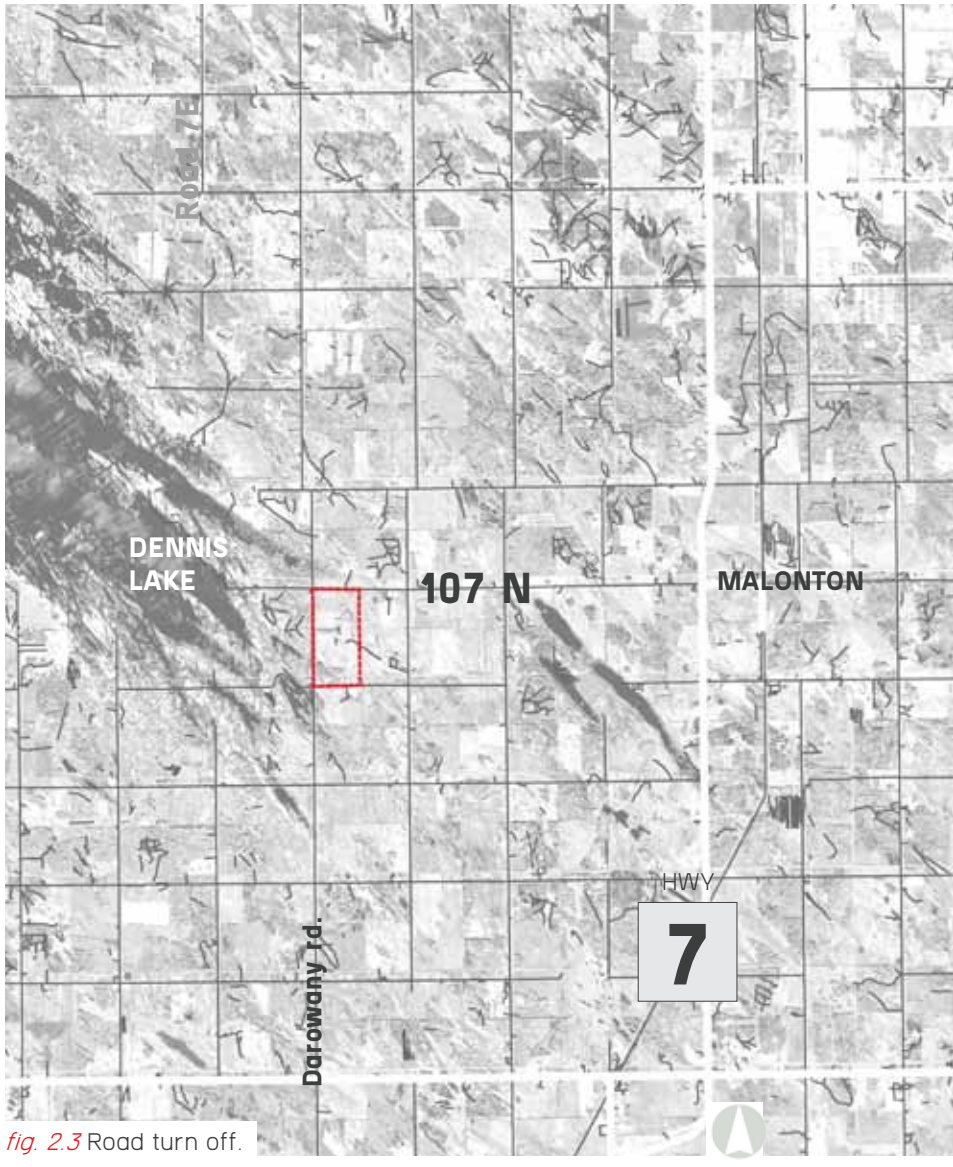


fig. 2.3 Road turn off.

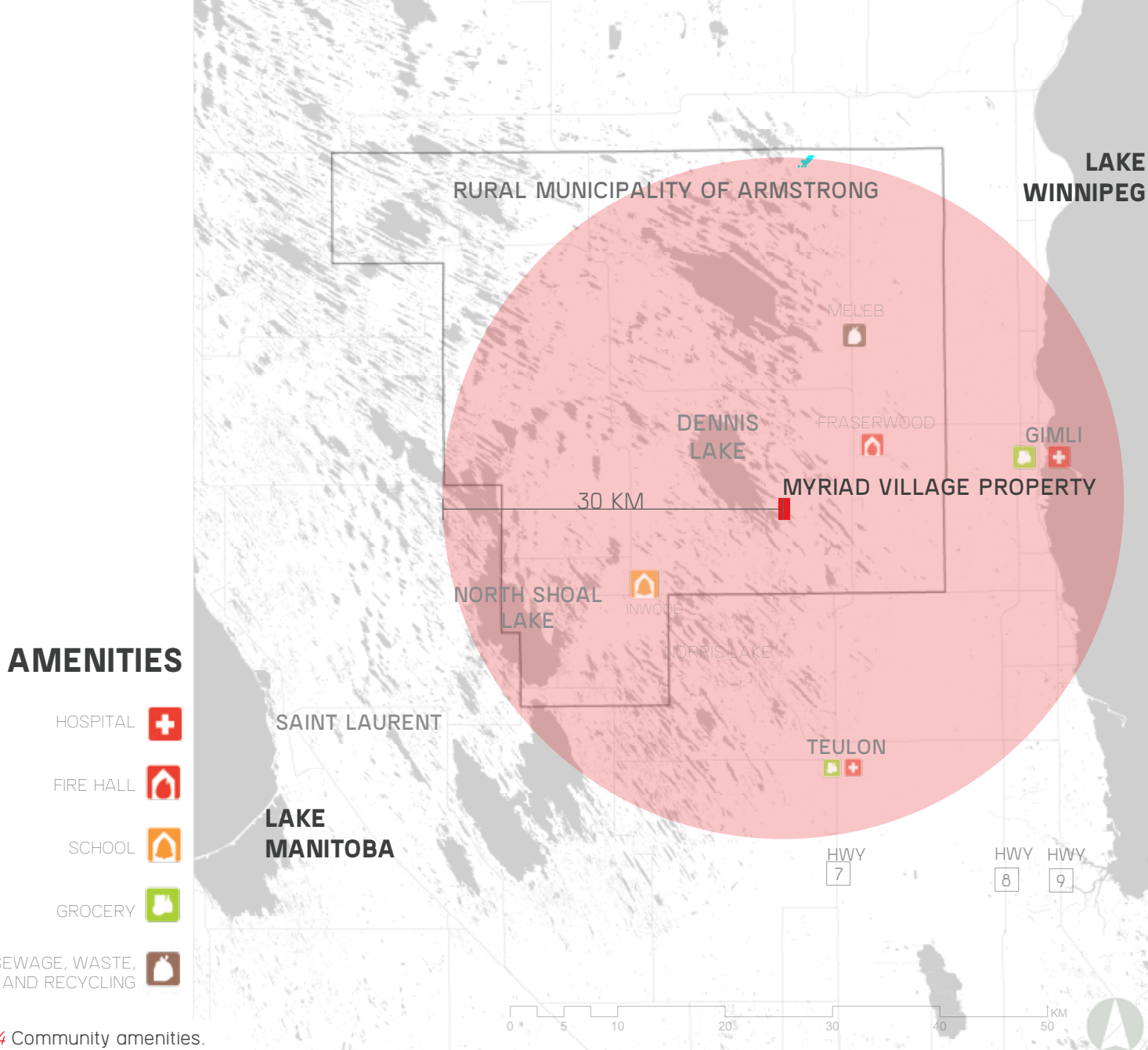


fig. 2.4 Community amenities.

Transfer Station and Meleb Waste Disposal Grounds. Groceries can be obtained, in Gimli: Sobeys, and Super A Foods, and in Teulon at Bigway Foods (Anon., 2018a; Google Earth, 2018a). During the summer, produce can be acquired at various farmers markets, and directly from local some farms.

TAKEAWAY FOR MYRIAD VILLAGE

In the case of an emergency, services may require extra time for arrival due to the distance. Therefore, ease of access to the site would reduce travel time. Other amenities are within a country drive of 22 to 32 minutes.

2.3 VISION MEETING WITH MYRIAD VILLAGE MEMBERS

Meeting Date: 4 February, 2018

An interactive vision meeting was held with maps and writing equipment. The objective was to gain deeper insight into the aims of the community. The outcome entailed an illustration [*fig. 2.5*] and the following points;

Three possible residential areas [cottage type lots], keep beaver, lots of spruce trees, hosting of festival and a festival area, recreation area, expandable community center, garden, area of maintained grass, permaculture, greywater management, forest garden, grazing, agriculture crop, bird sanctuary, camping, and encourage natural vegetative growth.

As a method to visualize the intentions, the written mission and vision of Myriad Village combined with the outcome of the meeting an illustration has been generated [*fig. 2.6*].

fig. 2.5 (background image) Illustration from vision meeting.

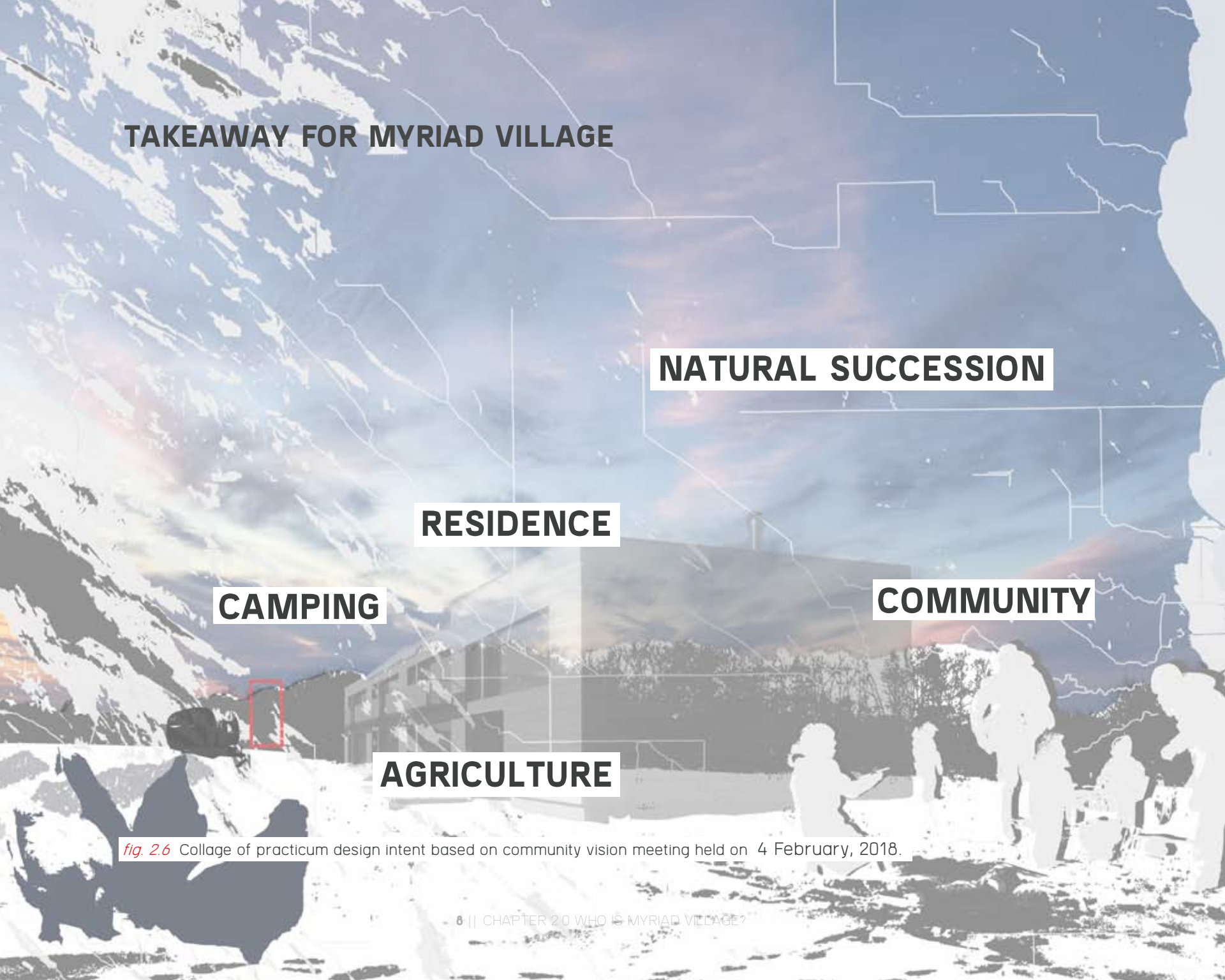


fig. 2.6 Collage of practicum design intent based on community vision meeting held on 4 February, 2018.

CHAPTER 2.0 CONCLUSION

In the vast prairie landscape of Manitoba, a significant factor in rural living is the necessity for protection from the sun, wind, water, and snow. It is projected that climate change is occurring, and the effects of storms will have a greater impact on the landscape (Manitoba Conservation and Water Stewardship, 2015). How is a sense of security developed in an undeveloped area and in a remote location a 22 minute drive to the nearest town? How would a residential community blend with camping and agriculture, and form the landscape of Myriad Village?

CHAPTER 3.0
WHAT IS AN ECOVILLAGE?

Ecovillages have been described as:

> *"Private citizens' initiatives in which the communitarian impulse is of central importance, that are seeking to win back some measure of control over community resources, that have a strong shared values base (often referred to as 'spirituality') and that act as centres of research, demonstration and (in most cases) training."*
>
> *- Jonathan Dawson (Dawson, 2006, p.36)*

As indicated on page two, one of Myriad Village's main objectives is to form an ecovillage. Ecovillages, in theory, have a broad background that is applied to each circumstance differently. The examination of existing tools will aid in transforming the Myriad Village landscape into an ecovillage. This practicum explores [*fig. 3.1*] the fibers of an ecovillage through the study of their theoretical background, history, common spatial qualities, and precedents.

3.1 THEORETICAL BACKGROUND OF ECOVILLAGES

3.1.1 THREE CORE ELEMENTS OF AN ECOVILLAGE

There are three core elements that comprise an ecovillage. Each ecovillage may differ as to which core element they focus on. The three elements include:

Ecological Spatial [Green Business, Lifecycle Analyses. Ecological Building. Renewable Energy. Local Water Care, Local Organic Food Production, Consumption, and Recirculation. Wilderness, Biodiversity, Earth Restoration, Permaculture, Ecovillage Design] (Jackson and Svensson, 2002).

Cultural-Spiritual [Creativity, Personal Unfolding, Spirituality, Finding Divinity within, Uniting with Nature, Celebrating Life, Honoring Cultures. Natural Cycles, Holistic Circulatory Worldview, Science and Philosophy, Localization, Bioregions, Resisting Globalization] (Jackson and Svensson, 2002).

Social Economic [Education and Communication. Living and Learning, Healthy Lifestyle. Preventive Healthcare, Complementary Medicine, Building Community, Decision Making, Conflict Resolution, Modernizing Welfare, Care of children and elderly, Integration of Handicapped, Localizing Economics, Complementary Currencies] (Jackson and Svensson, 2002).

3.1.2 HISTORICAL OVERVIEW

Ecovillages have been described as:

> "*human- scale full-featured settlement, in which human activities are harmlessly integrated into the natural world in a way that is supportive of healthy human development and can be successfully continued into the indefinite future.*"
>
> Source: *Gilman's Report* (Dawson, 2006, p.13).

The ecovillage movement began in reaction to the effects of globalization (Dawson, 2006). The idea of environmentally conscious intentional communities arose during the green movement in the 1960's and

fig. 3.1 (background image) Exploration of ecovillages.

70's though the term ecovillage was not coined until the 1990's.

The term *Ecovillage* emerged through a report following Rob and Diane Gilman's study on the best practice in the field of sustainable communities that began in 1990 (Dawson, 2006, p.13). Hildur and Ross Jackson, founders of Gaia Trust, encouraged the study, leading to a co-authored report 'Ecovillages and Sustainable Communities' (Dawson, 2006). The term ecovillage was also utilized at a conference held in 1995 at the Findhorn Foundation in Scotland titled *Ecovillages and Sustainable Communities: Models for the 21st Century.* Findhorn remains an ecovillage research center (Dawson, 2006).

One of the core goals of ecovillages is to foster intentional communities that aim to be self-reliant by meeting the needs of the community within itself, to be a place to live, work and play. As ecovillages exist globally, each takes a different form as each environment presents different environmental conditions.

An Ecovillage could range between 50 and 500 members (Bang, 2005). Each ecovillage is unique. Common elements include shared resources, for example, a community may have a community facility with a common kitchen. In the community there could also be a shared workshop, sauna, fire pits, wardrobe, outdoor spaces and so forth.

Some ecovillages exist as training centers without permanent residences, hosting seminars to educate others on their experiences in the village. Often Ecovillages strive to achieve alternative methods of waste management, working with soil, gardening, and many other practices, for example constructing Earthships, permaculture, and education on other homesteading tools.

3.1.3 **CO-HOUSING**

Ecovillages are an outgrowth of the cohousing movement that began during the 1970's in Denmark. Cohousing is a movement with the objective to reduce

home sizes, reduce car use, share resources and common spaces (Jackson and Svensson, 2002).

One of the differences between cohousing and an ecovillage is that an ecovillage also includes the consideration of the relationship with the environment (ScottHanson and ScottHanson, 2005).

Housing units may be in the form of multi-unit complexes, for example, the first neighborhood constructed at EcoVillage Ithaca were duplexes that aimed to save energy and materials (Anon., n.d.a). Other common units in cohousing communities consist of tri-plexes, quads, rowhomes or townhouses. Units save on infrastructural space requirements, time of construction and materials.

Chris and Kelly Scotthanson (2005) indicated that co-housing communities tend to be successful when there are between 12-36 homes. Smaller or larger communities may do well, although these could produce more challenges. The recommendation is 12-36 homes due to finances and roles in the community. In a smaller community, the tasks spread between members may be uneven, or too much to maintain a healthy lifestyle (ScottHanson and ScottHanson, 2005).

Some co-housing community sizes have expanded beyond the 12-36 homes, such as Ballerup a village located in the suburbs of Copenhagen, Denmark (ScottHanson and ScottHanson, 2005). Included in the village are shops and other commercial services. In North America, Ecovillage Ithaca also continues to expand communities.

Start-up costs of these new communities could range quite a bit; costs may be from the cost of the property itself, or from developing infrastructure.

3.1.4 **EXISTING ECOVILLAGES**

A few precedents are examined to begin to understand the complexities of ecovillages. As varying information

is available, the value of the precedents is to develop insight into the process, possibilities, involvement, evolution, solutions and possible issues an ecovillage may face. Some examples of ecovillages discussed in available literature and accessible through the internet include Findhorn in Scotland, Belfast Cohousing and Ecovillage, Yarrow Ecovillage in BC, Canada, Ithaca Ecovillage in New York, USA, Auroville in India, Sieben Linden in Germany, and Northern Sun Farm Coop in Manitoba, Canada. To narrow discussion, three contrasting communities, Auroville, Sieben Linden, and Northern Sun Farm Coop will be explored. These three ecovillages were selected to provide a brief overview of the range of geographic locations, the scale of community, information available and they each have been established for a considerable amount of time.

Auroville, India

Started in 1968 (Dawson, 2006),
Five thousand individuals gathered next to a tree, with the prospect of understanding the landscape. At that time there was minimal vegetation due to the many wind storms. The newcomers aimed to construct dams and dikes to stop runoff from monsoon floods and plant trees. In 30 years, two million trees were planted along with the implantation of water management practices all aiding in the restoration of the ecosystem (Dawson, 2006).

In 1968, there was no electricity in the area, inspiring villagers to install windmills for pumping water to generate power. Through the experience, the community developed businesses that integrated solar and biomass technologies. The technologies led to the installation of a large solar collector on top of the kitchen enabling the community to steam cook up to 1000 meals a day. As the village evolved, it became a valuable resource by providing a seed bank for the bioregion and Indian subcontinent. Auroville has exported technologies to communities across the sub-continent. In 2003 Auroville won the Green Oscar

Award in respects to its reforesting and renewable technology achievements (Dawson, 2006).

TAKEAWAY FOR MYRIAD VILLAGE

The development of this particular ecovillage stemmed from the need for water in this area of India. The community utilized the local environmental conditions to manage water. Efforts of a whole community provided the resources required to construct the necessary infrastructures.

Sieben Linden, Germany

Developing momentum for an ecovillage requires a strong vision, ambition, and dedication. Sieben Linden in Germany began their planning in 1989. During the planning stage, the members found interested parties, property, and council that met their needs. Sieben Linden has found that finding members of council who understand the vision an ecovillage has shown to aid in the process to accomplish ecovillage zoning, or determining which zoning is best suited for their needs.

The community of 15 members began construction in 1997 of their vision of an ecovillage to be low impact using a permaculture perspective. On-site was an existing farm building that they converted into a low-energy multi-use structure. Eventually, it became the community center (Dawson, 2006). Roads, wells, waste treatment plant, and trails were developed throughout 1999. During this time the 3 hectares [ha] of impoverished agricultural land was slowly revitalized into a productive garden.

From 2000 onward, an 11 multi-family residence, workshop, meditation house, seminar house, horse stable and summer kitchen were constructed on 8 ha of the property. Wood harvested on the property was used to construct cob straw-bale homes. The homes were not built using contemporary machinery or power tools, rather by manual labor and horses. Community numbers have since expanded to 100 adults and 40 children (Anon., 2018b).

TAKEAWAY FOR MYRIAD VILLAGE

Finding like-minded individuals, council, and planning legislation take time. As time and money are often in a relationship, alternative construction procedures could also be used as a method to reduce resource use. Another resource reducing method used by Sieben Linden was the construction of a multi-family residence.

Northern Sun Farm Coop

Location: South of Steinbach, Manitoba

Coordinates: N 49 22.424 W96 44.061

Address: 32045 Rd 25 North, Manitoba

Members: approximately 16

Area: Rural Agriculture

Municipality: Hanover

Visit Date: 19 March 2018

Northern Sun Farm Coop is a low impact, low resource requiring community. It has gradually transformed over the years from, as one of the members describes it as a "hippie commune," into an ecovillage coop. Northern Sun Farm has been around for more than 25 years with some of the members living on the property since the 1990's. The municipality initially allowed ten homes on the 160 acres, and the coop has since purchased an additional 80 acres.

fig. 3.2 (background image) Water tower cold storage at Northern Sun farm Coop.

Living at Northern Sun Farm Coop

Community aspects include a sauna, community center (2009), root cellar (2005), workshop and parking lot.

Structure details: There is a water holding tank on top of a hill that stores 5000L of water [*fig. 3.2*], used for gardening as gravity aids in providing pressure. On top of the root cellar is a windmill which is a power source highly used in the winter. The community center is 10.5 m in diameter, and the sauna is 4.5 m.

Resources: Homes are heated using biomass, retrieved from their woodlot [*fig. 3.3*]. As a method to budget

the wood from their woodlot, the members agree that homes may use up to 5 cords/ year. A cord is a unit of wood measuring 8' x 4' x 4' = 128 cubic feet when stacked, includes bark and airspace (Government of Canada, 2018). The wood use restriction impacts the home size since a larger space often requires more resources for heating (Anon., 2013). Homes are relatively small, a family of 4 had resided in a 46.5m^2 (500ft^2) home. Each home has their own sand point well, roughly 10 ft deep which they draw water from as needed. A wood stove is used to heat their homes, water, and for cooking.

TAKEAWAY FOR MYRIAD VILLAGE

Through discussion with Northern Sun Farm members about their experience; it was found that one cluster of homes may reduce conflict due to equal distances from community spaces and be near to each other for an increase of visiting and building community. Building community may also occur through gardening. However, members indicated that a community garden has at times been difficult to maintain. Therefore, having gardening space with individual plots could be a possible solution.

Another takeaway from the visit with Northern Sun Farm Coop members is to consider access to hydro for refrigeration. The climate in Manitoba fluctuates and has created a difficult environment to maintain a consistent temperature to preserve food.

Each ecovillage has its unique character, challenges, and opportunities. Common factors between each of them include a strong background in community involvement. Community involvement aids reducing the time of construction and monetary labor costs. Auroville is a large community. At the time of development, there was a local need for water. Therefore it seemed the development of the community was natural. In the local areas around Sieben Linden and Northern Sun Farm, resource needs of local communities have been met.

fig. 3.3 (background image) Location of Northern Sun Farm.

Therefore it could have impacted the communities to be smaller in scale.

3.2 SPATIAL ELEMENTS OF AN ECOVILLAGE

Another aspect of Ecovillages would be the spatial qualities they entail. The spatial qualities discussed are methods of managing the landscape. Examples of spatial elements identified in this document include ecovillage design guidelines, permaculture, and passivhaus site design.

3.2.1 ECOVILLAGE DESIGN GUIDELINES

A new project on a piece of property may require an element of earth restoration and guidelines on sustainable building. A list of earth restoration principles has been composed by Alan Watson Feathersone.

10 Principles of Earth Restoration

by Alan Watson Featherstone (2002), creator of award-winning 'Trees of Life' project.

As follows:

1. Mimic nature wherever possible.
2. Work outwards from areas of strength, where the ecosystem is closet to its natural condition.
3. Pay particular attention to 'keystone' species.
4. Utilize pioneer species and natural succession to facilitate the restoration process.
5. Re-create ecological niches where they've been lost.
6. Re-establish ecological linkages- reconnect the threads in the web of life.
7. Control and/ or remove introduced species.
8. Remove or mitigate the limiting factors which prevent restoration from taking place naturally.
9. Let nature do most of the work.
10. Love has a beneficial effect on all life.

Source: (Jackson and Svensson, 2002. p.27)

Jan Martin Bang (2005) has also generated a list of ecovillage design guidelines suggesting sustainable building methods and approaches to site planning. Ecovillages often intend to reduce impact to the environment.

Checklist of Sustainable Building

Part of the checklist Bang (2005) compiled contained

two focuses, one was the scale of site planning while the second was aimed at site design. As part of site planning, she concluded that if there were any existing structures on the property to renovate them if possible, considering the existing landscape and to evaluate the available materials on site. She also stated buildings should be located on the property to minimize eco-damage, which could include using buildings with a smaller footprint. Other sustainable practices include to site the home in the landscape for solar access and to consider transportation.

In the design portion of the checklist, Bang had written 'Smaller is better' (Bang, 2005, p.121), this could have a domino effect. For example, a smaller object would use less material and take up less space. Through design, energy efficiency is a top priority. Energy efficiency could be through the methods of construction, in the system of the structure, in the materials themselves and how or where they are sourced. While constructing and designing the thought of standard size dimensions of materials, and the dimensions of the structure could be coincided to reduce waste. If there are offcuts and access, they may be recycled and integrated into design elsewhere in the project. Where possible, choosing materials for the current project that could be used elsewhere in the future could be a possibility. Greywater is another topic that provides an opportunity for re-use. Bang (2005) also had discussed the importance of avoiding possible health hazards, and to design holistically to work with energy and food. Some examples of health hazards could be electric, magnetic fields or radon. Other health hazards could be groundwater pollutants.

TAKEAWAY FOR MYRIAD VILLAGE

One method of restoring a former agricultural field is to allow the existing ecosystem forest to reestablish. It is speculated the previous grazing cattle has limited forest growth. This practicum proposes that Myriad Village be in a forest to increase shelter to the community. If necessary, increasing a forest may be achieved

by encouraging the pioneer species through natural succession. For example; natural succession could be encouraged by identifying key species on the property and allowing space for future establishment. Each vegetative species grows best in a distinctive set of conditions. Therefore, establishing growth using species already found in the area is better than introducing new species.

Opportunities for Myriad Village to reduce their environmental impact may include siting, design and construction methods. The use of energy may be reduced by siting structures with access to the south sun for light and heat. Another feature of siting consideration could be to minimize the footprint. If structures are near to each other, there may be less demand for roads, decreasing environmental impact. Siting and the design of structures could also integrate a new way in which greywater is managed.

Smaller structures could suggest a smaller footprint, the use of fewer materials and reduction of energy used for light, heat, and construction. Another guideline to follow is to avoid health hazards. Health hazards may include pollution to water, electromagnetic field or radon. Opportunities to recycle greywater go beyond only household wastewater, it could also include rainwater.

3.2.2 **PERMACULTURE**

'*To work with nature, rather than against it* '

- Bill Mollison, (1990).

Ecovillage design often integrates elements from permaculture, a term introduced by Bill Mollison and David Holmgren in the early 1970's (Mollison, 2009). At that time, permaculture was described as "Perma[nent] [Agri]culture". It could be expressed as a way of designing systems to utilize nature's attributes to function fully or optimally (Jackson and Svensson, 2002).

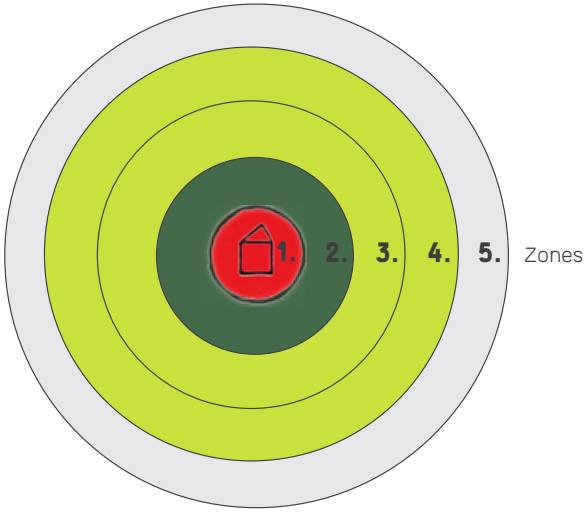


fig 3.4 Permaculture zones. Derived from: (Bang, 2005).

One of the fundamentals of permaculture is knowing how to best situate the home within the permaculture zoning areas [*fig. 3.4*] so that the areas used most are nearest to the home.

Figure 3.4 provides an example of site zone areas. Zone 1 of a permaculture design could include the home, flowers, herbs and intensive gardens. Between zones 1 and 2 there could house small animals such as rabbit, chicken, bees and/ or compost. In zone two could consist of public spaces such as orchards, shrubs, berries and/ or main crop beds. Zone 3 could contain community gardens, open space, fruit, nut trees, crafts, grains, animal forage, commercial gardens and/ or firewood. Zone 4 could include windbreaks, reserves and firewood, grazing animals, native forage, and wild harvest. Zone 5 is often considered the wild area (Bang, 2005; Jackson and Svensson, 2002).

TAKEAWAY FOR MYRIAD VILLAGE

Chickens, cows, goats, sheep, bull, bison and pigs are some animals that could one day find a home at Myriad Village. Caregiving for these animals would be optimized if there are appropriate spaces in an environment that best suits them. Each species has diverse care needs. Therefore devising grazing arenas in a range of distances from the residence follows the permaculture fundamentals. Gardening is another objective that could be positioned at varying distances to optimize the required needs.

3.2.3 **PASSIVHAUS SITE DESIGN**

The passivhaus principles are one way an ecovillage or community may approach siting and integrating homes into the landscape. Each landscape has unique characteristics that may pose as an opportunity for new design.

Passive homes [Passivhaus] are designed to utilize environmental resources (Friedman, 2012) to reduce resource use that requires secondary extraction methods, thus minimizing energy costs. In Manitoba, when situating a passivhaus in the landscape, south sun access, and wind protection during the cold season, should be maximized.

South sun access [*fig. 3.5*] through large south-facing windows may allow for heat gain and light entry during winter months. To prevent overheating during summer Avi Friedman (2012) has recommended through his written work *Fundamentals of Sustainable Dwellings,* that incorporating deciduous trees near to the home or a

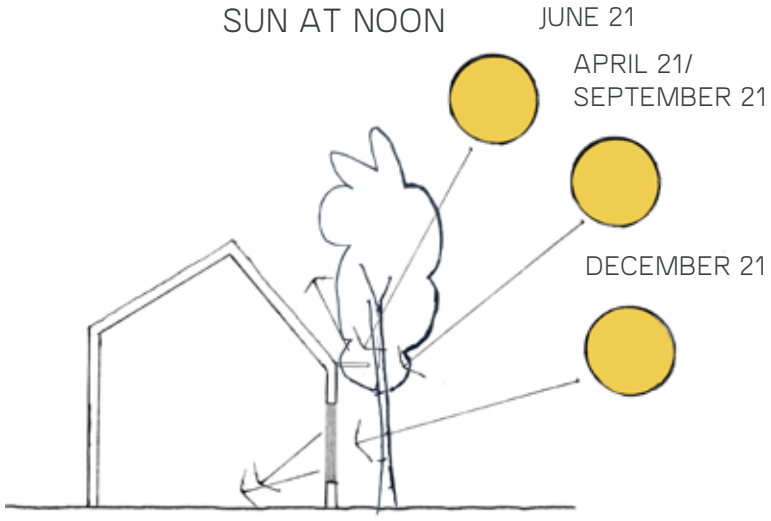


fig. 3.5 Passivhaus South sun access. Derived from: (Page, 2016).

sufficient overhang into the design could provide shade to the home. During the winter, the leaves often fall, allowing light to pass through and heat the home.

A large south-facing window could provide light and heat to the home. To reduce heat in the summer, the foliage of a deciduous tree could provide shade if located near to the home.

The orientation of the homes may affect the amount of daylight accessible to the south-facing windows. For

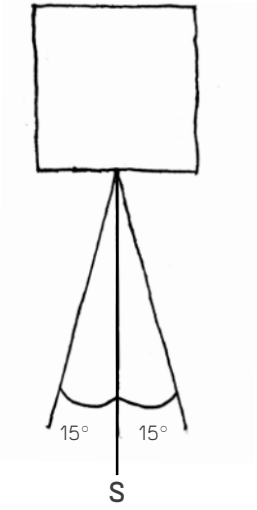


fig 3.6 Passivhaus orientation. Derived from: (Friedman, 2012).

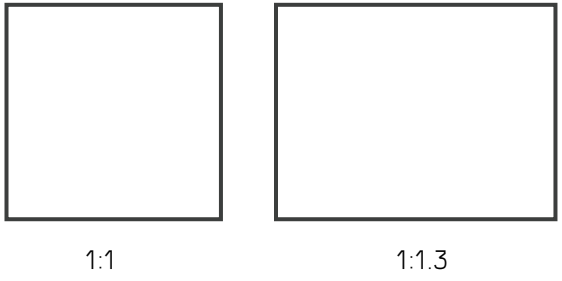


fig. 3.7 Passivhaus shape ratio. Derived from: (Friedman, 2012).

optimal heat gain throughout the year, Friedman (2012) suggests orienting [*fig. 3.6*] the home with large south-facing windows within a 15° variance of south.

In a cold climate, buildings with a north-south orientation may maximize solar gain which aids in providing light and heat to a home. For a cold climate heat loss is a concern in winter. Friedman (2012) recommends [*fig. 3.7*] using 1:1- 1:1.3 ratio for home dimensions to minimize heat loss from the winds through the exterior walls. The ratios refer to the length and width of the exterior of the structure. For example, a structure with a 1:1 ratio could be 7.5 meters in both length and width. A ratio of 1:1.3 may be 7.5 x 9.75 m. The ratio of 1:1 to 1:1.3 for a home could also provide enough surface area for access to the south sun.

Other structures such as buildings or vegetation often compose a landscape to allow for solar access into the windows of the homes. Friedman (2012) has indicated

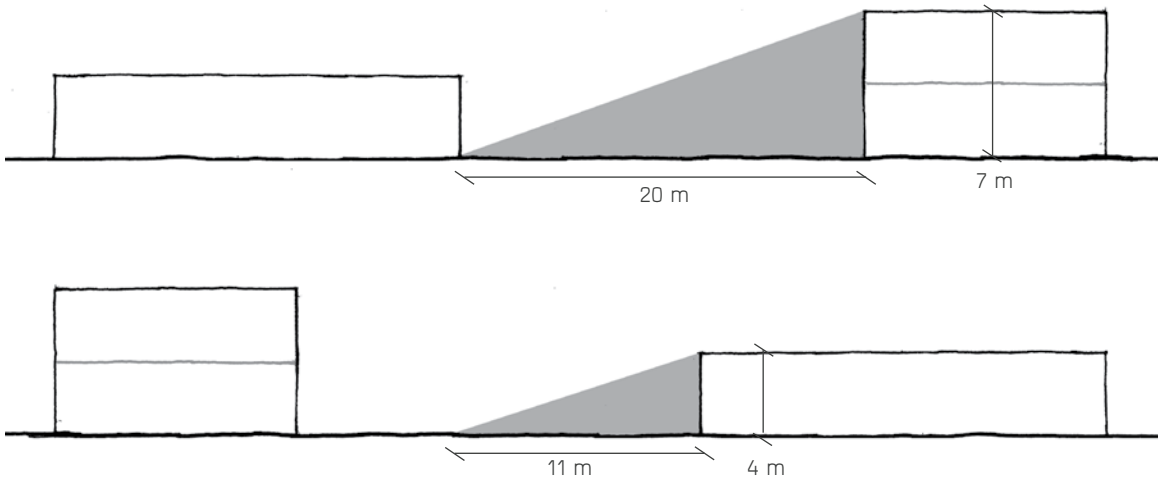


fig. 3.8 Passivhaus spacing. Derived from: (Friedman, 2012).

that spacing [*fig. 3.8*] between structures 7 meters in height to be at least 20 meters and at least 11 meters on the shade side of a structure 4 meters in height.

TAKEAWAYS FOR MYRIAD VILLAGE

In combination with home orientation, and large south facing windows, homes designed using a shape ratio between 1:1 and 1:1.3 may increase the probability of reducing heat loss. To reduce shading from other structures, the distance from a building 7 meters tall is suggested to be a minimum of 20 meters away. If a building is 4 meters tall, another structure or feature that requires sun access may be best situated at least 11 meters away. To reduce heat in the summer, the foliage of a deciduous tree could provide shade if located near to the home. To maximize heat gain from the sun, Friedman (2012) has expressed orienting a home within a 15-degree variance of south, tends to be optimal. A large south-facing window, deciduous tree, 15-degree variance of south, shape ratio and careful placement of

the buildings in relation to other structures could provide optimal light and heat to the home in the extreme climate of Manitoba.

3.3 PRECEDENTS

3.3.1 RESIDENCE DESIGN INFLUENCE

Through the research process, it was found that the row home met a few practicum objectives. Practicum objectives such as increasing the sense of community, through increasing the possibilities of crossing paths with one another. Another would includes one of the aims of sustainable development of minimizing footprint, which is an objective that relates with theory of ecovillage design. Row homes may also reduce costs to a CO-OP by reducing materials required for each home, as well as time for construction.

One of the precedents [*fig. 3.9*] that inspired the idea was *Wohnsiedlung Oepfelbaum* in Stetten, Switzerland. The structure was designed with the forethought of expansion while being sensitive to the surrounding landscape. It was situated in trees and orchard conditions. It was constructed in 1986 using a construction practice that allowed for additional residences to be constructed as needed (Bayerisches Staatsministerium des Innern, 1991).

Figure 3.9 is a graphic representation of the structure of Wohnsiedlung Oepfelbaum in Stetten, Switzerland, a residential complex. The image illustrated the process of construction with a pre constructed ground platform. It appeared that the structure was designed to be modular, where the framework could be constructed off site and brought to site for expansion.

fig. 3.9 Wohnsiedlung Oepfelbaum, Stetten, Schweiz (Switzerland) by Metron Architekten, Windisch. source: Bayerisches Staatsministerium des Innern, ed., 1991. *Wohnmodelle Bayern 1984 - 1990 / Beispiele des sozialen Wohnungsbaus Erfahrungen aus der Vergangenheit - Wege in die Zukunft*. 2nd ed. Munich: Georg D. W. Callwey. p.38.

TAKEAWAY FOR MYRIAD VILLAGE

As Myriad Village aims to invite new members, it is possible that not all homes will be constructed simultaneously. *Wohnsiedlung Oepfelbaum* demonstrates

that it is possible to be sensitive to the existing landscape of being in the trees while also considering future development.

3.3.2 **DWELLING SIZE**

'*Smaller is better'* as written by Jan Martin Bang (2005) in reference to the Checklist of Sustainable Building, could also be applied to dwelling size. Smaller homes have become a frequent topic in and out of co-housing since smaller homes reduce resource use.

Common private dwelling unit sizes in co-housing developments have been between 100 m^2 [1076 ft^2] -150 m^2 [1614.5 ft^2] (Jackson and Svensson, 2002, p.156).

At Northern Sun Farm Coop ecovillage in Manitoba, one of the home sizes is 46 m^2 (500ft^2) to reduce the use of wood off the lot for heating (Anon., 2013).

Starter homes at Kerhaussiedlung in Graz Mariafrost Oesterreich [1984] are cube with dimensions 7.5m x 7.5 m x 7.5 m. The square meters of floor area could range between 112.5 m^2 [1210 ft^2] and 196 m^2 [2109.73 ft^2] (Bayerisches Staatsministerium des Innern, 1991, p.49).

Avi Friedman, who authored *Fundamentals of Sustainable Dwellings* in 2012 recommends a one bedroom home to be 74m^2 [800 ft^2] and three bedroom home to be 177 m^2 [1,900 ft^2].

TAKEAWAY FOR MYRIAD VILLAGE

Constructing a community center prior to or during the same time as the residences would complement the smaller home sizes. Smaller home sizes have been utilized beyond co-housing communities.

3.3.3 **ROW HOMES**

Row homes are a housing style common in Europe and older North American cities (Scotthanson and Scotthanson, 2005). As single detached dwellings tend to use more energy than apartments, row homes would be cost saving. The premise is that shared walls would

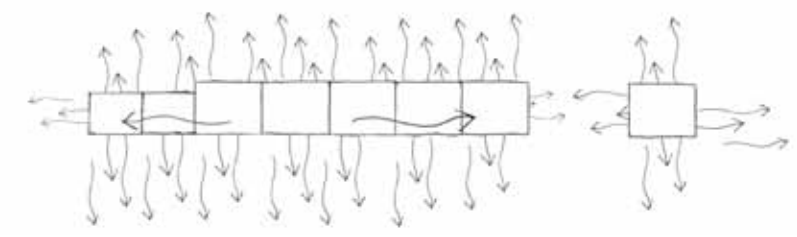


fig. 3.10 Row home heat sharing. Derived from: (Friedman: 2012; Page, 2016).

transfer heat [*fig. 3.10*] optimized from the south sun access [*fig. 3.5*] in passivhaus design. As resources are a theme in ecovillages it is valid to consider saving energy and materials through construction and design. With row homes, the reduced materials along with the transferring of heat would assist in minimizing energy costs.

Clustering has been a common method of organizing homes in co-housing communities (Scotthanson and Scotthanson, 2005). Clustering homes near to one another tend to enhance the sense of community and equity. It also minimizes footprint reducing utility costs (Scotthanson and Scotthanson, 2005). Along with clustering homes, designing the individual dwellings smaller and community facilities larger is recommended to reduce costs and materials. The standardization of row homes also tends to reduce construction time and cost (Scotthanson and Scotthanson, 2005).

Row homes have had negative connotations attached to them in urban areas. Lack of character in design is another criticism. However, the initial design of the row home could provide flexibility and character. Individuality to these could also be incorporated following the initial construction phase. As the community is a cooperative, there could be an agreement on other aspects to enhance community character as well.

Also, another option of flexibility in row home design could be the size. Within a row house, each resident

could choose its width, accommodating each villager (and their families) needs. A family may prefer more space than a single person. Size options could range in width and have a standard length using the idea of a narrow home.

Trends have returned to the narrow home. Narrow homes provide the opportunity for residents to have ground floor access while also reducing its footprint (Friedman, 2010). Avi Friedman's book Narrow Homes: New Directions in Efficient Design is a catalog of narrow homes existing around the world. Narrow homes range in width from 4 m (13ft) to 7.3 m (24ft).

FALKENWEG

Falkenweg residence is an example of how narrow homes may be designed.

Location: Dornbirn, Austria, 2002

Architect: Johannes Kaufmann

Falkenweg two storey homes [*fig. 3.11-3.14*] are longitudinal with sky-lit staircases. Narrow homes have been designed for passive heat gain. A longitudinal staircase encourages flow and allows for natural light to enter deep into the home. The images illustrate the possibility of how an individual narrow home could be spatially organized to allow for light to pass through the home. On the ground floor are the kitchen, dining and living area. On the upper floor are two bedrooms, and access to a balcony. The balcony would also shade the living space on the ground floor. These homes could be

Figure 3.11 - Falkenweg as it appears outside. The facade of the complex has a uniform lengthwise linear pattern. Each unit has a balcony, large window for the sun to access, and a ground floor entrance.

fig. 3.11 Falkenweg , Dornbirn - Photograph. Source: Pfeifer, G. and Brauneck, P., 2008. Row Houses: A Hous*ing Typology*. Boston: Birkhaeuser Verlag AG. p.25.

Figure 3.12 demonstrated a row home complex as a concept image highlighting the lengthwise orientation of the staircase.

fig. 3.12 Falkenweg staircase orientation.

Figure 3.13 portrayed in section view the relationship between each floor, basement, ground and upper floor.

fig. 3.13 Falkenweg section view.

Figure 3.14 illustrated in plan view the spaces on the ground floor, upper floor and roof.

fig. 3.14 Falkenweg plan view.

fig. 3.12-3.14 Falkenweg, Dornbirn floor plans, and sections. Source: Pfeifer, G. and Brauneck, P., 2008. Row Houses: A Hous*ing Typology*. Boston: Birkhaeuser Verlag AG. p.24.

designed with a full basement with access of a hatch (Pfeifer and Brauneck, 2008).

TAKEAWAY FOR MYRIAD VILLAGE

Prior to construction, characterization of the row home could be integrated into the design by the community, or an addition could be the responsibility of the villager themselves. Each villager could also choose the dwelling size based on their own needs.

Living in a row home, villagers would have ground floor access and have reduced heating costs. The amount of construction time would be reduced as well. As an example, the Falkenweg narrow row homes were designed with the consideration of south sun access for passive solar heat gain. Row homes could be designed to access solar heat effectively.

CHAPTER 3.0 CONCLUSION

Through this chapter, a brief overview of ecovillages, principles, guidelines, tools, and structures was discussed. Ecovillages range in size, age, and location. They each have the core intention of being a place of intentional community that shares resources and strives to reduce the use of resources. Reduction of resources has many forms such as; alternative construction methods, reducing, and reusing waste, planning, and constructing in bulk. Using these ideas and applying them to Myriad Village property is the focus of the site design aspect of this practicum. Prior to site design, the existing property features will be identified. For the purpose of this practicum the use of Ecovillage zoning, though not yet granted, will be exercised to design the residence, agricultural development, and camping areas.

CHAPTER 4.0
SITE SURVEY

The conditions on the property of Myriad Village may impact decision making as to where to situate the homes, grazing, and gardens. It may also aid in determining whether or where improving vegetation is required to increase spatial quality for well being.

The soil, hydrology, vegetation, infrastructure, and topography all interrelate with one another creating geographic points with unique conditions. The conditions impact the way in which we can live in that area. Performing a site survey of Myriad Village property is a way to start to form a foundation of how external systems interrelate with conditions on the property. How the landscape has formed, functioned, and how it could continue to evolve with the climate and the presence of a community are all important.

4.0 1 **WATERSHED**
MANITOBA, CANADA

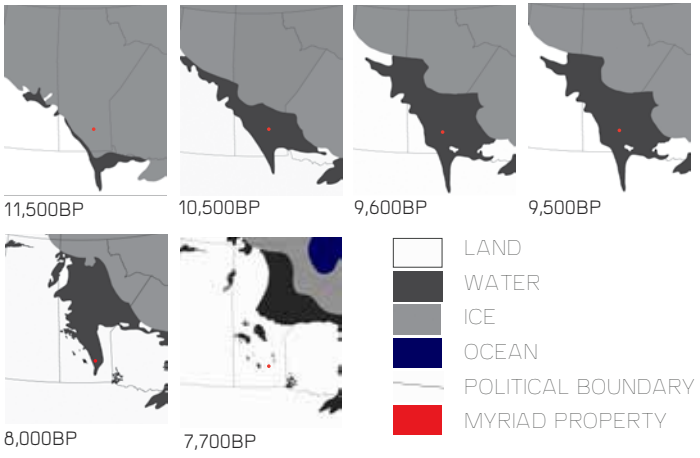


fig. 4.1 Glacial Lake Agassiz deglaciation.

Glacial Lake Agassiz [*fig. 4.1*] formed the prairie region of Manitoba. It left behind the two large lakes [Lake Manitoba and Lake Winnipeg] and many depressions. Depressions that form Dennis Lake [*fig. 4.3*] are a part of the Willow Creek watershed [*fig. 4.2*]. The watershed flows in the general south-east direction toward Willow Creek and into Lake Winnipeg. Lake Winnipeg has had water pollution issues. Therefore, efforts are being made to reduce rates of contamination (East Interlake Conservation District, 2012).

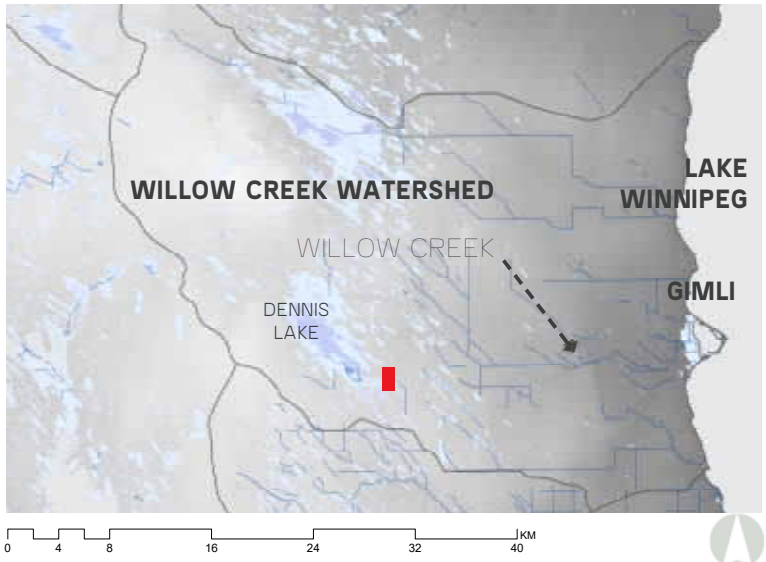


fig. 4.2 Willow Creek Watershed.

4.0 2 **SOIL**

Glacial Lake Agassiz's formation process contributes to the soil conditions at Myriad Village. Over the years studies have been performed by Agriculture and Agri-Food Canada [1998], and they have compiled data for Canada's Land Inventory, a national soil database. Soil conditions at Myriad Village [*fig. 4.4*] have been indicated

fig. 4.3 Dennis Lake and Myriad Village Property.

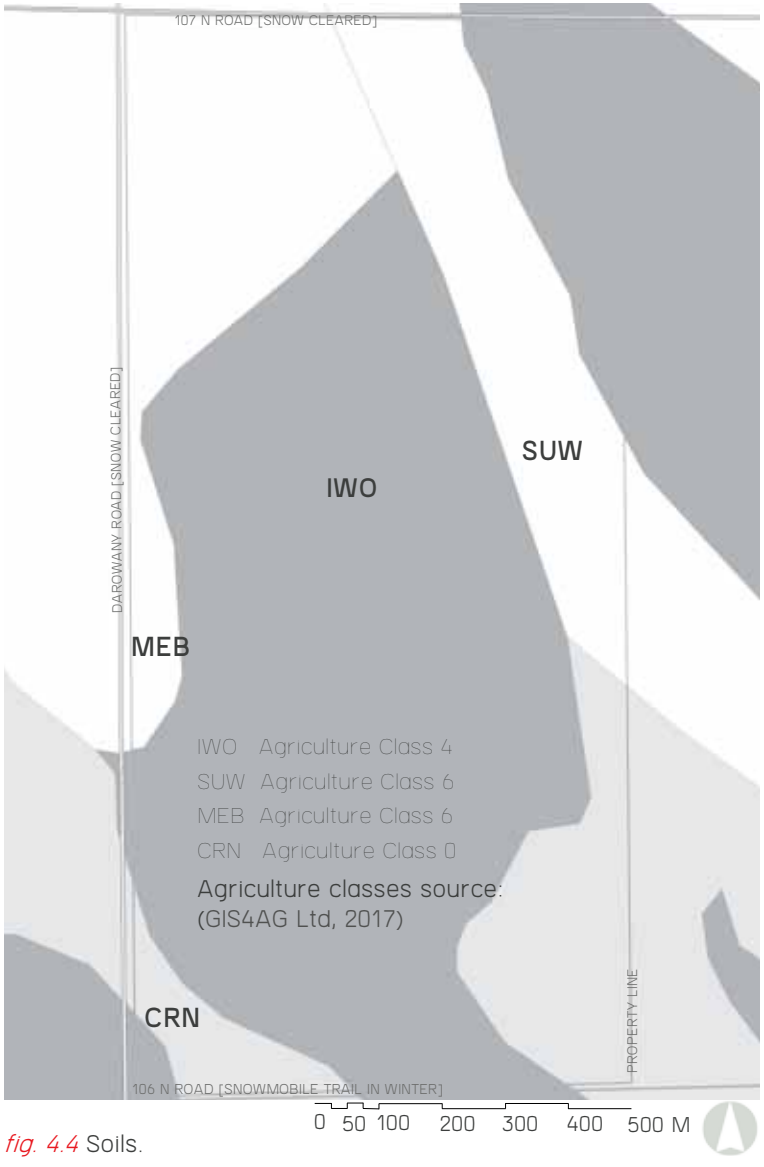


fig. 4.4 Soils.

to be either agriculture class 0, 4 or 6. Agriculture class 0 is organic and not placed as a class. Soils with agriculture class 6 have been indicated to have qualities where improvement practices are not feasible, though there is potential for annual forage, and may be potential for grazing of the natural grasses (Agriculture and Agri-Food Canada, 1998). Agriculture Class 4 soils may require strict conservation practices, may have success with some field crop although yield may be low or there may be a high risk of crop failure (Agriculture and Agri-Food Canada, 1998).

Soils with the identification of IWO, SUW, MEB, and CRN on the property of Myriad Village are a mix of sand, boulders, silt and clay (Government of Canada, 2013). These soils have also been indicated to be extremely calcareous (Smith, et al., 2001; Government of Canada, 2013).

TAKEAWAY FOR MYRIAD VILLAGE

Soils at Myriad Village best for gardening would be

fig. 4.5-4.8 Water gathering on points across the site.

soil class 4 where improvement practices (such as spreading manure) may be performed. The other areas may be suited for natural forage. The hydrology and topography could also alter the gardening potential. Many forms of gardening could be explored. Often these methods include altering the way in which water sits on the landscape as each plant species has a different tolerance to moisture in their root system.

4.0.3 **TOPOGRAPHY**

There are minor variations in grade across Myriad

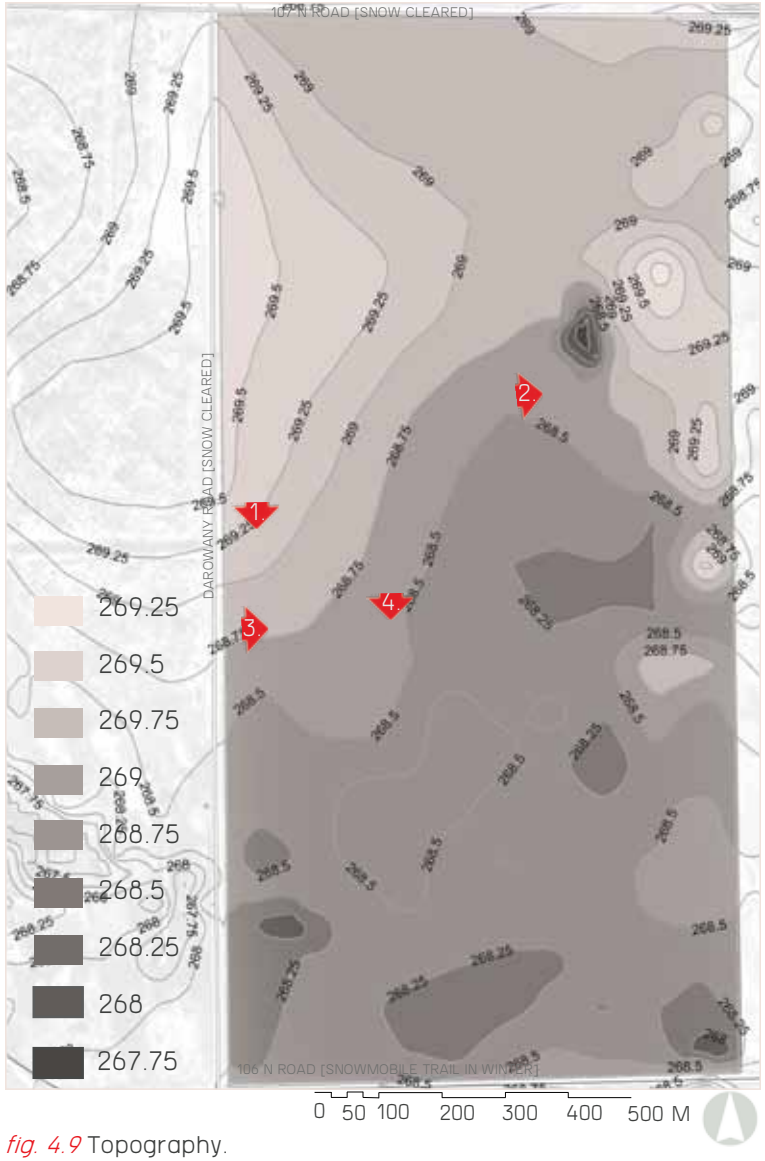


fig. 4.9 Topography.

Village. The depressions and deposits from the deglaciation of Glacial Lake Agassiz and previous land occupants [*fig. 4.5-4.8*] have created conditions where water gathers across Myriad Village landscape. Figure 4.9 illustrates the gradual change in elevation of 1.5 meters across the property. The lighter gray contours are the high points whereas, the darker regions are low points.

TAKEAWAY FOR MYRIAD VILLAGE

Identifying that the west area of the north side of the property as the highest elevation will assist in determining the flood risk areas. Following the determination of the flood risk areas, spatial possibilities for constructing homes on Myriad Village may reveal themselves.

4.0.4 SURFACE WATER DRAINAGE

Studies have been executed throughout the 1970's (Harrison, 2005) to determine drainage in the prairies. Myriad Village is a part of the greater Lake Winnipeg drainage basin in Manitoba. The Manitoba landscape is comprised of a series of depressions impacting the flow rate from the water events to the larger drainage basin. During larger water events the usage of Lake Winnipeg as a drainage basin increases, whereas smaller water events require usage of the depressions rather than the larger drainage system (Harrison, 2005).

A significant portion of the property drains west towards Dennis Lake. The hydrometric gauging stations monitor the immediate water drainage overflow of Myriad Village. The two hydrometric station catchment [*fig. 4.10*] areas could be followed by the topographic contours to off-site depressions such as Dennis Lake.

TAKEAWAY FOR MYRIAD VILLAGE

The increase of elevation and existing drainage patterns suggest areas in the North part of Myriad Village's property may retain less water over a given amount of time. Visualizing topography changes may aid in guiding

decision making as to where to situate structures, roads, and another landuse plausibility.

4.0.5 **HYDROLOGY**

On-site, hydrological features [*fig. 4.11-4.16*] that gather water include an intermittent marsh and some dugouts. A drainage ditch that begins in the middle of the neighbor's property aims to manage the intermittent marsh.

The light gray spots in figure 4.16 were mapped using satellite imagery. They are spots where water has shown to gather seasonally and may not occur every year. Other aspects mapped include marsh-like conditions, [*fig. 4.14* - image four] where water may be retained at an increased rate in the soil intermittently. Other surface water includes a few dugouts that hold water year-round.

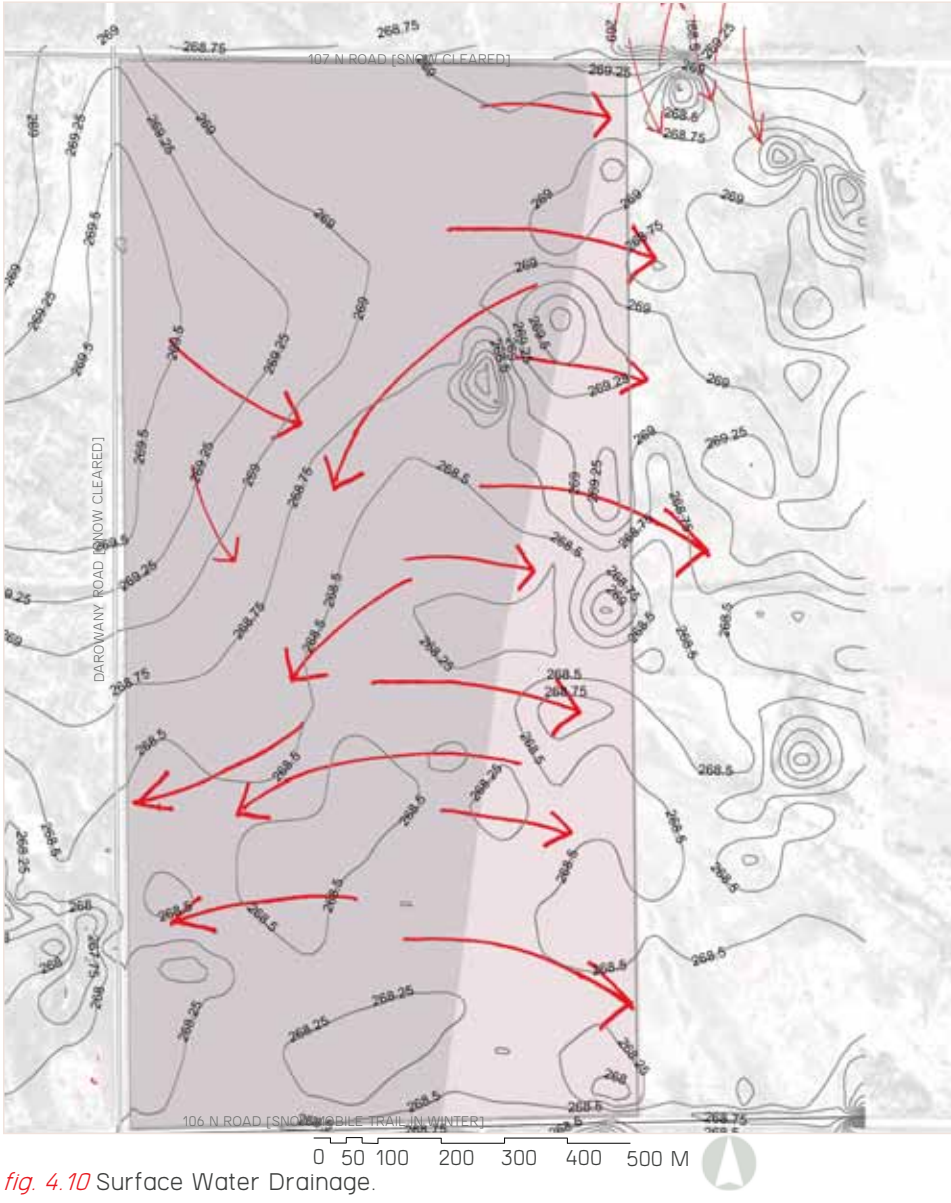


fig. 4.10 Surface Water Drainage.

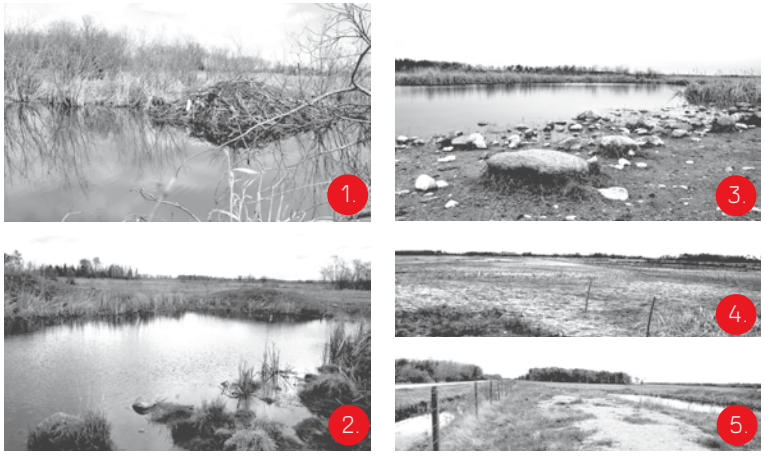


fig.. 4.11-4.15 Water body locations.

SEASONAL WET AREAS
[Source: [DigiGlobe, 2012]
INTERMITTENT MARSH
INDEFINITE MARSH
DUGOUTS
PROPERTY LINE
CONTOURS
GRASS
DITCH

TAKEAWAY FOR MYRIAD VILLAGE

Aside from natural depressions, dugouts are a method to manage water and could work with the existing hydrological and topographical conditions.

4.0.6 **VEGETATION**

As the property is on the south-east edge of Dennis Lake the southern region and northern corner of the

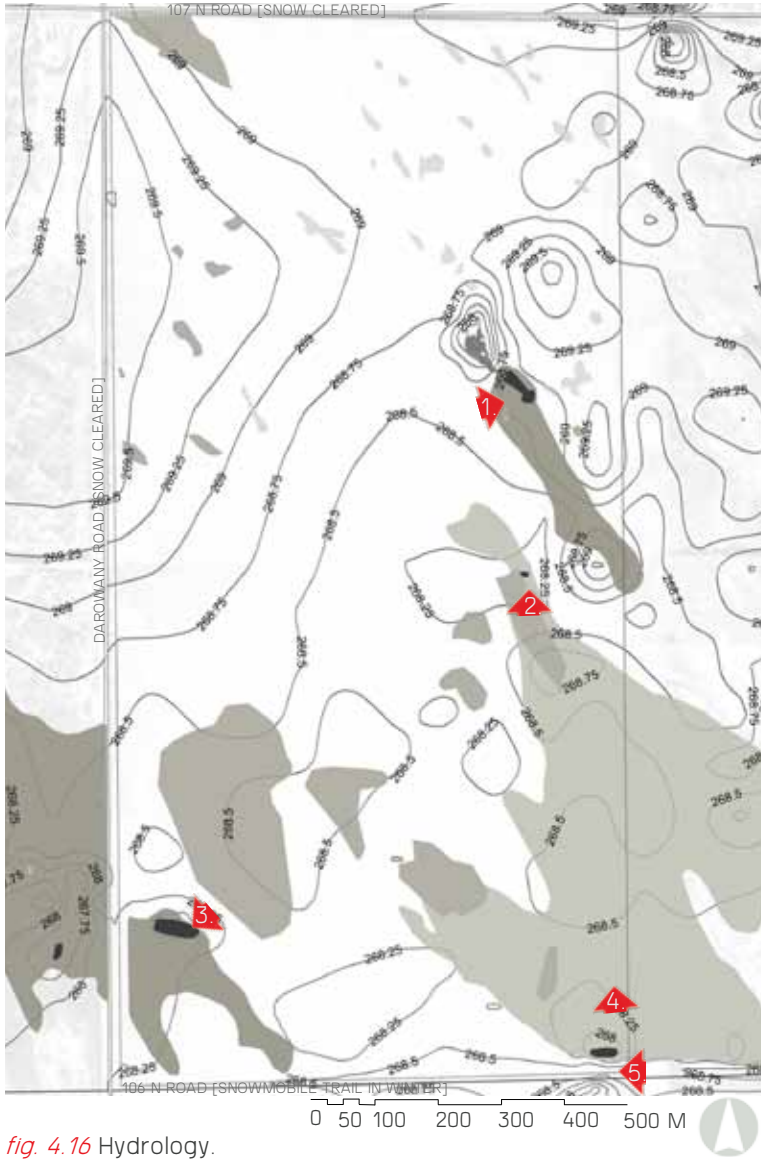


fig. 4.16 Hydrology.

property, consist largely of [*fig. 4.17*] marsh conditions. The marsh conditions consist of patches of marsh grasses integrated with prairie grass. In the center of the property are prairie successional shrub species such as hazelnut, hawthorne, and Cherry (Packard and Mutel, eds., 1997).

In partial fulfillment of this Masters Practicum, a topics research course was completed. The topics course entailed performing a tree inventory on the property. It concluded that vegetative cover is roughly 25% with a vast majority of the trees being stunted Trembling aspens. It is speculated that the former agriculture cattle operations and the marsh-like conditions reduced the growth of vegetation. Most tree species were Bur oaks [*Quercus macrocarpa*], Trembling aspen [*Populus*

fig. 4.17 Vegetation.

tremuloides], Balsam popular [*Populus balsamifera*] and a couple of White spruce [*Picea glauca*]. Further information indicated that the calcareous soils in the area result in poor growth and form of aspen trees (Smith, et al., 1998).

TAKEAWAY FOR MYRIAD VILLAGE

The calcareous soils impact the growth of the Aspen trees that mainly compose the tree canopy at Myriad Village. Apart from vegetation, there is minimal other infrastructure. There is an opportunity to increase vegetation. Saplings have been sighted on the property demonstrating favorable growing conditions.

4.0.7 **INFRASTRUCTURE**

As the property was formerly a cattle and agriculture field, there is minimal infrastructure [*fig. 4.18*]. Infrastructure at Myriad Village consists of: grass roads, an access point with a culvert, a composting outhouse, compost, tree nursery, straw bale seating around a community fire pit and a domestic well.

On the north side of the property are hydro and phone lines. Gas lines are common to communities, though are not currently present on the property. The previous owners constructed a barbed wire cattle fence. Other notable wildlife infrastructure includes a beaver dam and birds of prey nest.

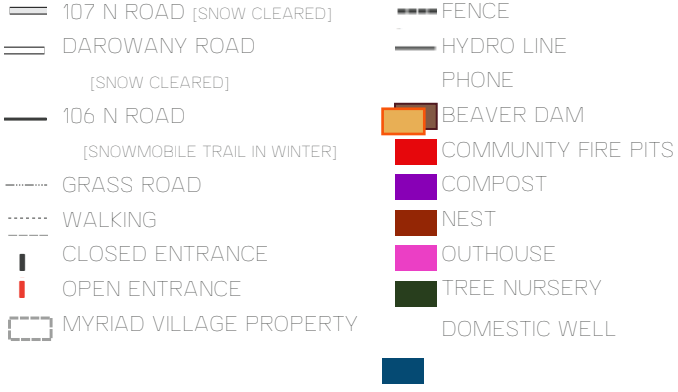
TAKEAWAY FOR MYRIAD VILLAGE

Once new zoning by-laws have been agreed upon between Myriad Village and the Municipality of Armstrong, further infrastructure may be implemented. Current Manitoba by-laws prevent Myriad Village from constructing permanent structures on the property. The community has begun to construct useful infrastructures such as a domestic well, outhouse and access point. As follow up from the site survey, the infrastructure that may serve Myriad Village in some form could be the domestic well, road culverts, entry points and hydro lines. The hydro lines may be useful if solar energy does not meet the energy requirements for the community. Existing wildlife habitats could be areas to explore.

4.0.8 **WELL AND SOIL PROFILE**

The domestic well on the property of Myriad Village was installed on the 25th of August 2017. Some information listed in the well log could impact concept design decisions such as the soil profile [*fig. 4.19 and 4.20*], and the well classification.

Classifications of the well suggest the potential of water quantity accessible to the well. To develop an understanding of the potential water quantity available to the domestic well at Myriad Village, examining other classifications could provide insight. As found, according to *The Drinking Water Safety Act*, there are three well classifications.



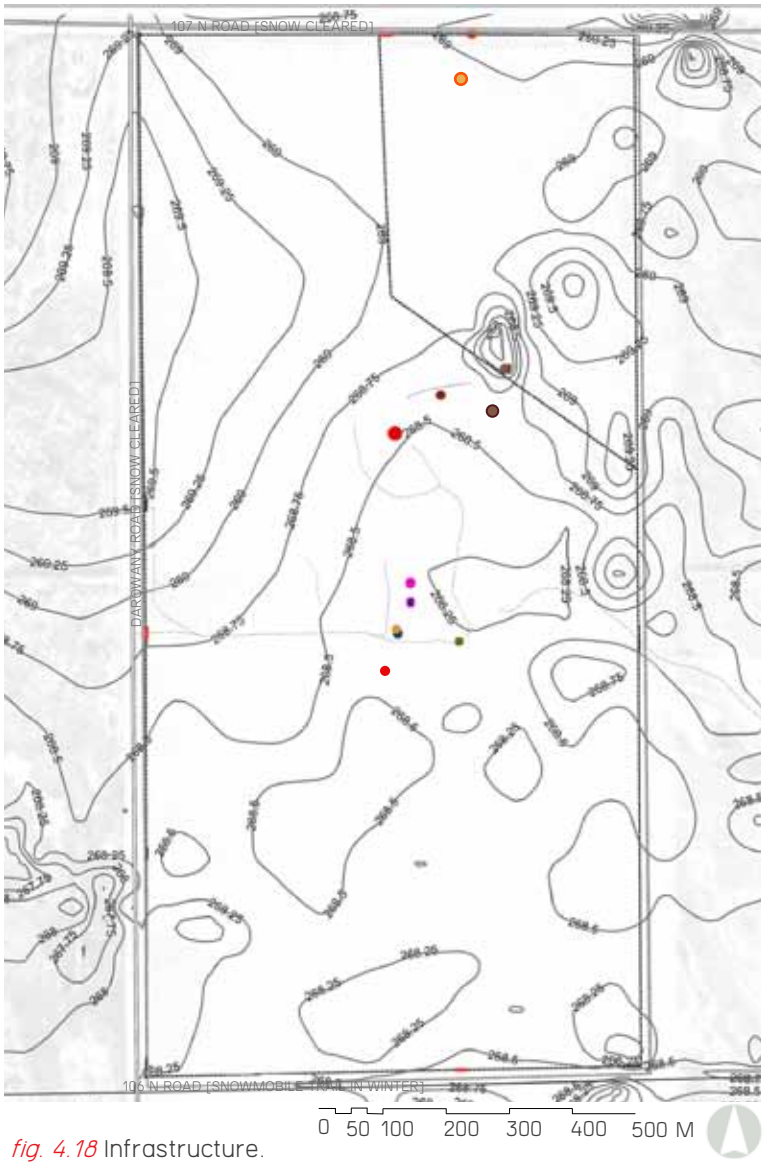


fig. 4.18 Infrastructure.

Public, Semi-Public, and *Domestic* (private). Domestic wells are commonly to service the household, for purposes such as hygiene, drinking and washing dishes.

A well is also referred to a water system such as: *Public, Private,* and *Semi-Public*. A public water system usually has 15 or more service connections. A private water system only supplies water to one private residence and semi-public water system is neither private nor public.

The soil profile at the well suggests there is minimal soil available for growing of garden produce as the existing soil consists of dense prairie grass roots.

TAKEAWAY FOR MYRIAD VILLAGE

It may be possible to upgrade the existing domestic well if it is not meeting the needs of the village (Green Communities Canada, 2017). As Myriad Village property is quite large, it may be of benefit to construct a second well to reduce overall costs.

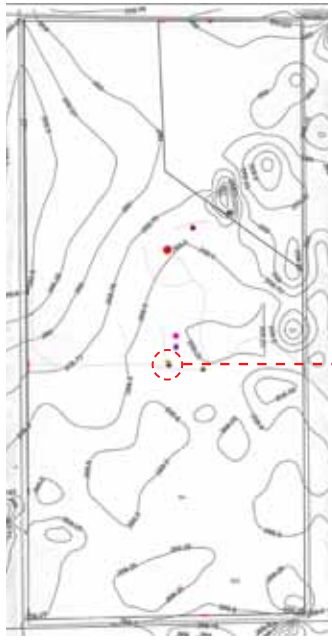


fig. 4.19
Location of the domestic well.

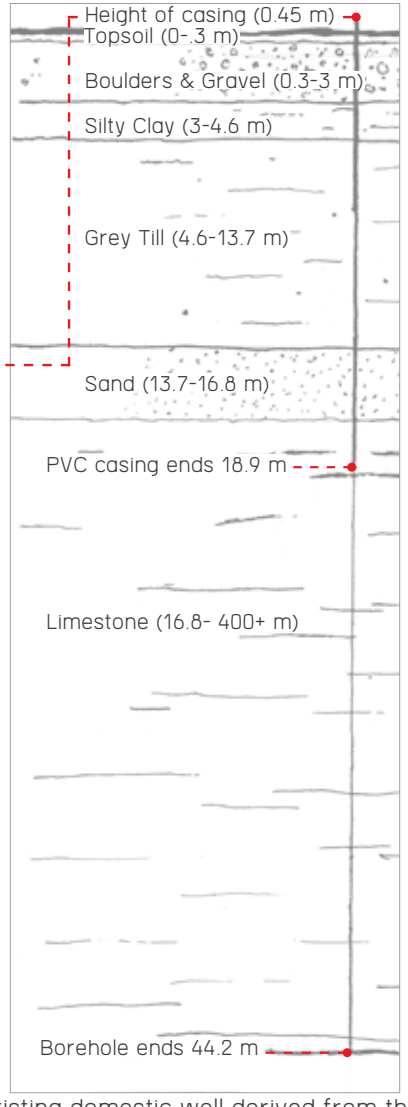


fig. 4.20 An Illustration of the existing domestic well derived from the report for Well #001021. Data derived from Guy Rohne [Well Driller].

CHAPTER 4.0 CONCLUSION

There is value in realizing the functional traits of the landscape. As a whole, the Myriad Village drainage system connects to Dennis Lake. The southern area has marsh with grasses that filter the water. The soils are clay based and are slow draining. Surface water fluctuations tend to occur due to the water levels in the area.

Though elevation change across the property is minor, patterns may indicate that vegetation does form an overall relationship with the landscape. There may be an opportunity to increase the vegetation on the property as there are areas where saplings grow.

As part of completing the site survey, the site characteristics will be explored.

CHAPTER 5.0
SITE CHARACTER

Each village has a unique quality created by the landscape in which it dwells. Myriad Village is in its beginning stages. It will evolve, go through transitions and grow. As it does, it will begin to write its own story. Myriad Village property was divided into 5 characteristics and implemented onto a map [*fig. 5.1*]. The intent of indicating the site characteristics is to aid in developing an overview of the landscape and its common qualities.

Site Character A is shown on the map in figures 5.1, 5.2, and the photograph in figure 5.3 as of September 2017. It is a stoney area with open forest patches, shrubs, and new growth. Site Character B is shown on the map in figures 5.1, 5.4, and the photograph in figure 5.5 as of June 2017. It is a forested area with shrub undergrowth, dugouts and has beaver activity. Site Character C is shown on the map in figures 5.1, 5.6, and the photograph in figure 5.7 as of September 2017. It is a forested area with shrub undergrowth, and several community facilitates. Site Character D is shown on the map in figures 5.1, 5.8, and the photograph in figure 5.9 as of September 2017. It was a former agricultural production field that has a dense forest with shrubs as undergrowth in the center of the field. Site Character E is shown on the map in figures 5.1, 5.10, and the photograph in figure 5.11 as of June 2017. It is an area with long grass, dugouts, marshy areas, and old road and open forest.

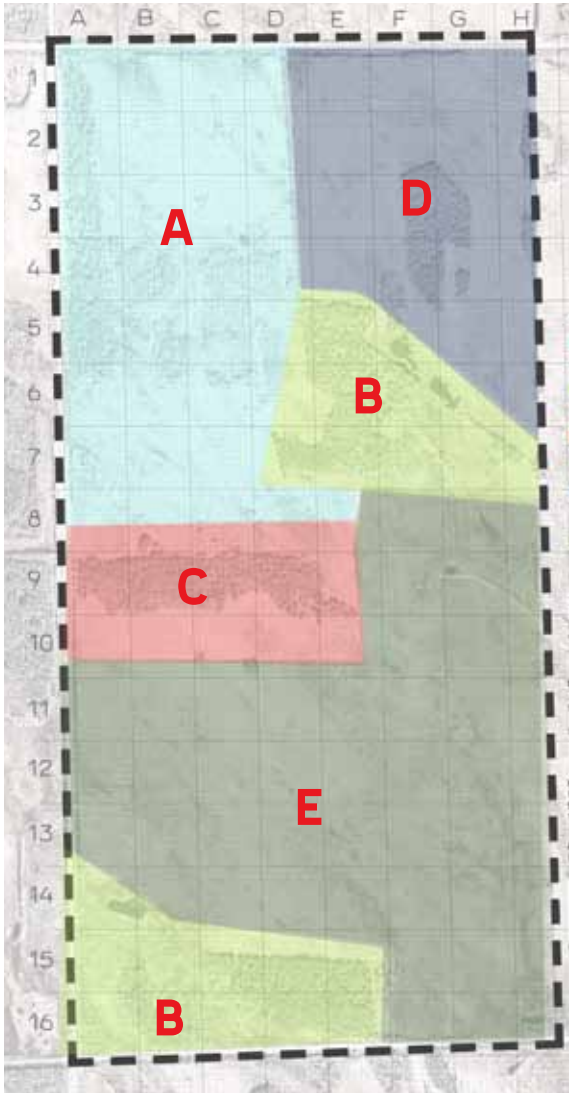


fig. 5.1 Site character map. [Grid on map is 100 m x 100 m].

fig. 5.2 Site Character A - Map.
fig. 5.3 Site Character A - Photograph.

SITE CHARACTER A
September 2016

It is a stoney area with open forest patches, shrubs and new growth.

fig. 5.4 Site Character B - Map.
fig. 5.5 Site Character B - Photograph.

SITE CHARACTER B
June 2017

It is a forested area with shrub undergrowth, dugouts and has beaver activity.

fig. 5.6 Site Character C - Map.
fig. 5.7 Site Character C - Photograph.

SITE CHARACTER C
September 2017

It is a forested area with shrub undergrowth and several community facilitates.

fig. 5.8 Site Character D - Map.
fig. 5.9 Site Character D - Photograph.

SITE CHARACTER D
September 2017

It was a former agricultural production field that has a dense forest with shrubs as undergrowth in the center of the field.

fig. 5.10 Site Character E - Map.
fig. 5.11 Site Character E - Photograph.

SITE CHARACTER E
June 2017

It is an area with long grass, dugouts, marshy areas, and old road and open forest.

5.1 EXPERIENTIAL SITE CHARACTER MAP

Figure 5.12 represents a compilation of experiences had on the property through a series of visits beginning in February 2017 continuing until March 2018. Some of these visits were day trips, and others involved camping in various areas.

Images on the map relate to the views and characteristics found in the general area on the property. The provides a visual of spaces that hold a memorable quality. Marked with a black dot are panoramic views. These are areas that held an essence unique to the location. Some of the panoramic views were in amongst oak trees, in a savanna, where food may be found, wildlife habitats, while others were in the direction of the vast open prairies.

Vast open prairies such as in the South part of the property provide space for the mind to wander, whereas urban spaces often tend to guide one's thoughts with the built environment.

The range of spaces creates a diverse experience while walking through the landscape. Spatial characteristics may intuitively guide design decisions. Over time some of the qualities may change. By identifying key features ahead of time, one could integrate them into the design of the community.

TAKEAWAY FOR MYRIAD VILLAGE

The marked qualities are only a glimpse of features to be observed on the property, marked to inspire future visits to these spaces and explore areas unmarked.

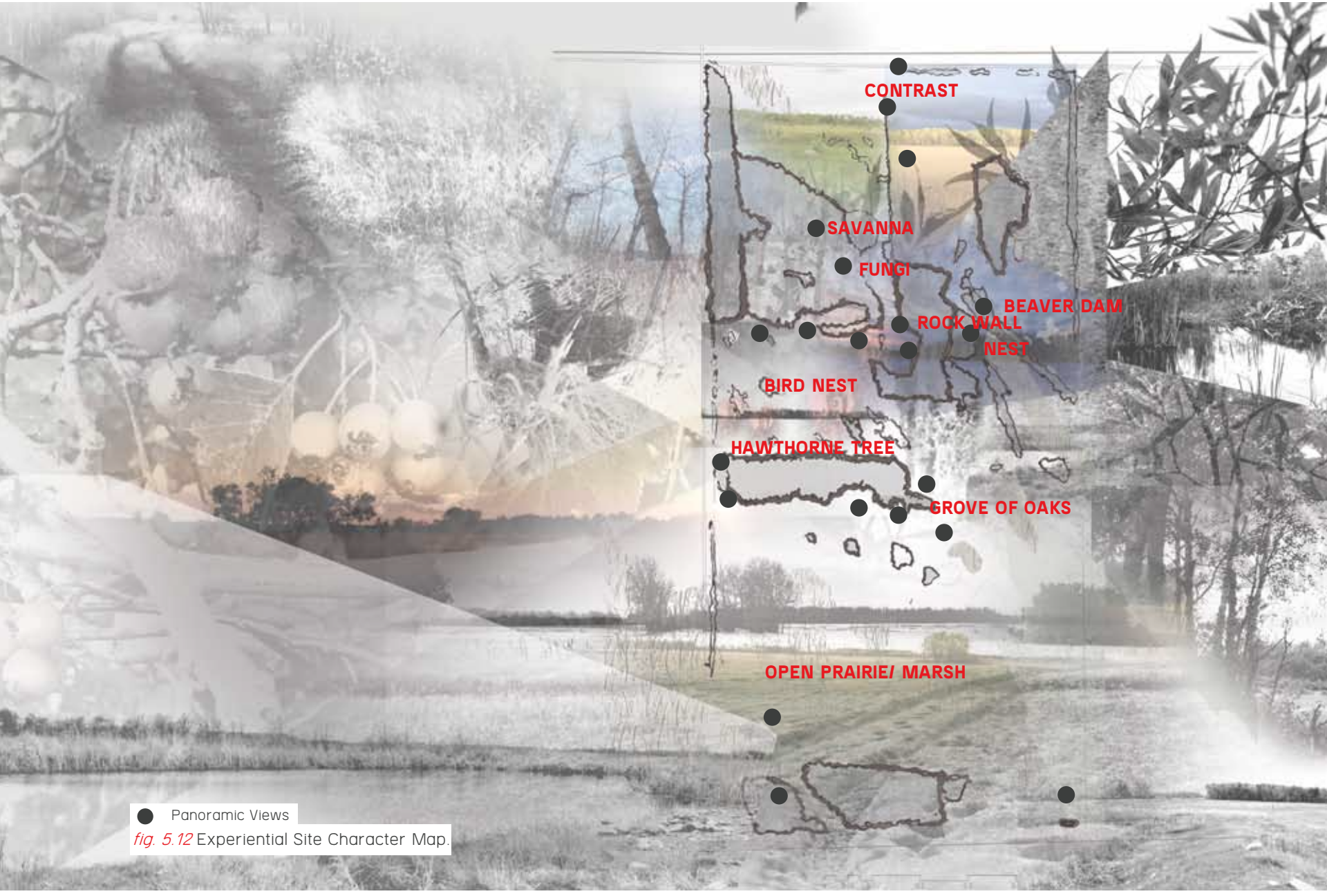


fig. 5.12 Experiential Site Character Map.

CHAPTER 5.0 CONCLUSION

The range of natural spaces creates a characteristically diverse environment to explore and inhabit. For example, spaces such as the open prairie in the South, savanna, and grove of oaks. These spaces may be considered in the design.

CHAPTER 6.0
WEATHER: SUN, SHADOW, WIND AND SNOW DRIFT STUDIES

In Manitoba, sun, wind and particularly snow impact our environment and how we relate with it. The elements will affect the developing village. Some of the intentions for the evolving landscape include: vehicular access, gardens, camping pockets, vegetation enhancement, refugee, animal grazing and so forth.

The objective of chapter 6.0 is to discern a framework of the how the sun, wind, and snow relate to the existing infrastructure and environmental conditions identified through the site survey.

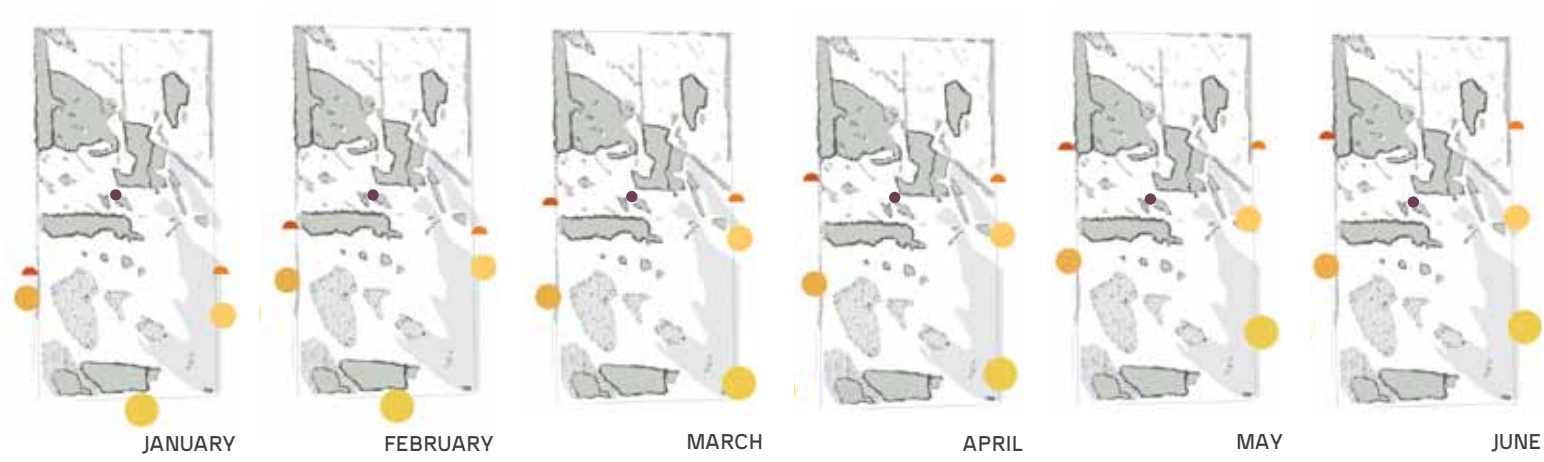


fig. 6.1 Sun Studies. Derived from (Sunearthtools, 2018).

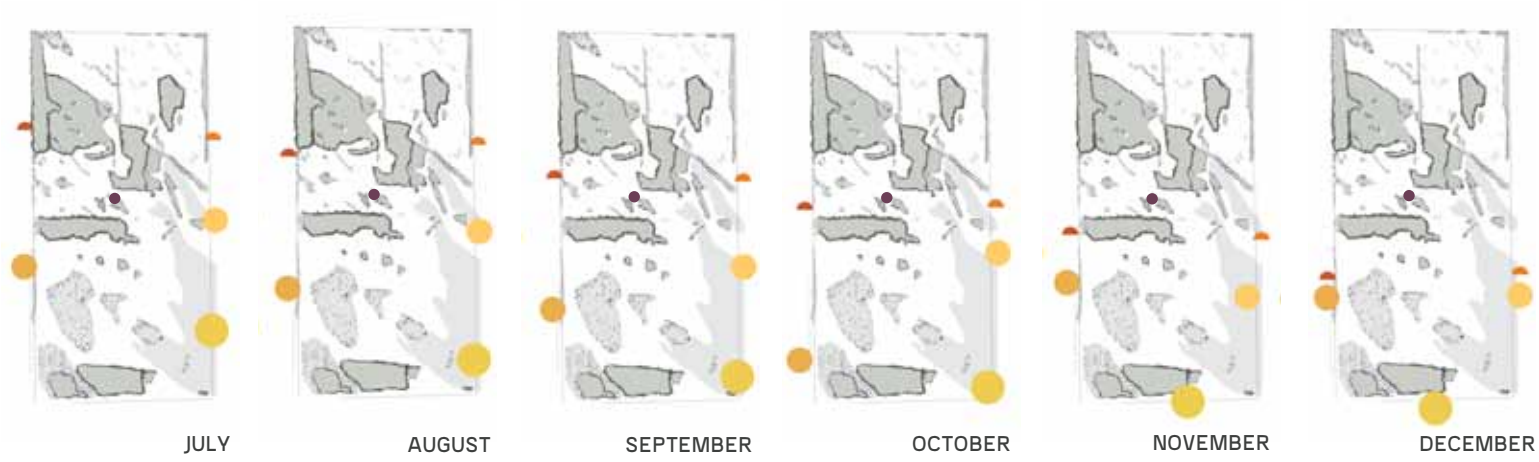
6.1 SUN STUDIES

Sun impacts much of what we do on this planet. It provides energy for vegetation; it has been harnessed by solar panels, and much more. The sun also reaches each point on the landscape from a different position and altitude. Sun path diagrams have been developed to illustrate the position [azimuth] and altitude in relation to the latitude.

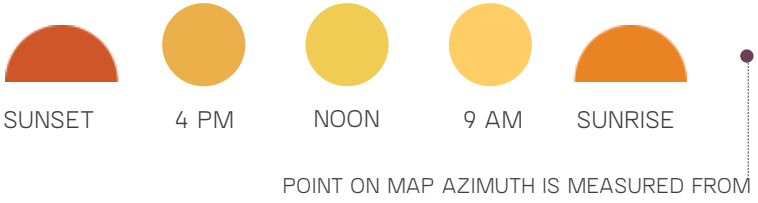
The property of Myriad Village is in the 50 north latitude zone (Sunearthtools, 2018). The following graphic [*fig. 6.1*] illustrates the range of the suns position on the 21st of each month. The angle/position/azimuth of the sun was measured from the black point on each map as if standing in the center of the property.

TAKE AWAY FOR MYRIAD VILLAGE

The map could be a tool demonstrating the position of the sun during the hot summer months, where sunrise



and sunsets may be viewed, as well as the range the sun crosses the sky over the course of the day. The longer the path suggests the sun being in the sky for an extended period of time. For example, during the spring and fall, sunrises may be viewed in from the center of the property. While during sunrises are best viewed in the winter months from the south-east.



TIME OF AZIMUTH

6.2 SHADOW STUDIES

Throughout the year the sun shines from different directions [*fig. 6.1*] casting shadows [*fig. 6.2*] of different lengths depending on the height of the object, time of day and year. The shadows illustrated in figure 6.2 range from 10 am - 12 pm to demonstrate the range the sun moves in two hours.

In an ecovillage, the sun's rays are of value to provide energy to the home in the form of heat [passive solar heat gain] and light. During the winter the sun casts long shadows [*fig. 6.2*]. Therefore, attention is necessary to the distance between shadowcasting forest trees and the large south facing windows on the homes. The longest shadows occur on the winter solstice [21 December]. A couple of single trees with no leaves will not have as much sun blocking impact as a densely forested area.

In Manitoba gardening has often occurred beginning in May. Shadow movement from May until June does not vary greatly [*fig. 6.2*].

TAKEAWAY FOR MYRIAD VILLAGE

Primary objectives of the practicum are to maximize on sun access to the homes in winter and summer to source energy for gardening. Ecovillage design often incorporates permaculture design [*fig. 3.4*] with gardens near the homes. A gardening area is suggested to be spaced at least 12 meters from a building height of 7 m [*fig. 5.7*].

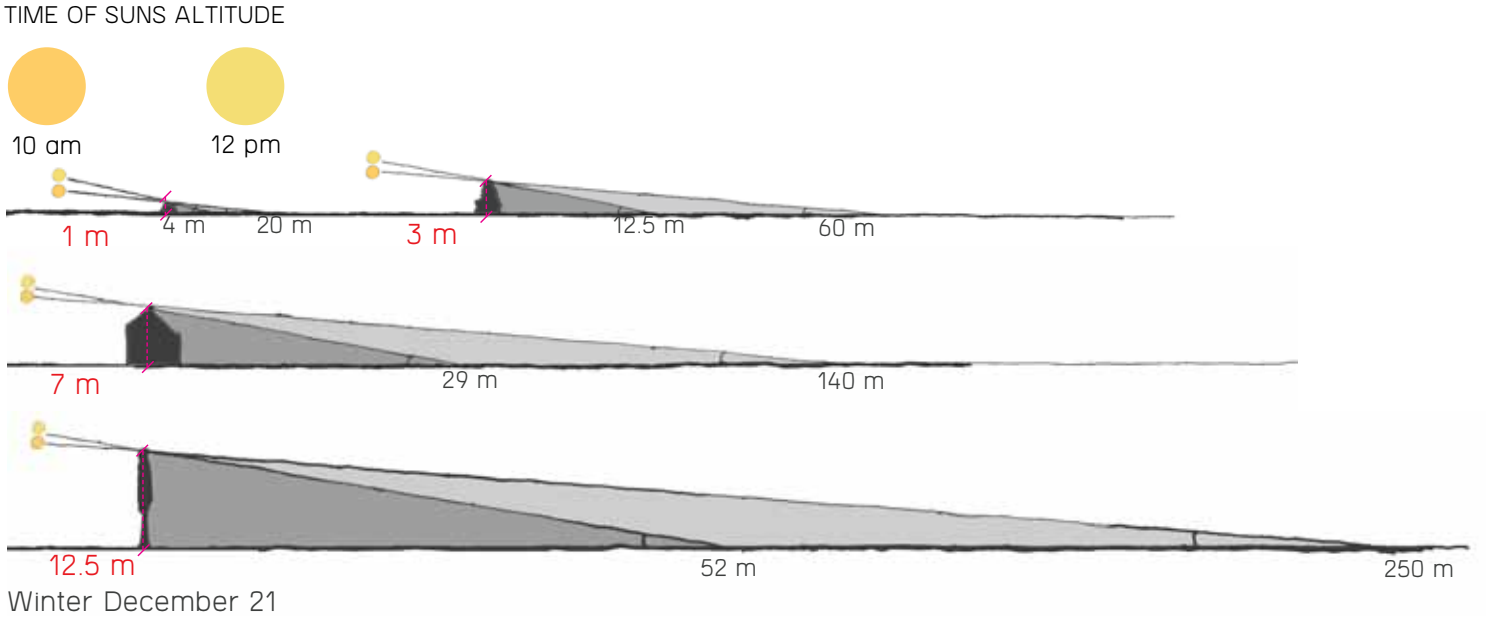


fig.6.2 Shadow Studies. Derived from (Austen, 2018; Sunearthtools, 2018).

6.3 WIND STUDIES

Wind temperature and direction range throughout the year [*fig. 6.3*]. In the months of [*fig. 6.3 and 6.4*] January, May, June, August, November, and December the general wind direction is from the north. In the months of [*fig. 6.3 and 6.5*] February, July, September, and October the general wind direction is from the south. During March the wind generally blows from the northeast.

TAKEAWAY FOR MYRIAD VILLAGE

The wind affects the windchill on the homes in winter and how the snow moves across the landscape. Most wind chill comes from the south-west and north-west. During only one-month wind chill may come from the northeast.

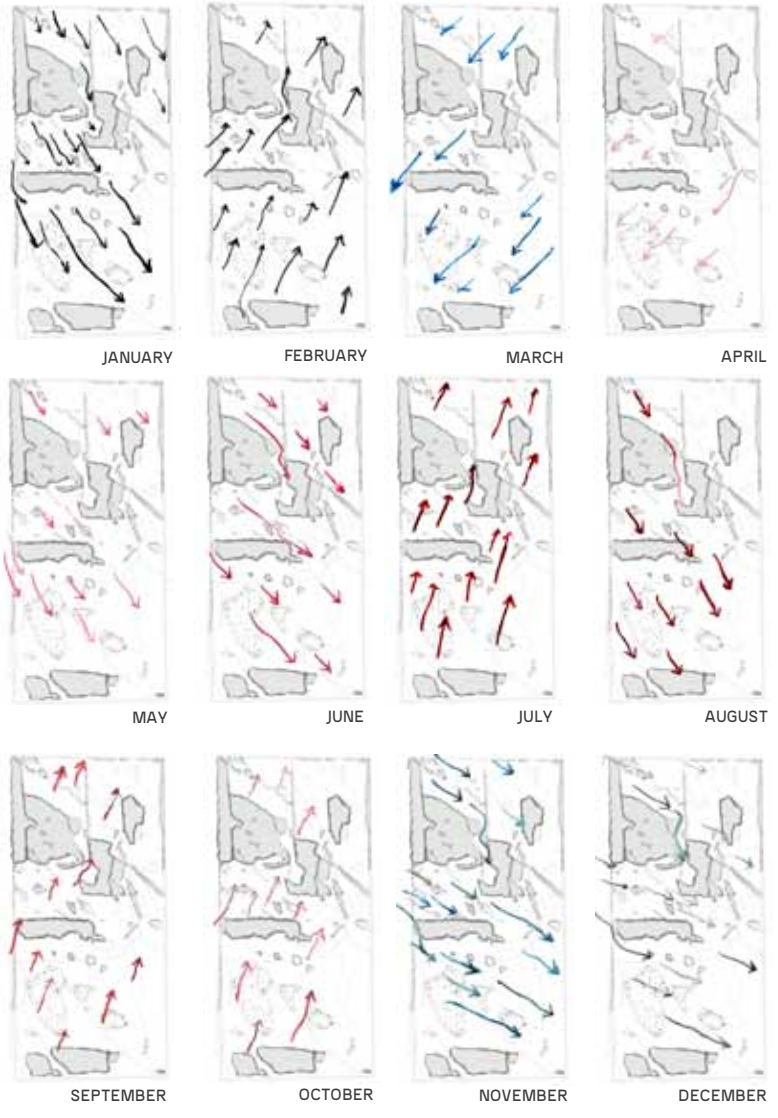


fig. 6.3 Wind Studies. Derived from: Gimli Airport (Windfinder, 2018).

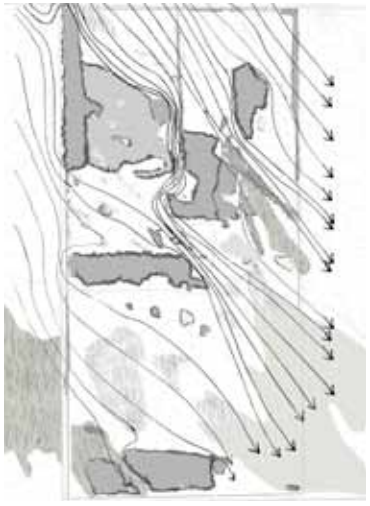


fig. 6.4 North Wind - During January, May, June, August, November and December.

fig. 6.5 South Wind - During: February, July, September and October.

6.4 SNOW DRIFT STUDIES

6.4.1 ACROSS TERRAIN

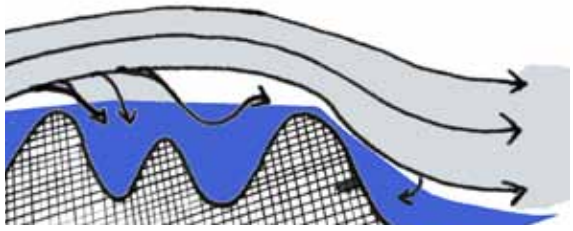
Manitoba has long winters, so snow is a significant factor and needs to be studied. Research has found that 90% of snow moves within 30 centimeters off the ground (Agriculture Canada, 1978, p.11). On the prairies, most snowdrifts occur from previously fallen snow blown by the wind as opposed to current snowfall conditions. Snow drifts do not usually occur until wind speeds are 15 km/h and the wind has the adequate velocity to pick the snow up off the surface of the landscape. (Agriculture Canada, 1978, p.11). The terrain, structures, and vegetation on the landscape impact how and where snow will gather.

In Manitoba snow may be present from October until April. Myriad Village property was visited on two occasions during the winter as a method to observe the relationship between the vegetation and snow. The snow conditions on the days of the visits were as follows:

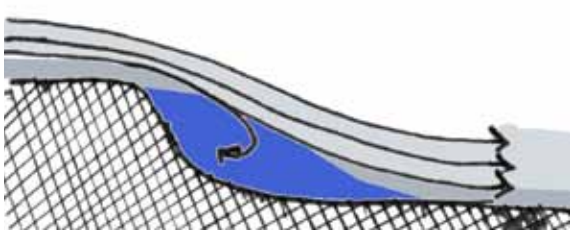
January 14th, 2018 the weather was windy with blowing snow towards the south, slightly west. On March 9th, 2018 it was bright and sunny. There was no visible snow movement.

Alongside visits to Myriad Village research was conducted to develop a deeper understanding as to what was being observed.

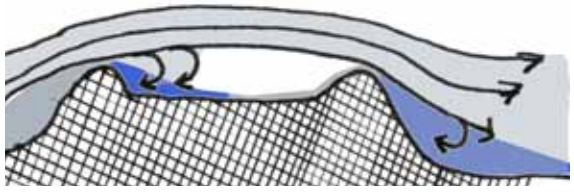
An overview of what was observed on the property is illustrated in figures 6.6 - 6.12. In the center of the area, there are minor elevation changes creating spaces where snow is deeper such as figure 6.6, 6.7, and 6.12. Slopes [*fig. 6.7, 6.8 and 6.12*] also gather more snow such as on the edges of the dugouts near the beaver pond. On the property of Myriad Village, snow also drifted on the road [*fig. 6.10, 6.11 and 6.12*].



1. *fig. 6.6* Depressions and other rough terrain.



2. *fig. 6.7* Drops, Slopes, Cliffs, Edge of Dugout



3. *fig. 6.8* Crater, Road Eg, Tire tracks in snow

1. *fig. 6.9* [January 14th] Snow drift depression photograph.

2. *fig. 6.10* [January 14th] Snow drift slope photograph.

3. *fig. 6.11* [January 14th] Snow drift crater photograph.

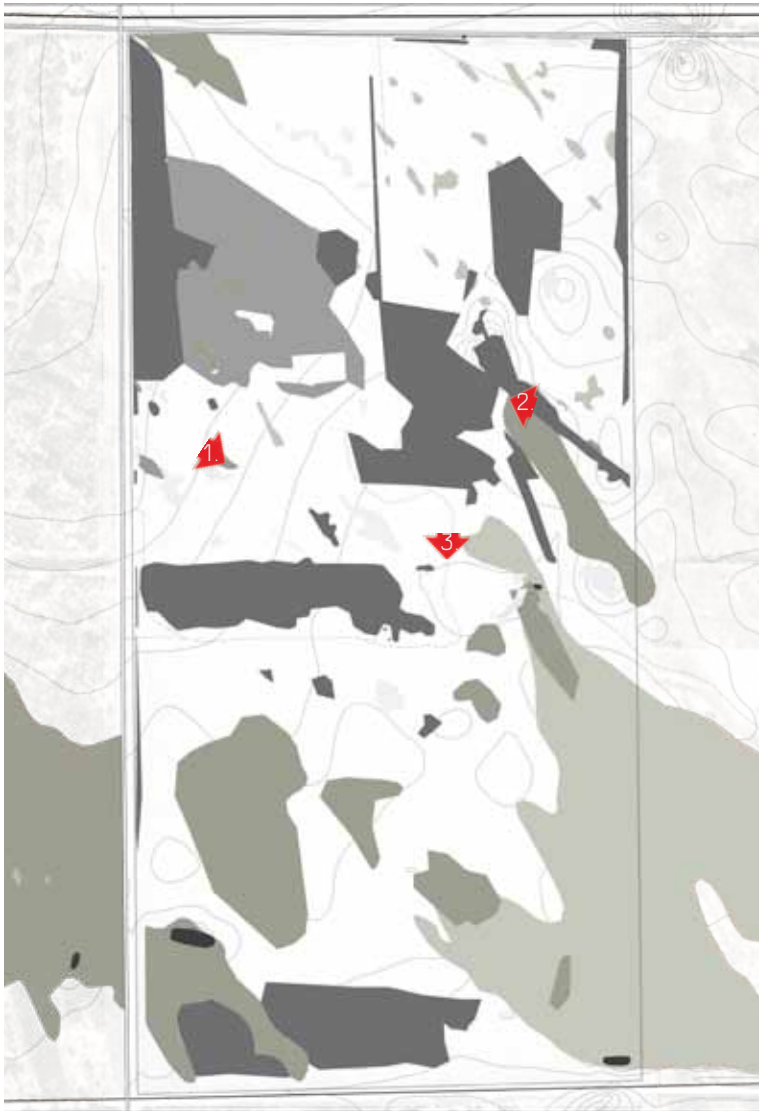


fig. 6.12 Snow drifts locations.

PROPERTY LINE
CONTOURS
GRASS
DENSE FOREST
OPEN YOUNG FOREST
SEASONAL WET AREAS
[Source: [DigiGlobe, 2012]
INTERMITTENT MARSH
INDEFINITE MARSH
DUGOUTS

6.4.2 AROUND OBJECTS

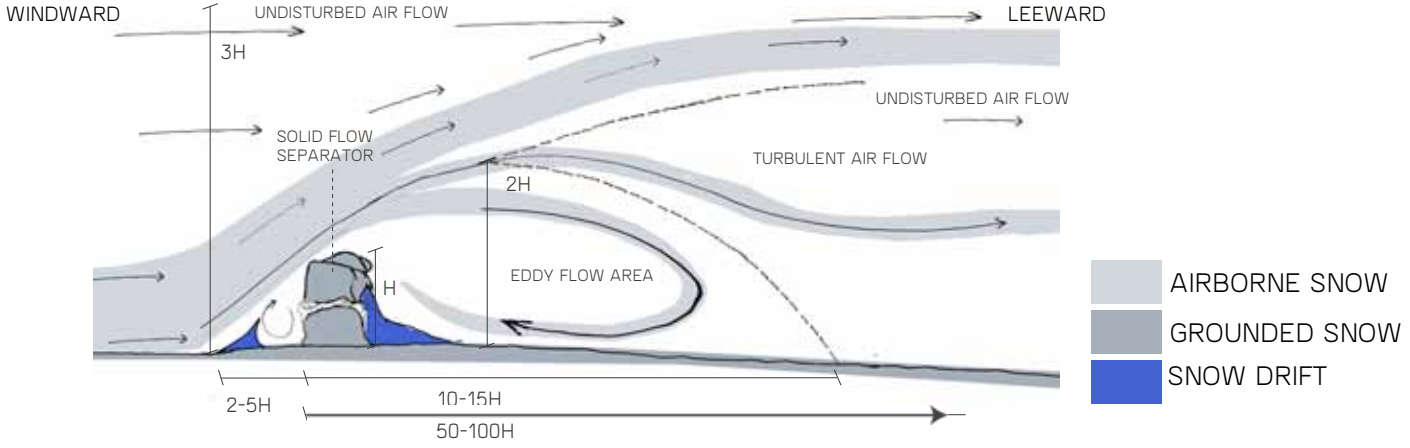


fig. 6.13 Snow drifts - Around a solid object. For a solid object the highest turbulence occurs at 5H (5x [H]) Where H = the height of the object. Data derived from (Agriculture Canada, 1978).

Snow drifts occur when wind contacts a solid object [*fig. 6.13*] and separates. The faster the wind, the longer the leeward shadow. If an object has a long leeward shadow, that suggests a greater distance where snow may be deposited by a series of swirling eddies. On the leeward side of an object, turbulence is created, reducing velocity, therefore, depositing snow.

Snow drifting varies depending on the density of the windbreak. A solid fence is an example of a dense windbreak. If the windbreak is solid (e.g., a fence or strawbale) snowdrifts will form on the windward and leeward side. On the windward side, there will be a clearance space where the wind deflected off the fence circling back in the direction of the wind. The snow will appear cliff-like. Snow blows over the fence, and since there is a change in wind flow on the leeward side, this creates an area of turbulence.

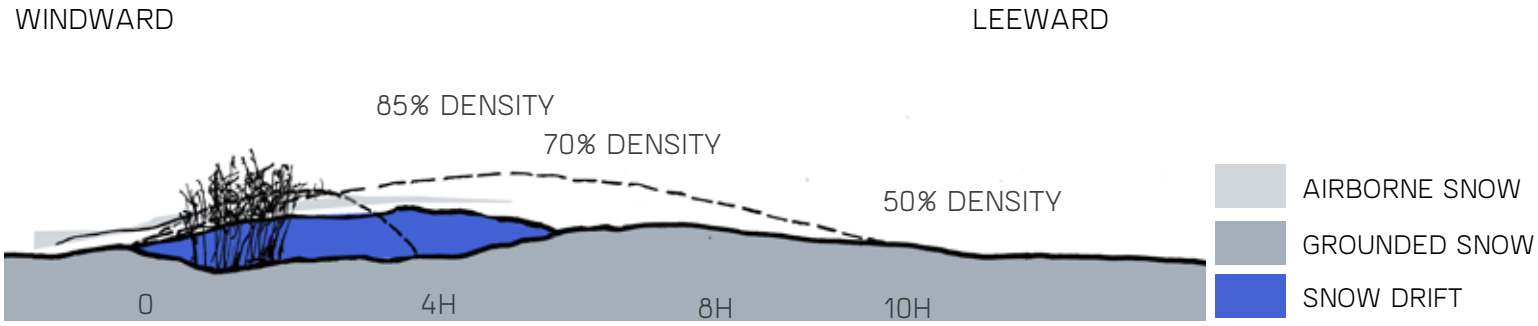


fig. 6.14 Snow drifts - Around a permeable object. Derived from (Agriculture Canada, 1978).

For example for a solid object [*fig. 6.13*] the highest turbulence occurs at 5H (5x [H]) Where H = the height of the object. H [height] following a number is a standard method to refer to the distance from an object. The turbulence creates swirling eddies causing the snow to drift toward the solid object, in this case, straw bales (Agriculture Canada, 1978).

Snow responds to a permeable object [such as a shrub] differently than a solid object [*fig. 6.14*]. On the leeward side of a permeable object [such as shrubs], snow could extend 30 - 90 meters depending on the level of permeability [density]. The denser an object is, the shorter and taller the snow drift (Agriculture and Agri-Food Canada, 2010, p.8). Since 90% of snow moves 30 centimeters off the ground, shrubs act as a snow trap, a place where snow collects (Agriculture Canada, 1978, p.11).

TAKEAWAY FOR MYRIAD VILLAGE

A pile of straw bales was found on the property with snow drifts on both the windward and leeward side. Around solid objects, snow drifts occur primarily on the leeward side and form cliff conditions on the windward side. The height of the object impacts the distance of the area swirling eddies occur. Swirling eddies form the snow drifts on the leeward side of the object.

In the middle region of the property of Myriad Village, there are also multiple shrub patches which collected snow. The surrounding vegetation would trap the snow, and the 30-meter clearance would provide space for the snow to drift beyond the snow trap. A single tree tends to create less drifting than shrubs due to density. Maintaining a clearance of 30 meters next to main roads will minimize snow drifting on roads. Snow will drift less around an object of low density whereas a denser object will create greater immediate snow drifts. The areas in the center, amongst the vegetation, is where most of the snow drifted as the wind had met a solid object. The long grasses also collected snow, limiting vehicle access to the property.

6.4.3 SNOW DRIFT MAP

This experiential map is a compilation of site visits on January 14th, 2018 and March 9th, 2018.

It was found on site [*fig. 6.15*] that snow would drift in the low-lying areas such as a vehicle trail [*fig. 6.10 and 6.11*]. It also drifted on the inside of the tree line on the north side of a tree grouping. Snow gathered in areas where objects extended outward beyond the intermediate landscape features.

TAKEAWAY FOR MYRIAD VILLAGE

Wind velocity increases in open areas and when contacting an object snow wind speed reduces and forms a snow drift. Snow drifts develop on the leeward side of wind direction.

On the property of Myriad Village, the snow drifts occurred around the vegetation; prairie grass, shrubs, and trees. From the visits, the snow drifts were witnessed to be found on the north side of the vegetation. The trees forming the windbreaks at Myriad Village are stunted Trembling aspen trees [due to the carbonate bedrock], reaching an average of 12.5 meters in height.

6.4.4 NEXT TO A WOODLOT

Shelterbelts have the potential to decrease wind velocity up to 24 H (Woodruff, Read, and Chepil, 1959). On the leeward side of a shelterbelt, the wind reduction zone may extend between 2H-7H [*fig. 6.16*] (Agriculture and Agri-Food Canada, 2010, p.8). If the purpose of a shelterbelt is to trap snow, a distance of 30-90 meters from the protection area (ex. a road or building) is recommended.

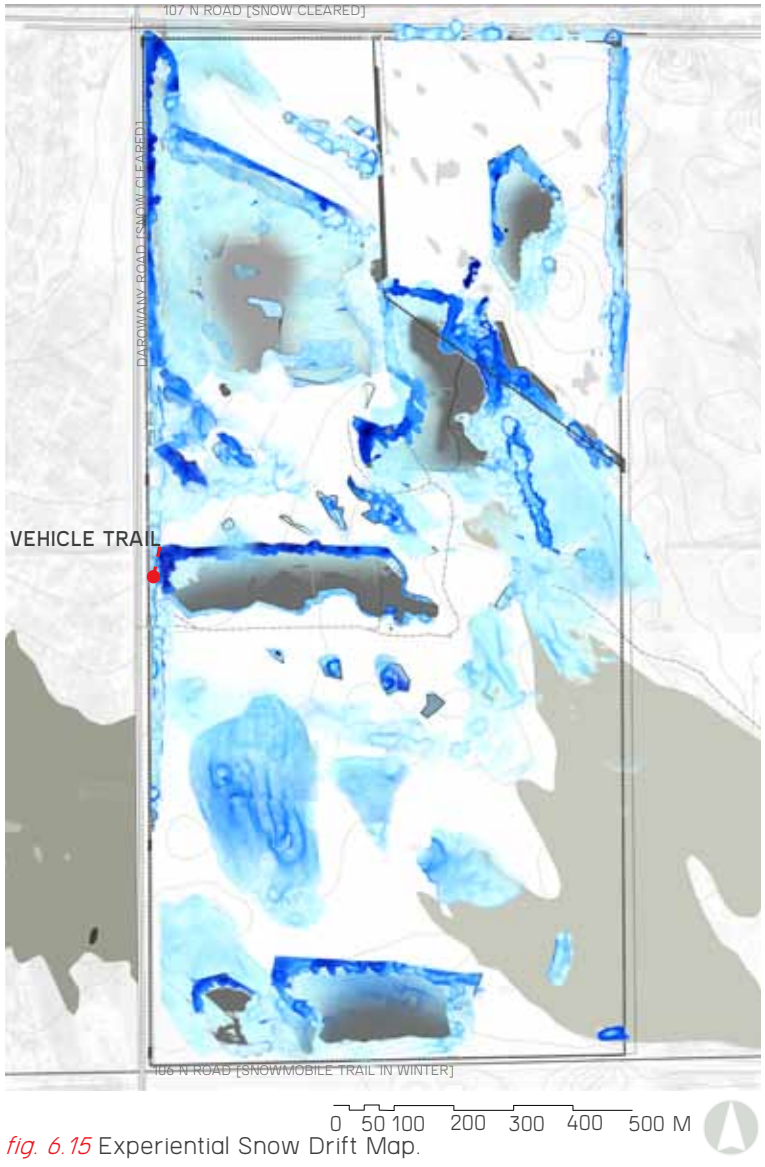


fig. 6.15 Experiential Snow Drift Map.

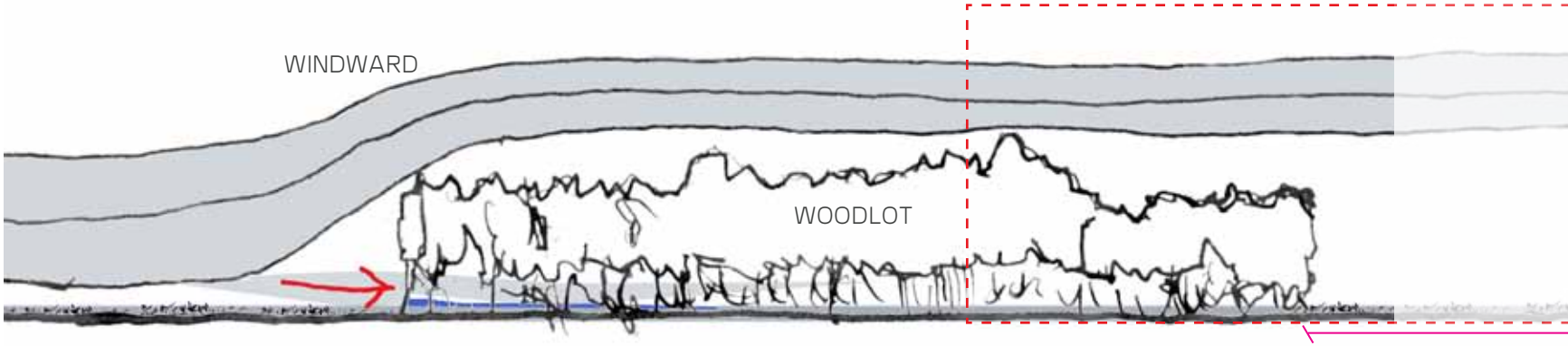


fig. 6.16 Snow drifts next to a woodlot.

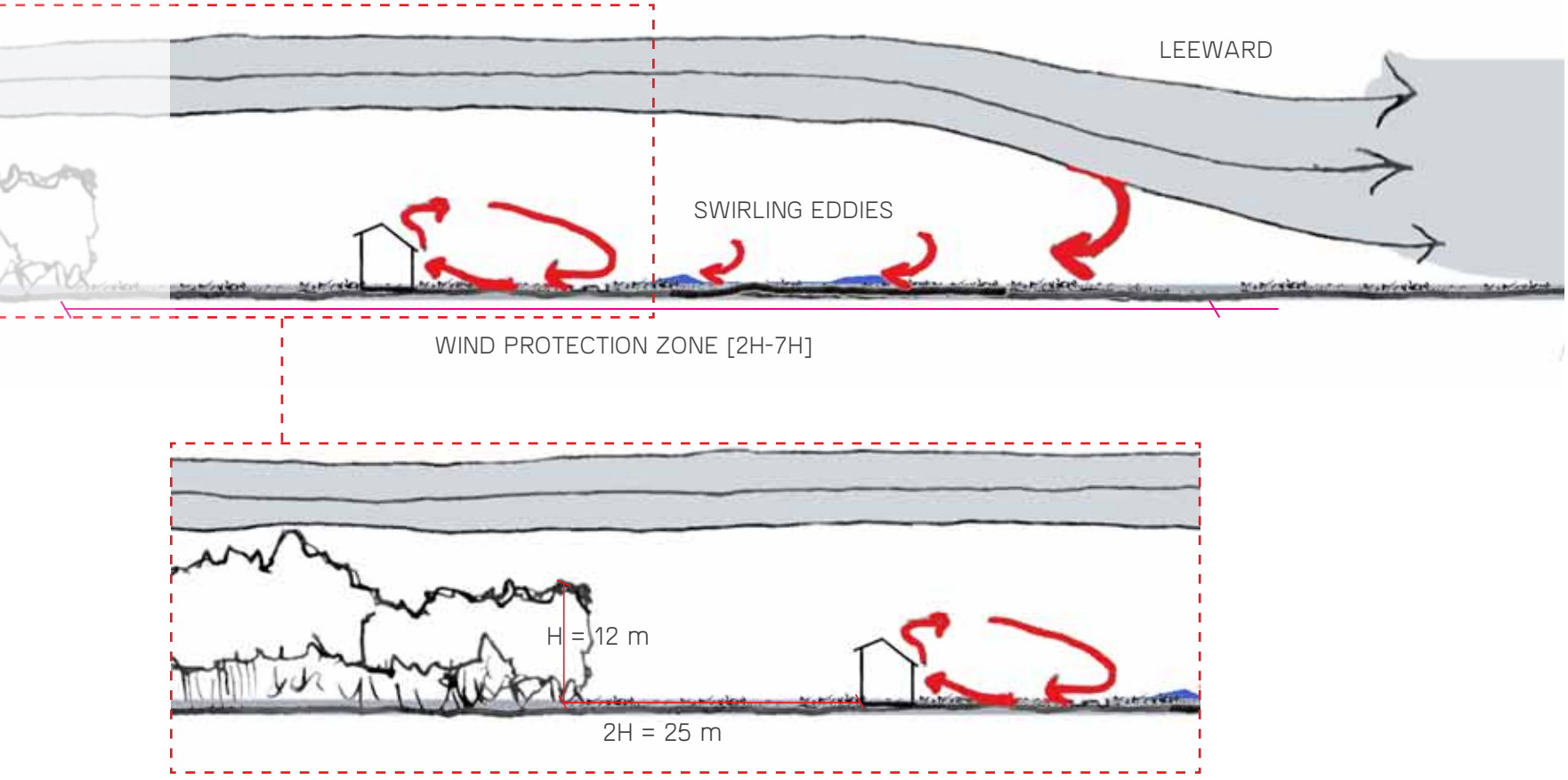
TAKEAWAY FOR MYRIAD VILLAGE

At Myriad Village there are a few woodlots that protect from winds. Positioning the home within 7H of a shelterbelt or woodlot would protect it from the wind chill.

At Myriad Village the 12.5-meter trees would create a wind protection zone of 2H-7H (Agriculture and Agri-Food Canada, 2010, p.8) equaling 25- 87.5 meters.

6.4.5 SHELTERBELT DESIGN

At Myriad Village, a shelterbelt on the north and west side of the property would increase protection from winters wind chill. It is found [*fig. 6.17*] that a shelterbelt designed 5 rows with variations of shrubs, trees and coniferous trees will protect from winds. Due to the density of conifer trees, they are most efficient at reducing wind speeds Depending on the species used, the distance between each plant in the row will vary to



From 2H (25 m) up to 7H (87.5 m) is considered the wind protection zone.

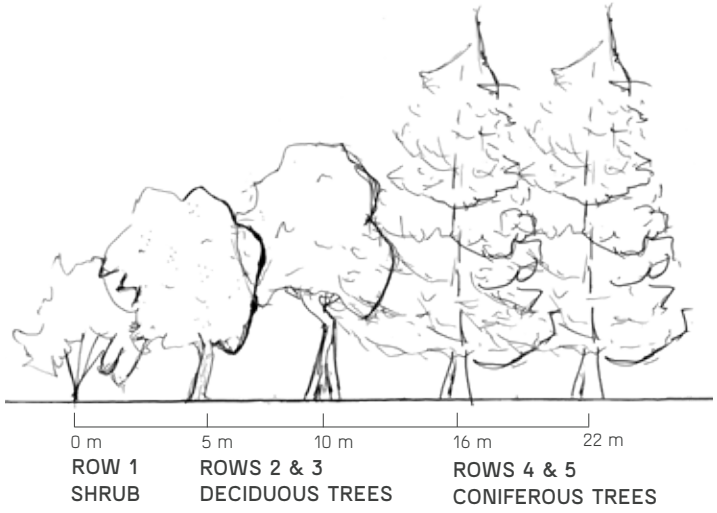


fig. 6.17 Shelterbelt spacing between rows. Derived from: (Agriculture and Agri-Food Canada, 2010, p.11)

achieve adequate protection. Smaller shrub species will need to be planted closer.

There are also many methods of establishing a shelterbelt. A greater quantity of plants may be planted and thinned out as they mature.

Using a species of higher density will increase protection from the wind. Examples of plant densities that may grow at Myriad Village include:

Low:

Bur oak, Balsam poplar, Trembling aspen

Medium-High:

Chokecherry, hawthorne, Red-osier dogwood, and willow.

High Density:

White spruce

(Agriculture and Agri-Food Canada, 2010)

Other aspects that could contribute to the design of a shelterbelt include the growth rate of a plant, geographic location, space available, the urgency of protection and the existing site characteristics.

TAKEAWAY FOR MYRIAD VILLAGE

Increasing the rows in a shelterbelt will increase the protection from wind and snow. If at Myriad Village space available, it is recommended to plant a shelterbelt that is at least 22 meters wide consisting of five rows.

CHAPTER 6.0 CONCLUSION

Sun, wind, and snow interrelate with one another creating a pattern of conditions on the site. Due to the history of environmental conditions [such as pollution of Lake Winnipeg] provincial legislation has been appointed.

CHAPTER 7.0
SITE REGULATIONS

As this practicum intends to implement agriculture, residence, community, and camping into a design for Myriad Village legislation and development in Manitoba will be reviewed. The reviewed legislation includes parts of The Municipal Planning Guide, *The Environment Act, The Planning Act, The Water Protection Act* and the document *Managing change in Rural Manitoba: A Manual for Conservation Subdivision Design.* When any development is proposed, conservation of environmental conditions is a current theme in Manitoba.

7.1 LAND AREA CONSERVATION

In Manitoba, the conservation initiative has been addressed to minimize the footprint on the landscape to encourage landscape function. Randall Arendt [2014] has compiled a document *Managing Change in Rural Manitoba: A Manual for Conservation Subdivision Design* demonstrating the value of creating tightly knit communities as opposed to traditional rural sprawl. Though the material in the document was discussing utilized Manitoba's existing zoning criteria, the overall message is conserving land area through design.

TAKEAWAY FOR MYRIAD VILLAGE

Conserving land area could be achieved by the way in which homes are organized on the property, type, and quantity of homes, as well as road length. Multi-unit homes such as row homes could increase homes on the property while still providing ground floor access. Row homes may be one aspect to integrate into a design that considers conserving land area.

7.2 WATER PROTECTION IN MANITOBA

In response to pollution issues in Manitoba, there have been policies developed such as; *The Water Protection Act, The Provincial Planning Regulation* of *The Planning Act* and the *Livestock Manure and Moralities Management Regulation* of *The Environment Act*. Each policy indicates the setbacks contributing to the initiative to protect water. A setback may be an indicated distance requirement between features such as a water element, property line, or structure. The setbacks related to the design for Myriad Village will be extracted and implemented.

One of the intentions of the practicum is to design space at Myriad Village for agriculture. In Manitoba, the term *agricultural operation* is used in each *The Water Protection Act, The Provincial Planning Regulation* of T*he Planning Act* and the *Livestock Manure and Moralities Management Regulation* of *The Environment Act*.

There are a range of operations that are considered an agricultural operation that is referred to in each of the listed acts and regulations. In Manitoba *agricultural operation* has been defined as:

> **'agricultural operation'** means an agricultural, horticultural or silvicultural operation that is conducted in order to produce agricultural products on a commercial basis, and includes
>
> a) the production of crops, including grains, oil seeds, hay and forages, and horticultural crops, including vegetables, fruit, mushrooms, sod, trees, shrubs and greenhouse crops;
>
> b) the use of land for livestock operations and grazing;
>
> c) the production of eggs, milk and honey;
>
> d) the raising of game animals, fur-bearing animals, game birds, bees and fish;
> e) the processing necessary to prepare an agricultural product for distribution from the farm gate;
>
> f) the operation of agricultural machinery and equipment, including the tillage of land and the application
> of fertilizers, manure, soil amendments and pesticides, whether by ground or aerial application;
>
> g) the storage, use or disposal of organic wastes for agricultural purposes.
>
> Source: *The Provincial Planning Regulation* of *The Planning Act,* p.3.

Terms that specifically refer to water protection include:

> "**animal unit** means the number of animals of a particular category of livestock that will excrete 73 kg of total nitrogen in a 12 month period" Source: *Livestock Manure and Moralities Management Regulation* of *The Environment Act,* (LMMMREA), p.4.
>
> "**field storage** means solid livestock manure that is stored in the open air other than in a manure storage facility." Source: (LMMMREA), p.5.
>
> "**surface water**" means any body of flowing or standing water, whether naturally or artificially created, including, but not limited to, a lake, river, creek, spring, drainage ditch, roadside ditch, reservoir, swamp, wetland and marsh, including ice on any of them, but not including a dugout or reservoir on the property of an agricultural operation. Source: (LMMMREA), p.8.
>
> ""**surface watercourse**" means the channel in or bed on which surface water flows or stands, whether continuously or intermittently, but does not include a dugout, reservoir, intermittent slough, drainage ditch or intermittent stream that is completely surrounded by private land controlled by the owner or operator of an agricultural operation and that has no outflow going beyond the private land;" Source: (LMMMREA), p.8.

> **"water body"** means a body of flowing or standing water, whether naturally or artificially created and whether the flow or presence of water is continuous, intermittent or occurs only during a flood, and includes lakes, rivers, creeks, streams, sloughs, marshes, swamps and wetlands and the frozen surface of any of them." Source: *The Provincial Planning Regulation* of *The Planning Act,* p.6.

For the purpose of this practicum spatial aspects were extracted from the *Livestock Manure and Moralities Management Regulation* of *The Environment Act* and *The Provincial Planning Regulation of The Planning Act.* The indicated policies impact building locations, space for animal keeping and animal waste management.

7.2.1 **BUILDING**

The aim of *The Provincial Planning Regulation* of *The Planning Act* is to allow for landscapes to function. The overall aim is to work with the environment to allow the fluid landscape to adapt to climate change as required. It is recommended to construct structures a setback distance of 30 meters from water bodies. The setback is intended to ensure clean drinking water, reduce the risk of flooding, protect aquatic ecosystems, protect heritage and cultural resources.

TAKEAWAY FOR MYRIAD VILLAGE

Constructing buildings, a 30-meter setback from significant water bodies could reduce the flood risk.

7.2.2 **ANIMAL KEEPING**

Animal Keeping refers to less than 10 Animal Units {A.U.] (Cumulative across species) (Government of Manitoba, 2015b). For the purpose of the practicum, space will be planned for less than 10 A.U. as policies increase if greater than 10. Information on the number of animals that equal one A.U. may be found in Appendix Two of the *Provincial Planning Regulation* of *The Provincial Act.*

Standards for animal keeping may be found in the *Municipal Planning Guide to Zoning Bylaws in Manitoba Component C: Plug-in Section of Zoning Tools* published by the Government of Manitoba. As per the planning

guide, one A.U. may occupy up to 2 acres or less of land equaling 8,094 m^2. A ground level structure intended to keep animals must be setback 4.5 meters or more from any property line (Government of Manitoba, 2015b, p.C-41).

TAKEAWAY FOR MYRIAD VILLAGE

To reduce requirements of forage and setbacks, 9 A.U. will be implemented in the practicum design for Myriad Village. Integrating up to 9 A.U. into a design indicates up to a maximum of 18 acres of land for grazing may be proposed. Other regulations to consider is the positioning of an animal keeping structure at a minimum of 4.5 meters from any property line.

7.2.3 ANIMAL WASTE MANAGEMENT

Manure storage facilities location and setbacks vary depending on the size and scale of the operation. The size and scale often are associated with the quantity of A.U. within the operation. Refer to the *Livestock Manure and Moralities Management Regulation* of *The Environment Act, and Municipal Planning Guide to Zoning Bylaws in Manitoba Component C: Plug-in Section of Zoning Tools* for more information.

As indicated in the *Livestock Manure and Moralities Management Regulation* of *The Environment Act*, manure is not to be applied by a person to soil that is class 6, 7 or an unimproved organic soil. Please refer to section 12(1.4) (b) in the *Livestock Manure and Moralities Management Regulations* for information regarding manure storage methods and spread rate.

Composting moralities and composting manure may contribute to an increased rate of water pollution. In response to the increased pollution, setbacks have been indicated in the *Livestock Manure and Moralities Management Regulation* of *The Environment Act* setbacks, as follows:

> ' (15.1(1)) Composting Moraities must be located at least 100 m from surface watercourse, sinkhole, well and operations boundaries. Methods of composting moralities are to be performed in a manner

acceptable to the director and that do not cause pollution to groundwater, soil or surface water.

" (8(1)) Composting manure
No person shall compost livestock
manure on the property of an agricultural operation unless
(a) the composting site is located atleast 100 m from
(i) any surface watercourse, sinkhole, spring or well, and
(ii) the operation's boundaries;
(b) the manure is composted in a manner that does not cause pollution of surface water, groundwater or soil; and
c) the composting facilities" .

TAKEAWAY FOR MYRIAD VILLAGE

There may be other parts of Manitoba's acts and regulations that were not reviewed in this practicum document that may be relevant. It is to be discussed with the Municipality as to the details [example; manure storage] of the policies in Manitoba relevant to Myriad Village. For the purpose of a design practicum, the setbacks found are integrated into the design process to accommodate best any setbacks that may be required as a planning method.

The 100 m setback and limit of spreading manure on soil class 6, 7 or unimproved areas is in response to protecting water from pollution due to agriculture operations. On the property of Myriad Village, wetland/ marsh areas could include the area on the south side of Myriad Village, as it is considered an intermittent marsh.

7.2.4 RESIDENT WASTE AND GREYWATER MANAGEMENT

For the villagers, alternative greywater management may be an option. Myriad Village's mission statement expresses the objective of alternative greywater management. However, existing by-laws in the Municipality of Armstrong currently have not incorporated alternative methods of greywater management. Soil tests might be required to determine alternative greywater management options.

One alternative solution could be a shared septic system instead of each home requiring an individual system. The idea of a shared septic system was introduced

by Ardent [2014]. He had compiled a document titled *Managing Change in Rural Manitoba: A Manual for Conservation Subdivision Design* that addressed the provincial legislation on the allowance of shared wastewater systems (Ardent, 2014, p.12).

TAKEAWAY FOR MYRIAD VILLAGE

Rather than utilizing a standard waste management system, the Myriad Village aims to use a greywater management system. Further studies are required to identify whether alternative greywater management methods are feasible in the village. As an alternative solution to greywater management, shared septic tanks would also reduce environmental impact and infrastructure costs.

CHAPTER 7.0 CONCLUSION

In chapters two to seven, design intent, ecovillage concepts, site survey, site characteristics, studies and site regulations have been identified. The next step is to unite them into an analysis.

CHAPTER 8.0
SITE ANALYSIS

Regarding this practicum, the site analysis of Myriad Village will present the areas suitable for the objectives of camping, residence, community and agricultural production. The analysis will be executed by overlaying correlating site survey and regulations data. The overlay maps will be illustrated as conflict maps. The conflict maps intend to expose potential constraints visually. Visualization of the potential constraints will aid in determining landuse suitability.

8.1 CONFLICT MAPPING

8.1.1 SURFACE WATER FILTRATION

Figure 8.1 map is in reference to; *The Planning Act*, *The Environment Act,* and *The Water Protection Act*. The surface water filtration - conflict map uses topography [*fig. 4.9*], surface water drainage [*fig. 4.10*] and hydrology [*fig. 4.10*] maps as part of the assessment.

The surface water filtration map [*fig. 8.1*] is in response to water protection of Lake Winnipeg, as the property of Myriad Village is part the Lake Winnipeg watershed [*fig. 4.2*]. The intention is to reduce contamination and flood risk. Filtration increases as the distance between potential contamination and water feature increases. Water filters gradually into the surface through the

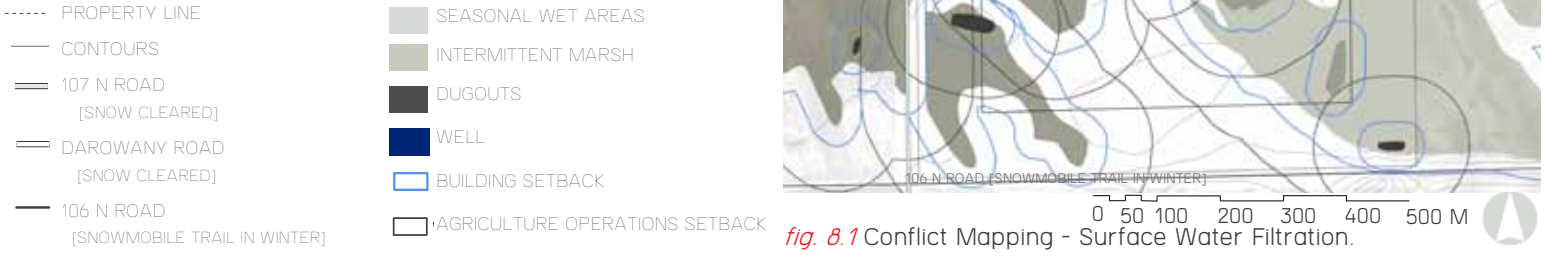


fig. 8.1 Conflict Mapping - Surface Water Filtration.

marsh and prairie grass aiding in water decontamination (Kennen and Kirkwood, 2015).

TAKEAWAY FOR MYRIAD VILLAGE

Water elements not included with a setback requirement are upland or are seasonal wet areas, which are lower risk areas. In areas where there are building setbacks of 30m, the intent is to reduce the risk of flooding to the home. For agricultural production, any set back is to reduce the risk of pollution to drinking water.

8.1.2 **MANURE SPREADING**

The *Livestock Manure and Moralities Management Regulation* of *The Environment Act* was reviewed for the manure conflict map [*fig. 8.2*].

fig. 8.2 Conflict Mapping - Manure.

Manure may be used to revitalize soils for the purpose of gardening or generating richer feedlots for grazing animals. Figure 8.2 is the result of combining the soil capabilities [*fig. 4.4*] and surface water filtration [*fig. 8.1*] conflict maps, illustrating where manure may be spread [*fig. 8.2*].

TAKEAWAY FOR MYRIAD VILLAGE

Areas, where manure may be spread for fertilization, are related to the soil conditions, the existing well, and hydrology. More information on the fertilization rate and period of application may be located in the *Livestock Manure and Moralities Management Regulation* of *The Environment Act*.

8.1.3 **GRAZING**

Criteria that was overlayed in figure 8.3 aims to illustrate areas suitable for grazing. The criteria expressed includes the soil [*fig. 4.4*], vegetation [*fig. 4.17*] and surface water filtration [*fig. 8.1*] maps. Across Myriad Village is a spread of prairie grasses formerly used as cattle feed and other agriculture production. The current carrying capacity of the forage on the property is unknown. A few years may be required until fertility has regenerated naturally. Please refer to the manure spreading map [*fig. 8.2*] for areas where manure may be used intentionally to enhance fertility.

TAKEAWAY FOR MYRIAD VILLAGE

Forage grass grows on these soils, and there may be potential to increase forage without the spread of manure. The grazing areas may require time to regenerate nutritive content also known as carrying capacity.

8.1.4 **GARDEN**

There are many forms of gardening as solutions to existing environmental conditions. Criteria that was used in figure 8.4 includes the soil [*fig. 4.4*], topography [*fig. 4.9*], hydrology [*fig. 4.16*], vegetation [*fig. 4.17*], south sun exposure [*fig. 6.1 and 6.2*], surface water filtration [*fig. 8.1*] and manure spreading [*fig. 8.2*] maps. In areas

where nutrients have been diminished, manure has been utilized as a fertilization method. Figure 8.3 has been developed to illustrates potential areas for gardening that uses manure as fertilization, which thrives in full sun and integrates vegetation with roots that may require water drainage.

Most often food providing vegetation requires full sun. Therefore, sun access needs to be determined. Through analyzing sun access, shadow studies could be used to suggest a suitable setback the from surrounding vegetation and infrastructure to position the garden.

fig. 8.3 Conflict Maps - Grazing.

TAKEAWAY FOR MYRIAD VILLAGE

Possibilities for alternative gardening expand outside of the indicated areas. The garden area map [*fig. 8.4*] refers to agricultural practices that utilize manure as fertilizer. Manure spread rates indicated are in the *Livestock Manure and Moralities Management Regulation* of *The Environment Act*.

8.1.5 **CAMPING**

The future of Myriad Village may bring visitors to festivals and the like. Many areas around Myriad Village could form beautiful camping spots. To create a sense of community, camping areas near community

fig. 8.4 Conflicts Map - Garden.

features would encourage relationships. It is speculated community campfires may be a common occurrence. Therefore, areas further away may have an impact on convenience. As the property is large, a walk from the road 107 N to 106 N on a flat road could take 20 minutes (Google Earth, 2018b).

The camping conflict map [*fig. 8.5*] is a compilation of the following illustrations: views [*fig. 5.12*], vegetation [*fig. 4.17*], topography [*fig. 4.9*], and infrastructure [*fig. 4.18*]. Criteria extracted from the views also coincided with open areas, and from vegetation were areas that could potentially provide shelter and privacy
To reduce the risk of excess water from rainfall or

fig. 8.5 Conflicts Map - Camping.

seasonal conditions, upland areas would be most suitable. Accessibility may also be a factor for those camping with trailers and campers. The accessibility may be limited to the roads. Limiting access to only using existing roads may be an intention to reduce potential impact to the ecosystem. Other infrastructure to consider would be nearby service facilities such as a restroom.

TAKEAWAY FOR MYRIAD VILLAGE

A sense of enclosure tends to provide a sense of privacy and shelter. For a camping experience with an element of privacy considered, increasing enclosure may be of benefit. One method of increasing the sense of enclosure could be through planting vegetation.

8.1.6 **BUILDING**

The building area map indicates two suitable areas to build on. Two building areas have been identified with the intention of selecting one for permanent structures to minimize ecological footprint. Minimizing ecological footprint was site planning design suggestion by Bang (2005) as discussed in section 3.2.1 of this practicum. Each building area was outlined as a result from the surrounding views [*fig. 5.12*], vegetation [*fig. 4.17*], topography [*fig. 4.9*], infrastructure [*fig. 4.18*] and snow drifts [*fig. 6.13, 6.14 and 6.15*].

For both building area one [B1] and two [B2], it was necessary to determine areas most accessible to rural snow routes. There may be areas with an increase of wind protection, though snow drifting on site is inevitable. A wind protection zone of 87.5 meters was mapped, using the surrounding vegetation qualities. The surrounding vegetation was also considered with the intention of increasing south sun access to homes for passivhaus design as discussed section 3.2.3. Views from the home and community facilities may also be a determining factor.

Each building area has aspects to highlight that attribute to the support the development of a community.

Building area one is nearer to hydro services, and the surrounding vegetation increases wind protection. Building area two has services that may aid in the start of a community such as an entrance with a culvert, and a domestic well.

TAKEAWAY FOR MYRIAD VILLAGE

There are many costs involved in constructing a new community. The areas shown [*fig. 8.6*] in the conflicts maps- building aims to reduce the cost in infrastructure and minimize the footprint on the property. It may be possible to expand a domestic well if the rate of use increases beyond its supply.

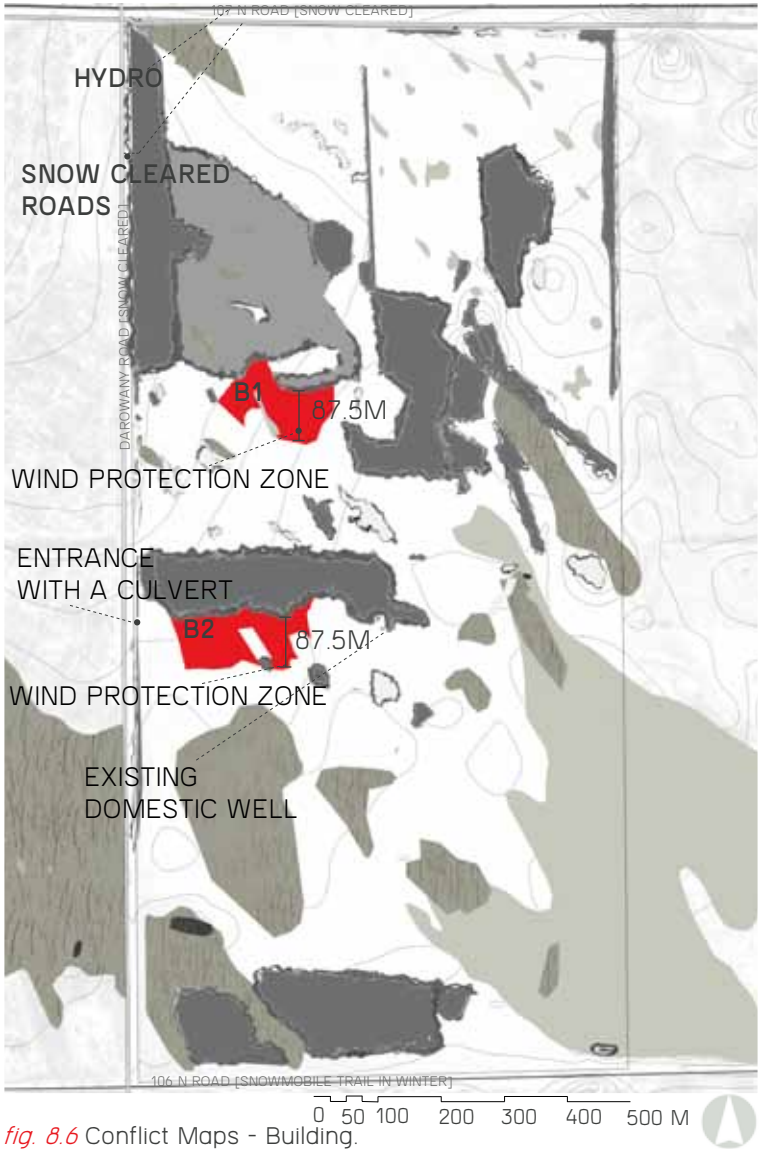


fig. 8.6 Conflict Maps - Building.

8.2 LANDUSE SUITABILITY

The following landuse suitability map [*fig. 8.7*] has been generated by overlaying the grazing, garden, building and camping conflict area maps. The building, garden, grazing and camping areas will be further described as to how they relate with the practicum design intent of including residence, community, agriculture, natural succession, and campng.

RESIDENCE

The residence will include each building, garden, and grazing areas.

Building

The residence component of the design intent could be formed in the building area. In the prairie landscape of Manitoba, a significant factor in rural living is protection from environmental conditions. On the property of Myriad Village, building area one [B1] is favorable as it has a greater sense of protection from wind, is nearer

fig. 8.7 Site Analysis - Landuse Suitability.

to hydro, and there is space nearby for gardening and grazing. Space nearby for gardening and grazing is a fundamental within permaculture design [*fig. 3.4*].

The surrounding vegetation provides shelter from the cold winds [*fig. 4.17 and fig. 6.15*]. Though there is existing vegetation, increasing vegetation in the form of a shelterbelt may increase protection. Saplings have also grown in the surrounding [*fig. 4.17*] area of B1 suggesting the potential for enhancing vegetation.

Constructing in only one area as opposed to two aims to reduce infrastructure costs, increase the sense of community and reduce the impact on the environment by minimizing the footprint. A minimized footprint may result in decreased infrastructure costs by suggesting shorter roads, that may affect access for emergency service vehicles. One building area may also decrease the footage requirements of underground services.

AGRICULTURE

Garden

Part of the aims for the practicum site design for Myriad Village is to integrate permaculture gardening methods which range from food forests to herb gardens, to raised beds. These gardening methods may be projected on any part of the property. The illustrated garden area is for the gardening that requires most attention [and potential for manure spreading as shown in figure 8.1].

Grazing

Forage grows in the areas shown [*fig. 4.4 and 4.17*], as well as a vegetative canopy could provide shade for the animals.

CAMPING

The village may begin primarily through camping. Camping areas were selected by applying views and experiences had on-site [*fig. 5.12*]. As priority is given to the residence, grazing and gardening areas to be near to the home, camping was integrated next.

Camping thus far at Myriad Village has included campers, yurts, tents and hammock tents. Campers often require vehicle access, at times this may be limited due to the drainage conditions [*fig. 4.9 and 4.16*] that could reduce accessibility on the property. The southern camping area has an existing access point [*fig. 4.18*] from Darowany Road. The entrance off Darowany has a culvert and a gravel driveway.

NATURAL SUCCESSION

Including natural succession in design could appear in the form of allowing space to remain open for ecology to expand. The open space could be utilized with respects to the expanding conditions. Aspects that may challenge natural succession from occurring may be mowing of grass, grazing or hydrological conditions. Mowing of grass may be a method to reduce the risk of fires, therefore organizing space may allow for both conditions to occur.

COMMUNITY

The intention in ecovillages often is to harvest community in as many areas as possible, though reducing the number of spaces, as well as creating community spaces for each component may increase the opportunity of the community to occur naturally. A sense of community could reveal itself through the design and how space is further ordered in relation to one another. For example, if a resident is to leave their home, the space outside the home could be a shared space, increasing the opportunity to cross paths with community members.

TAKEAWAY FOR MYRIAD VILLAGE

The landuse suitability map was generated using the intent for the practicum and ecovillage zoning.

CHAPTER 8.0 CONCLUSION

The compilation of maps in chapter 8.0 may be used to develop a deeper understanding of site conditions and regulations. Ecovillages often aim to consider the impact on the environment. Many of the activities of an ecovillage are geared toward understanding the landscape and working with it rather than damaging it. The conflict maps may act as a starting point to illustrate areas to reduce consistent activities that may potentially pollute drinking water, groundwater and surface water.

CHAPTER 9.0
CONCEPTUAL IDEAS

The landuse suitability map [*fig. 8.7*] was developed using the criteria from conflict mapping to further translate to an overview site design plan. From the landsuse suitability map, the building area transformed into the *Village Residence*, while the camping separated into *campers and tents* and a *vehicle-free camping* space as illustrated in figure 9.1. Gardening and grazing will be part of both the overview map and in detail site designs.

The overview site design plan will be a tool to discuss suggestions for housing, gardens, trees, grazing, and trails. Also in the overview site design plan are the locations for detail site designs for a *Village Residence*, a *Bird Sanctuary,* and an *Animal Haven* [*fig. 9.1*] that will be further presented in chapter 10.

9.1 CRITERIA FOR CONCEPTUAL IDEAS

The landuse suitability map led to developing the following criteria to then be implemented into the overview site design [*fig. 9.1*]:

COMMUNITY

i. Equal distance to community facilities.

ii. One view of nature and one to the community [particularly for the Village Residence].

iii. Be near agriculture [Gardens and Grazing].

iv. Destination away from the residence to walk to.

VILLAGE RESIDENCE

ANIMAL HAVEN

BIRD SANCTUARY

GARDEN
GRAZING
CAMPERS AND TENTS
VEHICLE-FREE CAMPING
PROPERTY LINE
CONTOURS
107 N ROAD [SNOW CLEARED]
DAROWANY ROAD [SNOW CLEARED]
106 N ROAD [SNOWMOBILE TRAIL IN WINTER]

TREES [LOW DENSITY]
TREES AND SHRUBS [MODERATE DENSITY]
SHRUBS [MODERATE DENSITY]
MARSH GRASS
GRASS
SEASONAL WET AREAS
INTERMITTENT MARSH
DUGOUTS
SHELTERBELT
NATURAL SUCCESSION

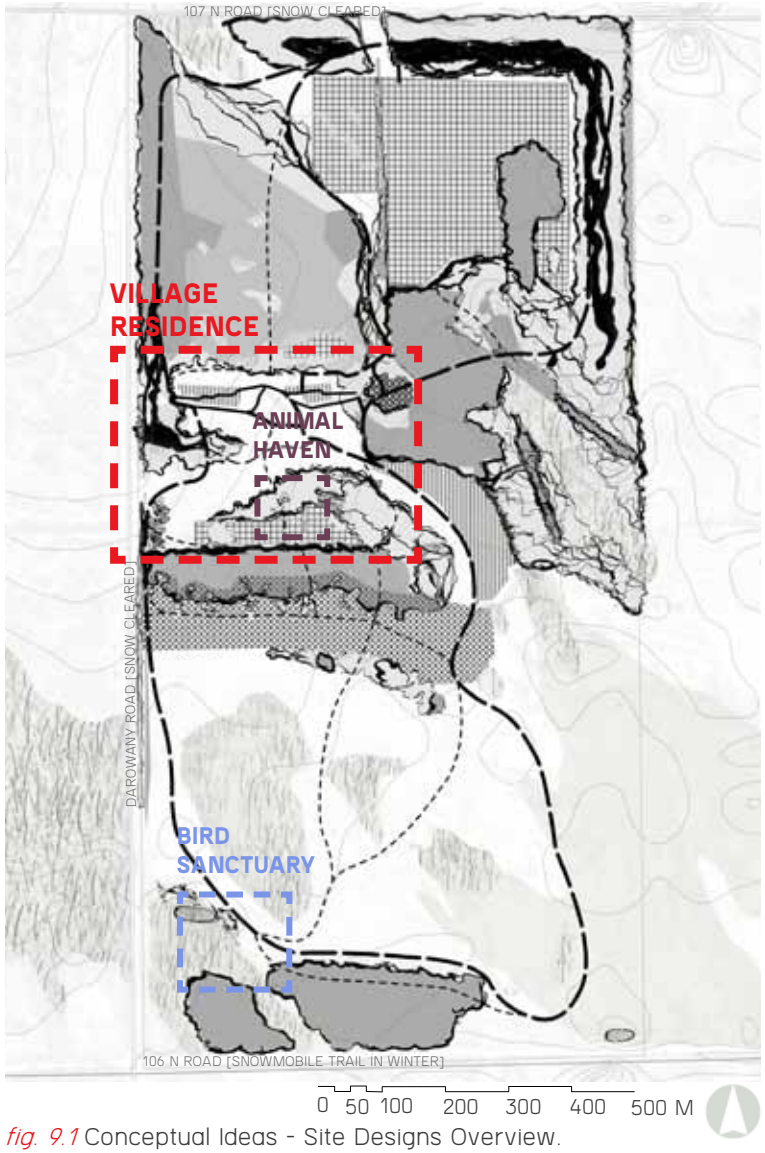


fig. 9.1 Conceptual Ideas - Site Designs Overview.

FUNCTION

a. Parking under trees.

b. Minimum infrastructure footprint.

c. Passive home criteria.

Orient within 15 degrees of South.

The spacing between buildings [at least 11 m or 20 m depending on building height].

Each intention on the property correlates with one another. Therefore, the criteria listed above impacts site locations for each site design component. The Village Residence was the initial focus of the criteria as it was the final objective of the practicum. Details of the Village Residence are discussed in chapter 10.0, and an overview of the housing options for the Village Residence will be revealed in the following section 9.2.

9.2 HOUSING

The compilation of precedent studies, the theory and background of ecovillages, and the intention of allowing for transition and the growth of a community has led to the design of Passivhaus row homes with each dwelling unit to have a narrow floor plan.

The row home complexes were designed with the Passivhaus dimension ratios [*fig. 3.7*]. Proposed in the design of the residence row home complexes are between 2 - 5 dwelling units. Each resident may have different spatial needs. Therefore, the opportunity is available for the resident to select a suitable private dwelling unit size. The individual dwelling unit dimensions were generated as an outcome from the precedents discussed in chapter 3 regarding common small home floor areas and widths of a narrow home.

Size options for the row home complexes range from 12 m x 12 m to 12 m x 15.6 m. The exterior row home

complex dimensions range from a ratio of 1:1 to 1:1.3. For the dimensions of a dwelling unit in the complex, the dimensions are related to the precedent studies from section 3.3.2. Each of the complexes was designed to have a standard length of 12 meters [m]. In the design, the options for widths include 4 m, 5 m and 7.5 m. A 12 m x 4 m home could be between 48- 120 m2, a 12 m x 5 m home could be between 60-180 m2 and a 12 m x 7.5 m home could be between 90- 225 m2.

Unit floor area varies as it is optional to the number of storeys, and could include a basement. Up to two storeys have been calculated with the intention of maintaining a sense of human scale and the consideration of the surrounding vegetation that may aid in reducing wind chill to the structures.

9.3 **CAMPING**

Also implemented at the overview site design scale are camping areas. Not all members may want to live permanently on the property. Therefore space is provided to allow for this opportunity. The center circle camping area is only accessible by foot to reduce vehicular traffic on the property, and to allow for the opportunity to dwell in the quiet refuge.

It is suitable for campers, yurts, tents and the like to camp on the south side of the mature woodlot [*fig. 9.1*]. The access point off Darowany Road, the well, community area and fire pit could service the area. Breaking into the tree line to create fire pit pockets and increasing vegetation could increase privacy from other neighboring campers.

CAMPING AT THE VILLAGE

SUMMER

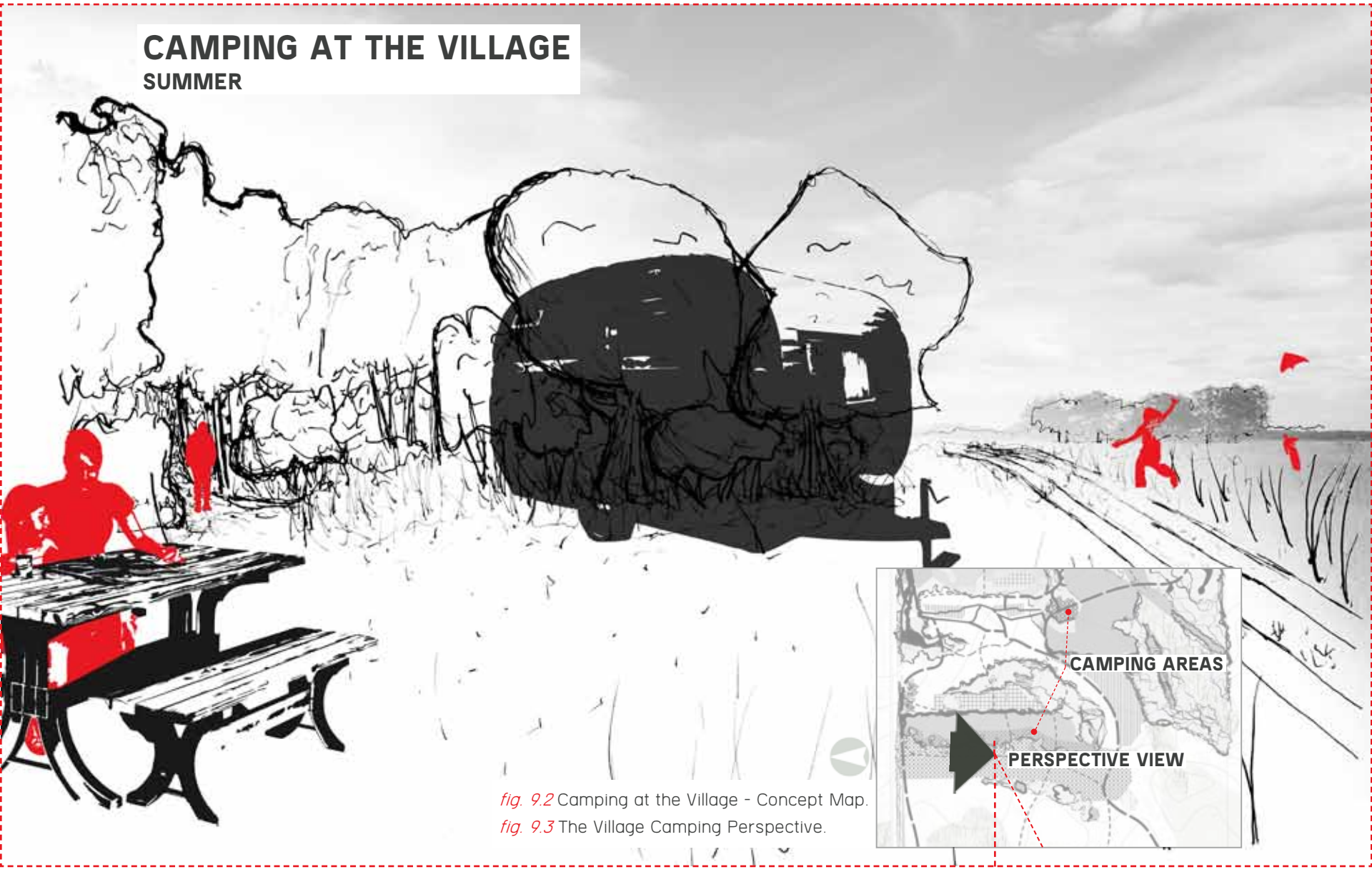


fig. 9.2 Camping at the Village - Concept Map.

fig. 9.3 The Village Camping Perspective.

9.4 **TREES, GARDENS AND GRAZING**

As there is roughly 25% coverage of woody species , there is an opportunity to increase it. As ecovillages aim to work with existing site conditions the existing surrounding vegetation may be used for shelter, gardens, and grazing and enhanced where necessary. In some areas, there is a need to increase shelter for protection from wind chill.

[Trees]

In the design, trees have been indicated to be increased using three various methods. One as natural succession [occur throughout], another as plantings [in the camping area], and the last as intentionally planted shelterbelts [in the surroundings]. Shelterbelts in the proposed design [*fig. 9.4*] could be comprised of a synthesis of the suggested species using the figure 6.17 as a reference for distances between each row. Other vegetation could be planted organically around a shelterbelt to increase the woodlot ecological connectivity in mind. Ecological connectivity refers to the connectivity between ecological systems within the village and continuity beyond it. Shelterbelts are not required to have an overall linear form, though integrated into the overall form could be the distances between rows and trees of shelterbelt design [*fig. 6.17*].

PLANTED SHELTERBELT

For a dense shelterbelt, five rows of trees are recommended to integrate into an overall form. Each form of plant has different wind reducing capabilities. Therefore, It is suggested to plant a variation of species and forms in each row. In row 1 of a sheltherbelt could be shrubs, in rows 2 and three could be deciduous trees, and in rows 4 and 5 could be coniferous trees.

SUGGESTED SPECIES

As part of the ecovillage guidelines for earth restoration in section 3.2.1, it was recommended to use pioneer and keystone species. Species that are common to the local conditions that have been identified on site include: *Amelanchier alnifolia* [Saskatoon], *Corylus americana*

[American hazelnut], *Corylus cornuta* [Beaked hazelnut], *Crataegus chrysocarpa* [hawthorn], *Picea glauca* [White spruce], *Quercus macrocarpa* [Bur oak], *Populus balsamifera* [Balsam poplar], *Populus tremuloides* [Trembling aspen], *prunus* spp. [Cherry], *rubus* spp. [raspberry], and *salix* spp. [willow].

The suggested species are already existing in the landscape, and increasing the vegetation could be used to reestablish connections between fragmented habitats. The idea of using existing species from the local landscape coincides with the ecovillage design guideline to mimicking nature where possible from section 3.2.1.

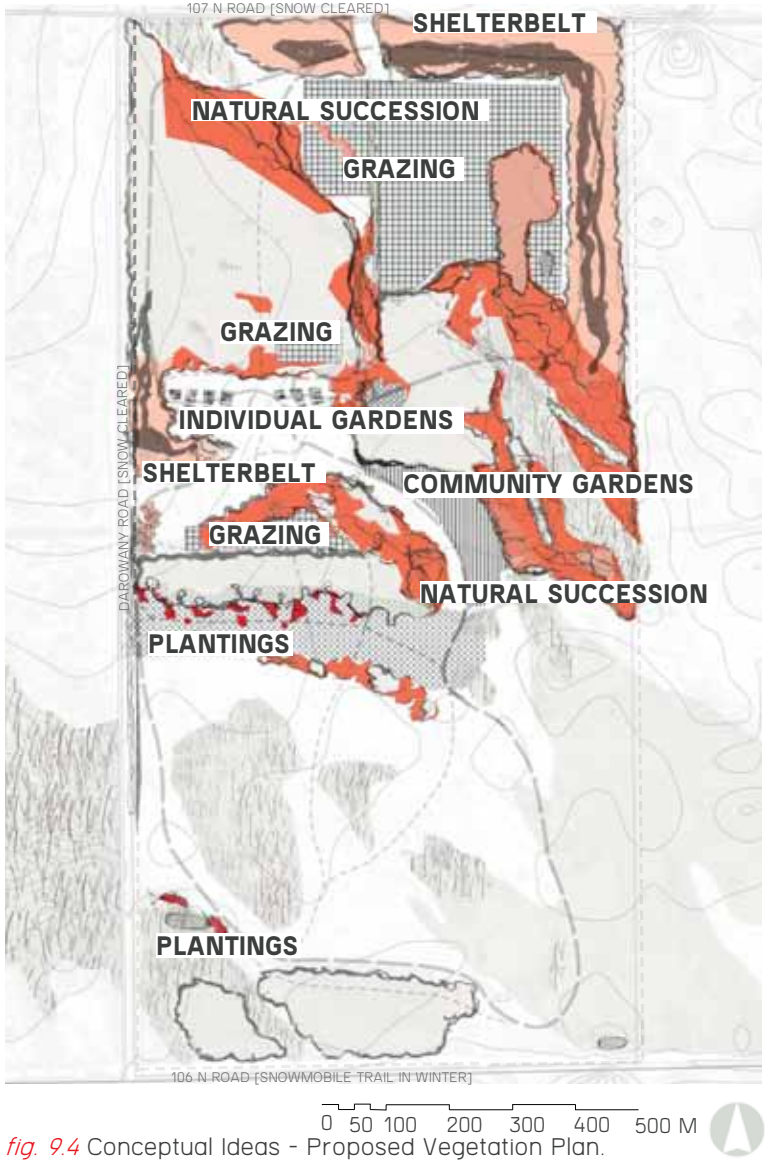


fig. 9.4 Conceptual Ideas - Proposed Vegetation Plan.

[Garden]

In the concept overview site design, there is an area for gardens, as a community garden. The area shown in the overview plan [*fig. 9.1*] is intended to be for gardens that do not require as much tending as the ones that will be integrated into the Village Residence. In the Village Residence, each residential dwelling will have a individual garden plot in the center and the opportunity to garden in the community gardens using ideas from the permaculture zoning [*fig. 3.4*] strategy. The community gardens could also have outlined plots.

Near the well, the depth of the topsoil around the well [*fig. 4.20*] is roughly one-foot blending to gravel and boulders. Therefore, it is recommended to obtain extra soil or use other soil building methods to form raised beds. Extra soil may be locally sourced from either the neighbors or extracted through the construction of the Village Residence. The raised garden beds do not need to be confined in a structure; they may be formed as raised soil rows.

[Grazing]

Permaculture design strategy of zones [*fig. 3.4*] were used to situate three grazing areas that aim to allow space for smaller animals that may require more attention to be near the residence. The indicated area meets the maximum space allowance for up to 9 A.U. of animals to graze on the property. Up to 18 acres of grazing area has been suggested in the concept overview site design.

On two of the south grazing areas experimentation with manure to potentially increase fertility may occur. Part of the grazing area in the North was formerly a production field, therefore possibly requiring time for nutritive regeneration.

fig. 9.5 Conceptual Ideas - Winter trails.

9.5 **TRAILS**

Trails connect each area [*fig. 9.5*]. The path in the grassland will extend in winter [*fig. 9.6*] as a snowshoe and ski trail to limit heavy equipment for snow clearing in the area. Some of the trails are suggested routes, not all are surfaced. Surfaced routes and all other will be discussed in more detail in chapter 10.0 in the Village Residence section.

fig. 9.6 Conceptual Ideas - All trails.

CHAPTER 9.0 CONCLUSION

Concepts for Myriad Village were discussed to provide an overview of potential options for the design of a community. The concepts could be implemented in other areas, though concluding from the site regulations, landuse suitability and the intent of the practicum has led to these site designs. Chapter 10.0 illustrates the detailed site designs.

CHAPTER 10.0
IDEAS FOR MYRIAD VILLAGE

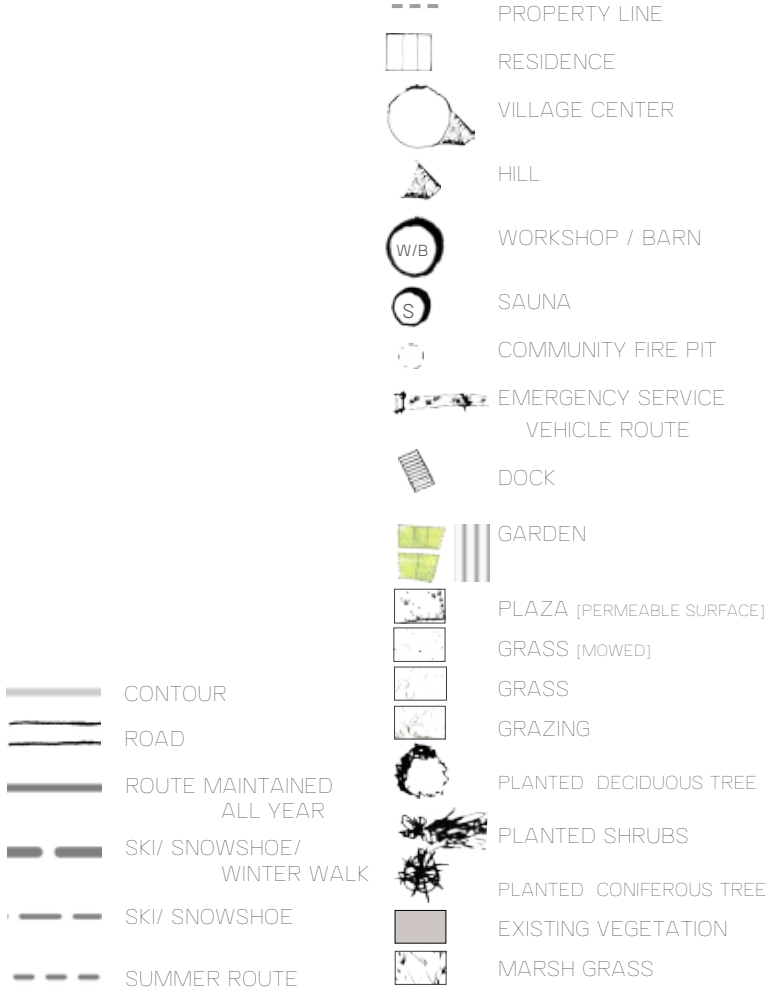
Ideas for Myriad Village will be illustrated through plans and perspectives. Plans were generated for each of the two phases of the *Village Residence*, *Bird Sanctuary*, and *Animal Haven*. Individually presented will be trails, vegetation, and hard surfaces. Perspectives include the village center in both winter [*fig. 10.4 - 10.5*] and summer [*fig. 10.6 - 10.7*], a section perspective [*fig. 10.8 - 10.9*] overlooking the Village Residence, Bird Sanctuary [*fig. 10.12 - 10.13*] and of the Animal Haven [*fig. 10.15 - 10.16*].

10.1 CRITERIA FOR SITE DESIGN

Constructing the village all at once may be a difficult task. Completing it in multiple phases as vegetation and community grows could be a natural approach. What separates the two phases is a point where it may be decided the planted shelterbelt on the west side of the property is established enough to provide shelter from the wind chill. The discourse could be:

VILLAGE RESIDENCE - PHASE ONE [Section 10.2]
During phase one in the design, the roads as shown in figure 10.1 are to be constructed. The idea is to reduce initial cost by reducing infrastructure costs. Other features to construct would be the east parking and residence. It is recommended to construct the community center and hill at the beginning of developing the community. The construction and size of the community center are intended to correlate with the smaller home sizes. Part of phase one could also include the construction of the wetland. Other community

VILLAGE RESIDENCE
PHASE ONE



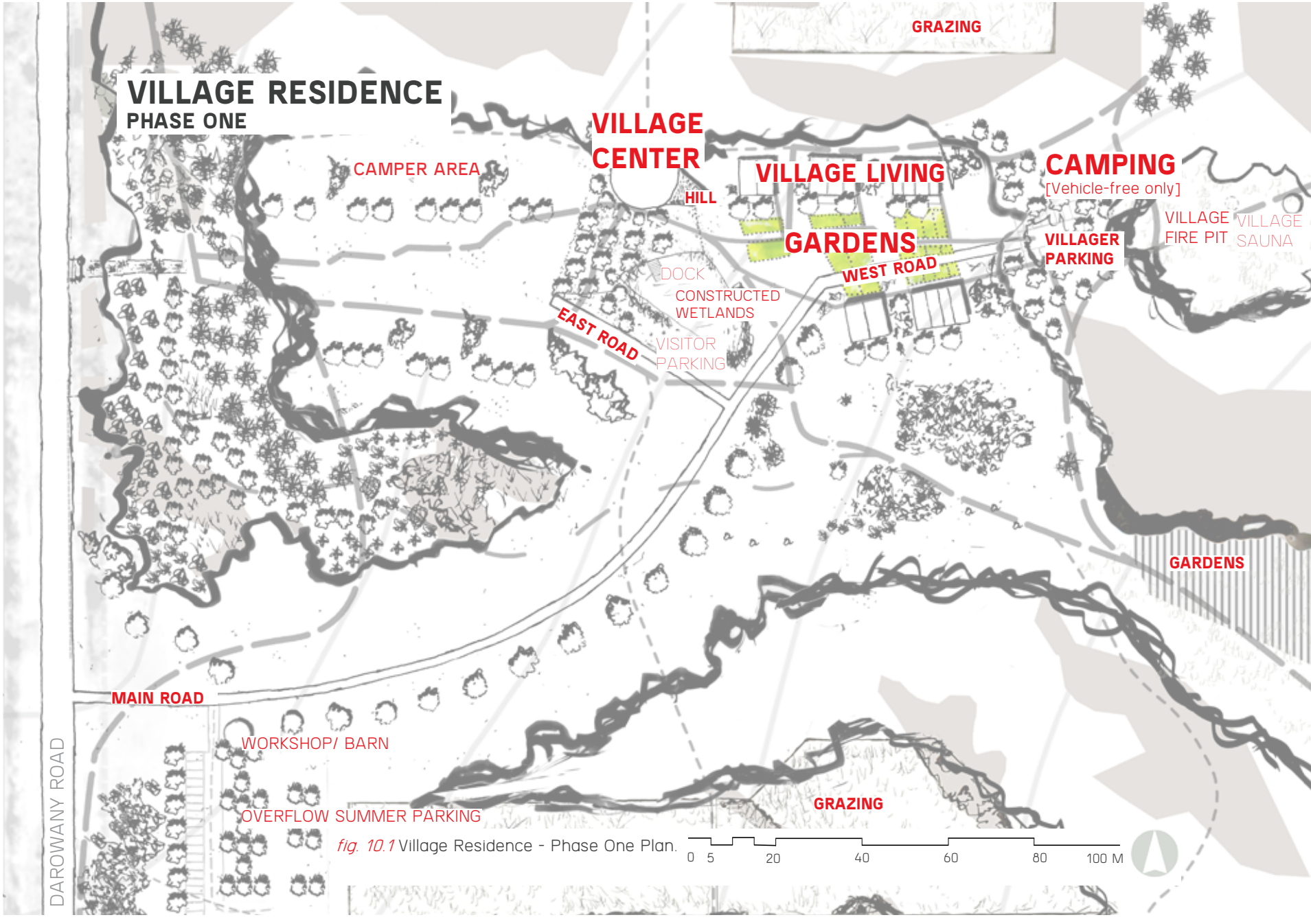


fig. 10.1 Village Residence - Phase One Plan.

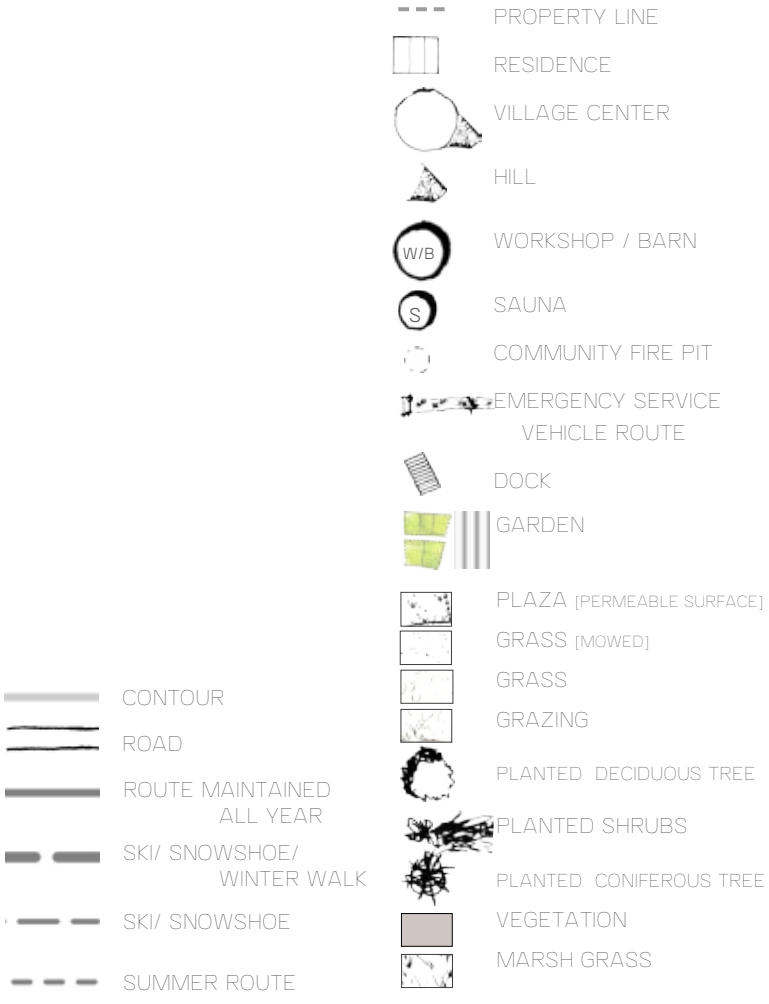
features to construct during the first phase could be the sauna and community fire pit.

It is recommended to plant all of the vegetation indicated as plantings and as a shelterbelt as illustrated in figure 10.3 during phase one to allow the vegetation time to establish.

VILLAGE RESIDENCE - PHASE TWO [Section 10.2]
As part of phase two [*fig. 10.2*] the rest of the west road is suggested to be constructed following with the west residence, details to follow in section 10.2.

BIRD SANCTUARY [Section 10.3]
Criteria for the Bird Sanctuary include planting willow and constructing a stone bench, details to follow in section 10.3.

VILLAGE RESIDENCE
PHASE TWO



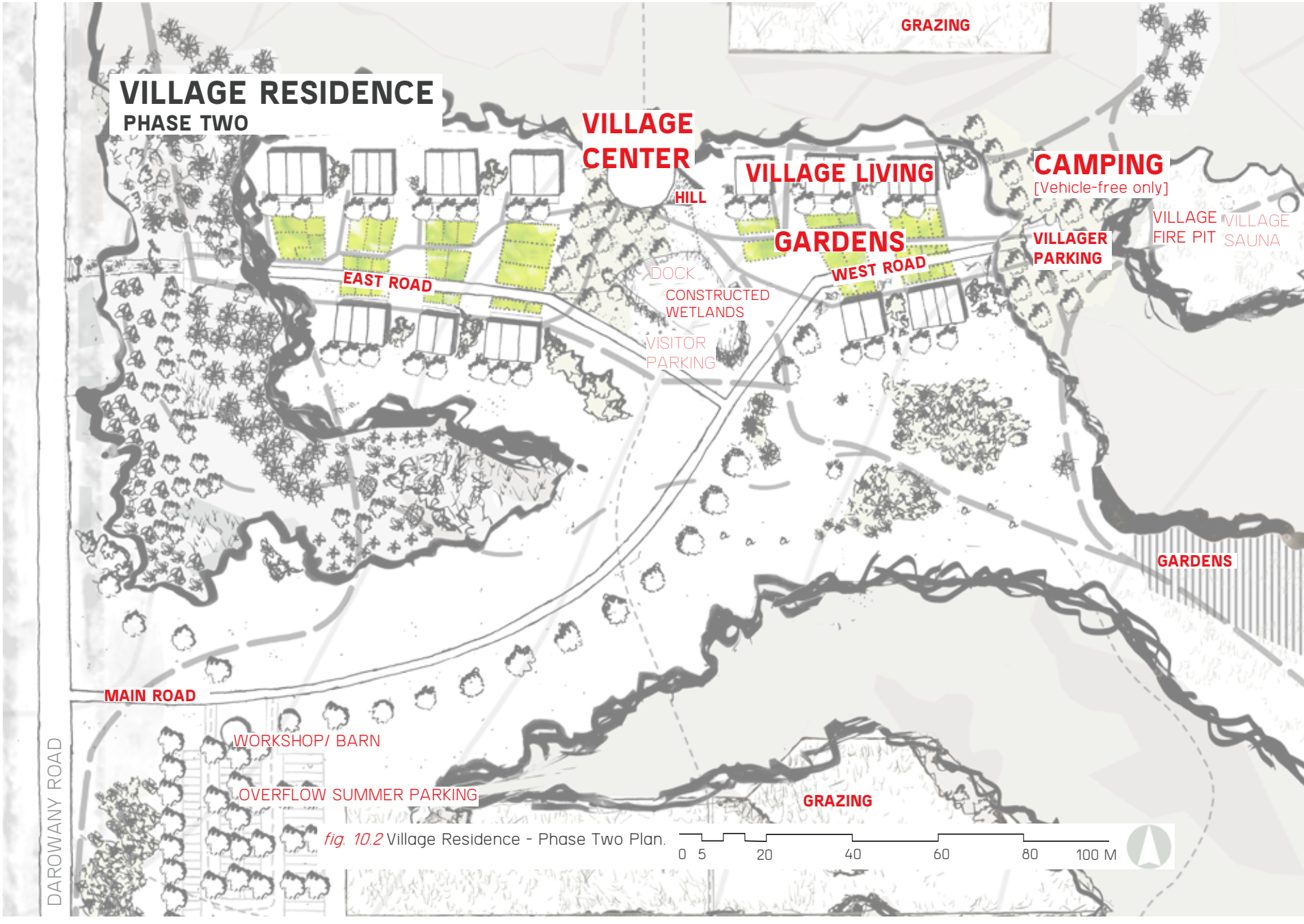


fig. 10.2 Village Residence - Phase Two Plan.

ANIMAL HAVEN [Section 10.4]

In the Animal Haven, a permanent fence may be constructed and the planting of forage, details to follow in section 10.4.

10.2 VILLAGE RESIDENCE

In the site design of the Village Residence [*fig. 10.1 and 10.2*] are dwellings [residence], gardens, grazing areas, and community facilities. The community facilities include a community center with a hill and a rooftop terrace, a sauna, parking lots, and a workshop with a neighboring barn. Also, in the proposed design are the constructed wetlands, a dock, a plaza, and camping areas.

Throughout the design of the Village Residence are shrub patches, tree stands, groves, and an alley of trees. Some of the shrub patches may occur through natural succession, while others are planted to provide residents and wildlife food. The shrubs could also be a place for wildlife to inhabit.

VILLAGE RESIDENCE
PROPOSED
VEGETATION

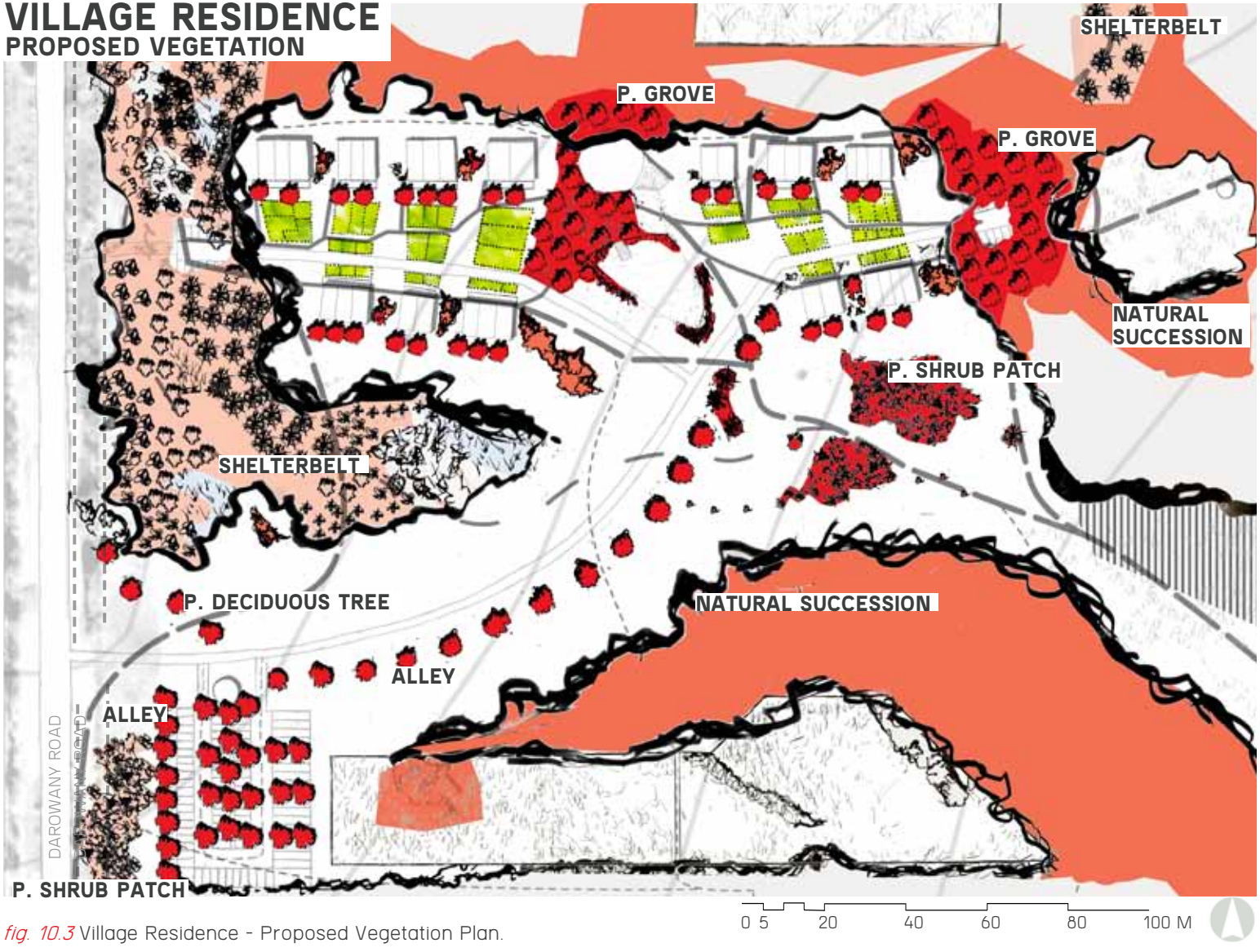


fig. 10.3 Village Residence - Proposed Vegetation Plan.

One grove of trees shades a plaza just outside of the community center while another shades a parking lot leading to a camping area. The alley of trees from the road to the center is to guide one inward to the center while revealing the community through the travel up the main road. Along the main road is the workshop/ barn, summer overflow parking, and Animal Haven. At the cross-section [*fig. 10.4 - 10.7*], there is visitor parking on the westside. The parking spaces may be constructed to be semi-permeable.

On the north side of the visitor parking is a constructed wetland. The constructed wetland aims to provide a place for excess water to drain to, and a place that brings people together while enhancing wildlife. On the north edge of the wetland is a dock for access into the wetland during the summer. In the winter the wetland may be used as a skating rink. Just beyond the wetland is a grove of trees with a surrounding plaza that leads to the community center.

The large community facility aims to invite villagers and visitors to the center [*fig. 10.2, 10.5 and 10.7*]. The center could be a place for business, retreats, community kitchen, and also could support other community affairs, to be a place of vision and growth. The idea is for the community center to be constructed with a hill on the side to provide access to a rooftop terrace. It could also be a space for cold storage and tobogganing during the winter.

In the design, looking out from the terrace are the east gardens and village homes [*fig. 10.6 and 10.7*]. The housing options for the homes are as mentioned in section 9.2. As the members join and transition to permanently living on the property homes could be constructed. On one side of the row, homes are community features while the other side is to look out at nature. The community features viewed from the home include the parking lots, road, and gardens.

VILLAGE CENTER
WINTER

fig. 10.4 Design Concept Map - Village Center Winter.
fig. 10.5 Village Center Winter Perspective.

VILLAGE CENTER
SUMMER

fig. 10.6 Design Concept Map - Village Center Summer.

fig. 10.7 Village Center Summer Perspective.

With the objective to reduce vehicles through the community, there are a few parking locations to limit cars to these zones. There is the visitor parking outside of the community center that may be used seasonally, and for events that bring in an influx of visitors, there is the summer overflow parking lot along the main road. The summer overflow parking is also designed to support larger vehicles and provide a storage space for trailers, and access resident vehicles. This lot is also intended to be used by the campers in the southern camping area on the property. This overflow lot could be constructed using semi-permeable materials to reduce the amount of surfaced areas.

Gardens, a highlight of the community provide an opportunity for growth. Growth in the sense of community, as well as growth in vegetation as a resource for the members. The garden spaces just outside the residential homes are located there with the intention of bringing people together to tend the grounds regularly.

Garden spaces [*fig. 10.2, 10.7 and 10.9*] outside the homes are individual plots assigned to a home. At times shared gardens may become challenging to manage therefore individual plots have been outlined. If there is desire by the resident to increase the size of their garden, there are other opportunities for gardening in the broader community gardening area to the south-east. Alternative gardening methods may also be experimented with throughout the property.

The design of the relationship between home and garden provides an opportunity to use greywater off the roofs as a source to water for the garden. Infrastructure around the garden such as a fence may also reduce potential browsing by wildlife. As ecovillages aim to share resources, shared tools could be stored in a central location at the community center.

Hard surfaces are shown in figure 10.10. These spaces are ones that may be of higher traffic. The minimal hard surfaces are intended to reduce impact to the

VILLAGE RESIDENCE [PHASE TWO]
SUMMER

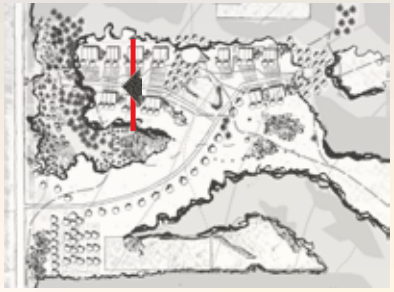
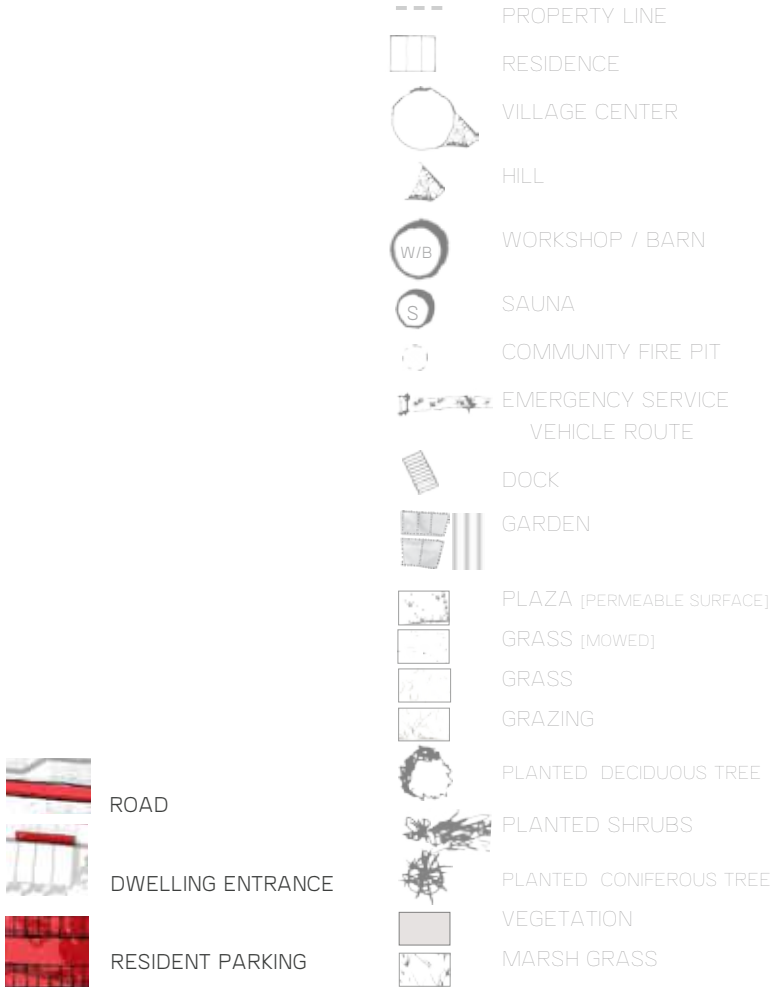


fig. 10.8 Design Concept Map - The Village Phase Two Perspective.
fig. 10.9 Village Residence - Phase Two Perspective.

environment. There may be instances where a hard surface outside the home may provide a bridge from an interior to exterior space. For example, in winter a hard surface may be easier to shovel and keep clear for ease of access into the home, to reduce risk of ice buildup. In the summer a hard surface could provide a flat ground to work on bikes rather than going to the workshop each time.

There are many methods of creating routes throughout the seasons. Some routes may be created using maintenance methods, such as clearing snow either by shoveling or using a snow plow or by cutting grass using a lawnmower. Other routes may be created by clearing a path through a forest, spreading woodchips or gravel. Trails [*fig. 10.11*] may also be suggested, and each season rediscovered as the landscape fluctuates over time. A significant portion of the south side of the property has marsh-like conditions. Therefore access to these areas should be limited to preserve the ecosystem.

VILLAGE RESIDENCE
HARD SURFACES



VILLAGE RESIDENCE
HARD SURFACES

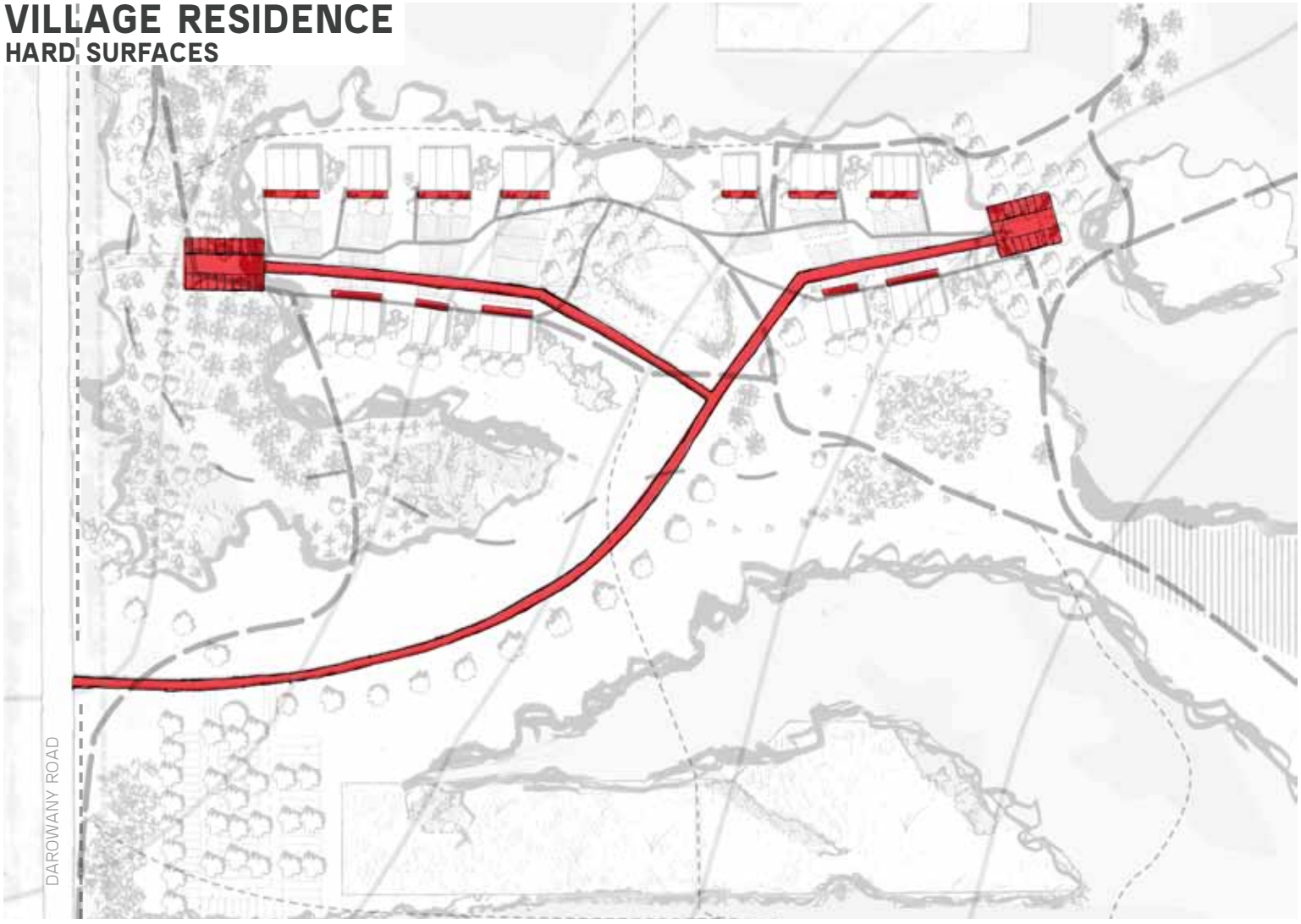
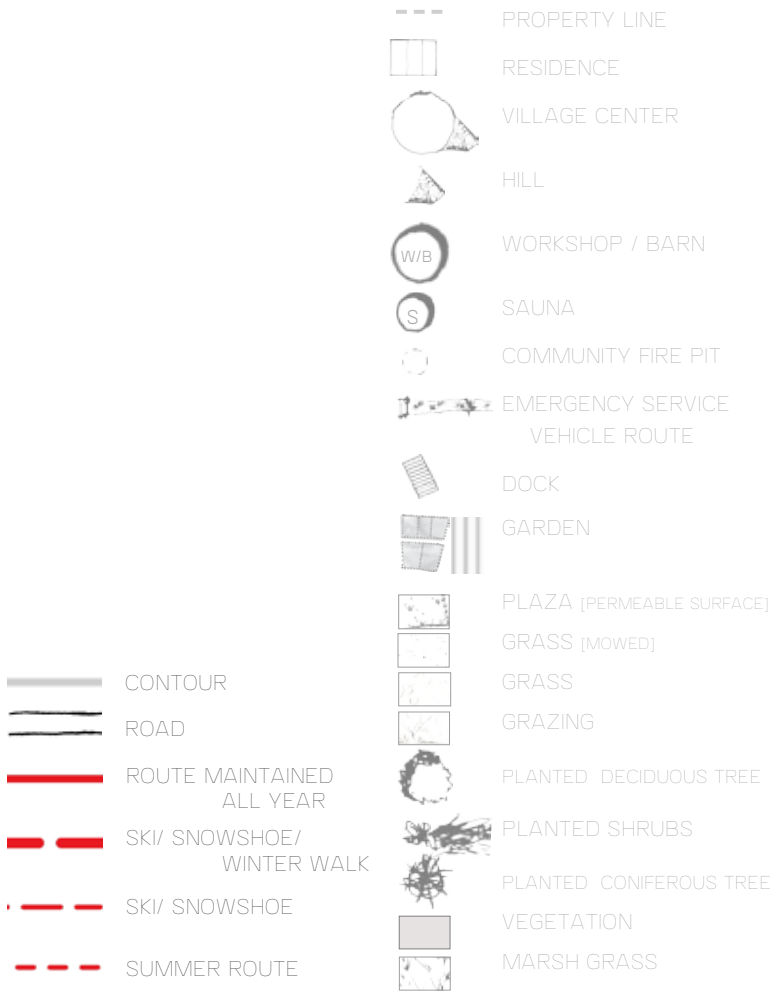


fig. 10.10 Village Residence - Phase Two Hard Surfaces Plan.

Another aspect to consider in the development of a community is the relationship with the environment. Myriad Village is in an area at risk of fire, drought, and tornados. If the local fire hall has the equipment, it may be possible to suppress fires through extracting water from a body of water or constructed wetlands 8 feet deep or greater. On the property of Myriad Village, there may be the opportunity to utilize water from the constructed wetlands near the community center if it contains enough water. Another possibility for fire suppression may be from an underground water cistern. The water cisterns may also provide water during times of drought. Greywater could be managed as a source for water in the cisterns or the constructed wetlands. During the event of a tornado, shelter could be inside the cold storage located in the hill next to the community center or a basement of a home.

VILLAGE RESIDENCE
TRAILS



VILLAGE RESIDENCE
TRAILS

fig. 10.11 Village Residence - Phase Two Proposed Trails Plan.

10.3 BIRD SANCTUARY

As a destination to walk away from the residence is the Bird Sanctuary [*fig. 10.12 - 10.14*]. Its a place intended to offer of solitude, and rest. The stone bench in the design stems from the existing stone wall on the property. Throughout the construction process, it is suspected that many rocks will be dug up as there are multiple piles of rocks throughout the property. These stones could be utilized to construct the bench branching out of the south dugout. Willows could be planted to increase shade, shelter, and to create a sense of enclosure.

10.4 ANIMAL HAVEN

Animals also require shelter from the wind and sun. The Animal Haven grazing area [*fig. 10.15 - 10.17*]. is surrounded by vegetation, such as trees, that could provide shade.

Grazing of grass-fed animals often incorporates portable fencing as a method to control feeding. In

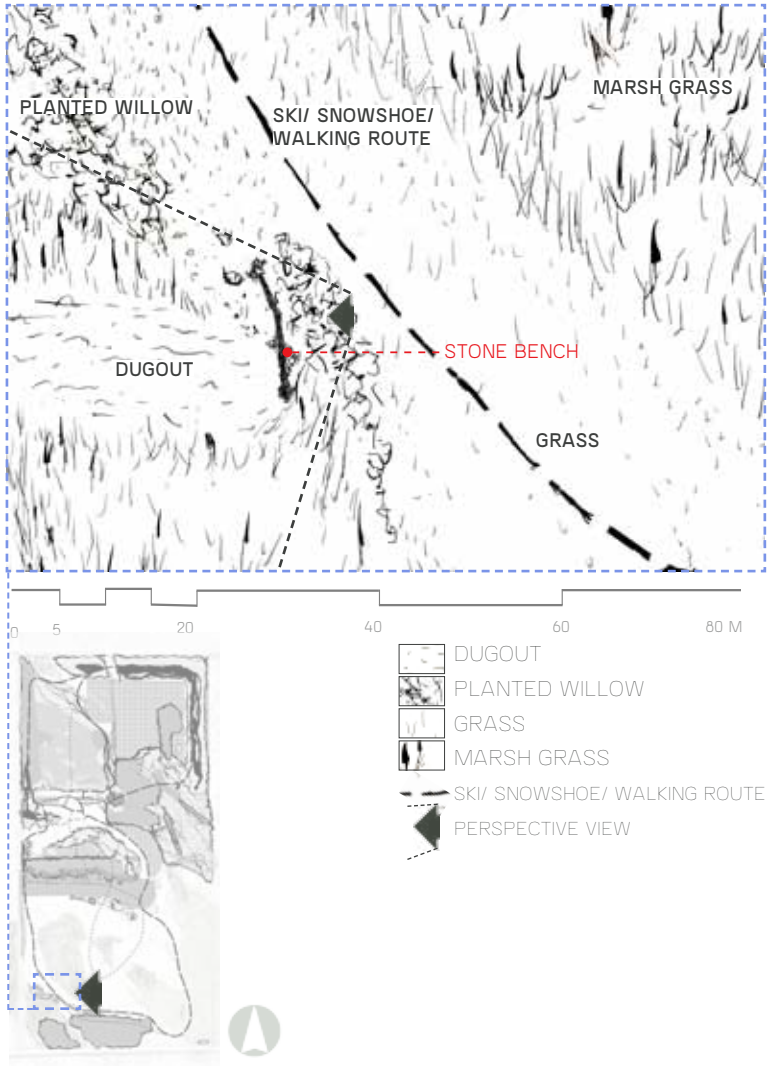


fig. 10.12 Bird Sanctuary - Concept Map.

fig. 10.13 Bird Sanctuary plan.

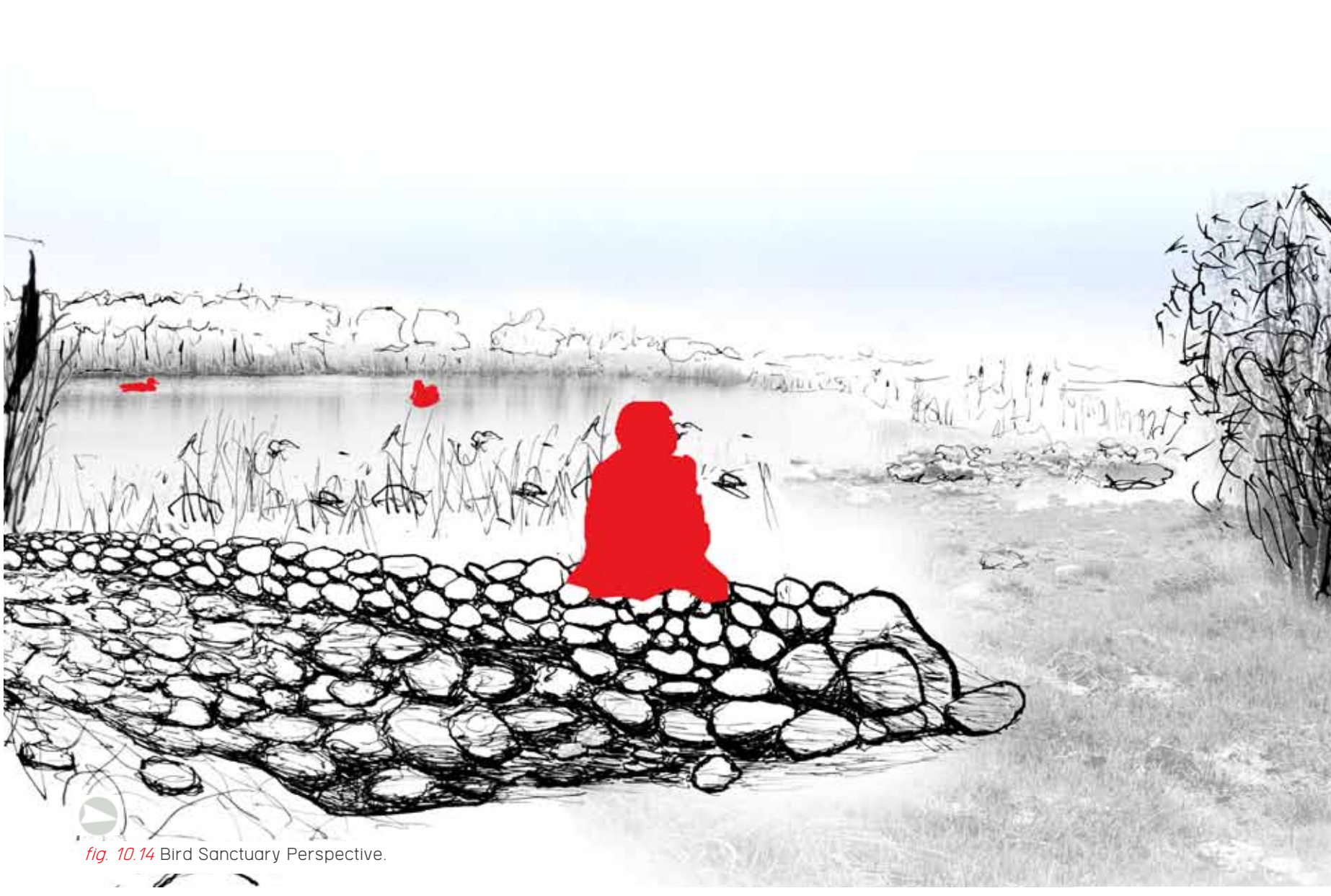


fig. 10.14 Bird Sanctuary Perspective.

the design is a sturdy permanent perimeter fence surrounding the grazing area. The larger grazing area may be organized into smaller areas using moveable fencing. A sturdy perimeter fence is to reduce the risk of animals escaping. Fencing requirements for animals vary due to size and activity level. For example, goats have horns that may get caught in loose rope fencing or larger grid fencing. Goats also tend to jump, and ram, therefore, challenging fencing options.

In reference to the conflict maps - grazing and manure [*fig. 8.2 and 8.3*], the Animal Haven has the potential for experimentation with manure to increase the carrying capacity of the forage.

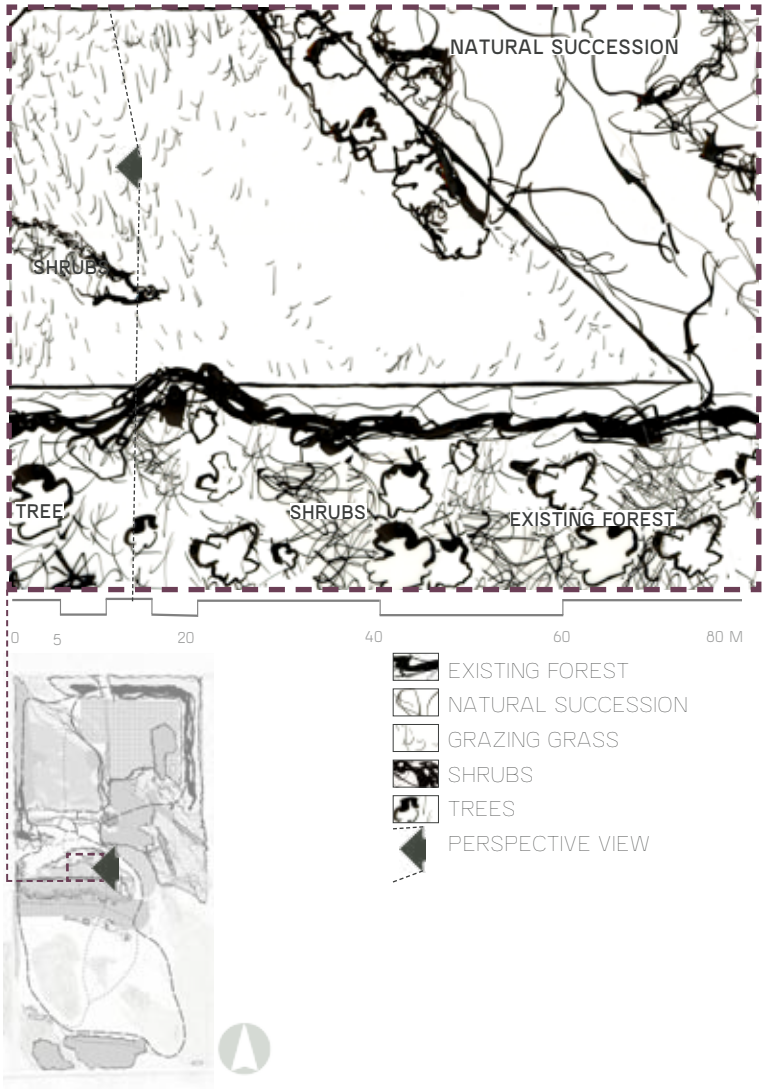


fig. 10.15 Animal Haven - Concept Map.
fig. 10.16 Animal Haven Plan.

fig. 10.17 Animal Haven Perspective.

CHAPTER 11.0
CONCLUSION: LOOKING BACK/ LOOKING FORWARD

The practicum aims to contribute to the conversation and reveal through illustrations various components that may influence the future design of Myriad Village's property. This document will be provided to the community and if any questions or comments shall arise, there is the opportunity to discuss the perspective of this compilation.

If Myriad Village were to utilize the maps on-site, methods of indicating the precise outlines may require experimentation. Experimentation could be executed through overlaying a grid on top of a satellite image and determining GPS points at particular spots on the grid. The grid could then be overlayed on top of any illustrated plan. While on site the map could be used along side a GPS unit or tool providing GPS points to correlate with the map points.

Precise outlines may be most relevant for issues regarding site regulations. For the concerns surrounding site regulations, it is recommended to discuss further with the Municipality to determine the necessary action for an ecovillage on the property.

One of the challenges for the practicum process was the availability of detailed data. At the time minimal resources had been available for the location of the property. Therefore some of the data was traced from

satellite imagery. Data that was created includes some of the marsh areas, seasonal wet spots, vegetation, and infrastructure. It is also to be acknowledged that some of the information throughout this document is not as current as there had been a fire in spring of 2018. The vegetation and infrastructure illustrations require re-assessment and recreation.

Possible challenges Myriad Village could face may be the time required to process requests for permits for alternative methods. For example, alternative methods of residential construction or greywater management. With alternative greywater management strategies, a soil test may be required. Geothermal options may also require a feasibility study.

If Myriad Village were to move forward with the proposed designs, they would be required to find an Architect or Engineer to provide them with plan drawings for the passivhaus row homes to submit to the Municipality of Armstrong. Other challenges may be finding experienced carpenters to construct the homes to meet the design standards.

Myriad Village has experienced firsthand efforts of another ecovillage and how it allowed them to proceed without as many resources required as the initial ecovillage. For example, the thoroughly written by-laws O.U.R Ecovillage in BC [Canada] uses. These zoning by-laws were easily accessible, potentially aiding in the speed of the rezoning process.

Myriad Village will continue to develop resiliency as it has experienced a fire in April 2018. Experience such as this indicates the reality of the conditions of prairie landscapes. An ecovillage is the sort of community that

could be resilient in a Manitoba prairie landscape. The supportive energy of an intentional community may bring positive change to many of those around. Developing relationships seems to be an essential aspect to the success of a community. Relationships have been forming amongst the community, with the locals, and with the Municipal members.

Myriad Village has been open and welcoming. Members are continually making efforts to engage in the local community, they have attended local markets and continually communicate the intentions of the budding village. They send out invites to join celebratory events on the property, present at ecovillage meetups, have participated in radio and journalistic interviews. The list continues as they move toward generating a positive new reality for the ecovillages in Manitoba. It could be a place for likeminded individuals to construct a new reality, one different from typical city dwelling and a place of continual learning and training.

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