SWAT MAPS

Soil, Water And Topography MAPS

Partner Information Package

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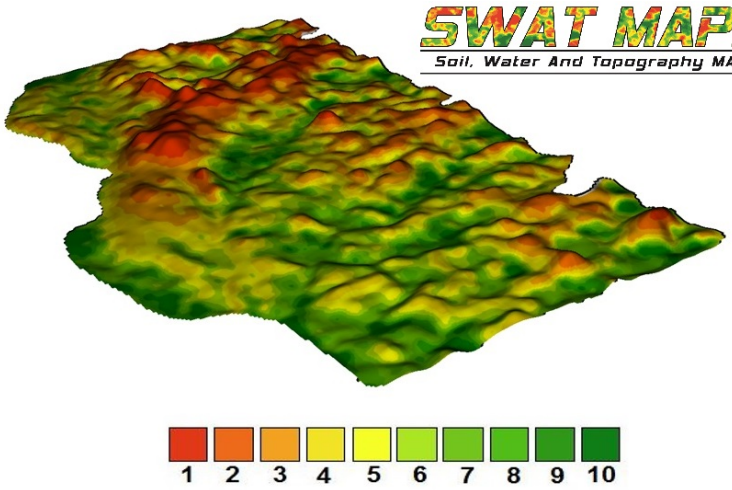
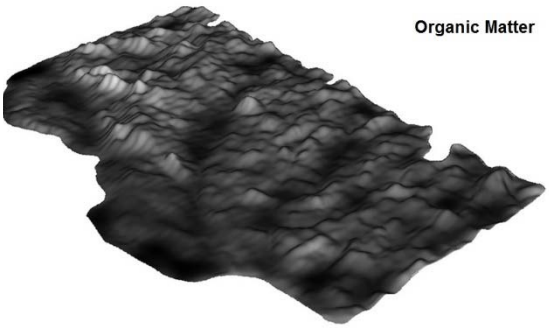
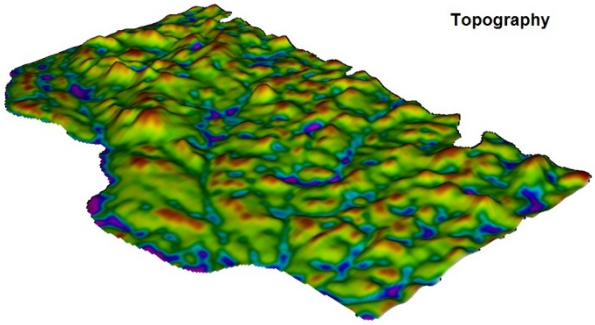
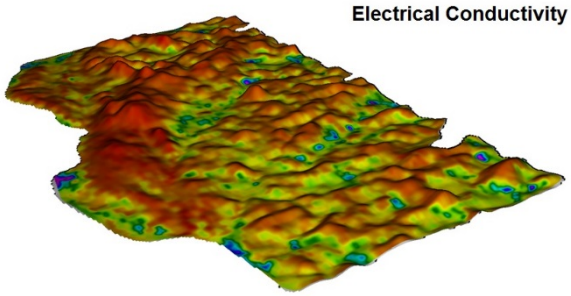
1.0 Introduction

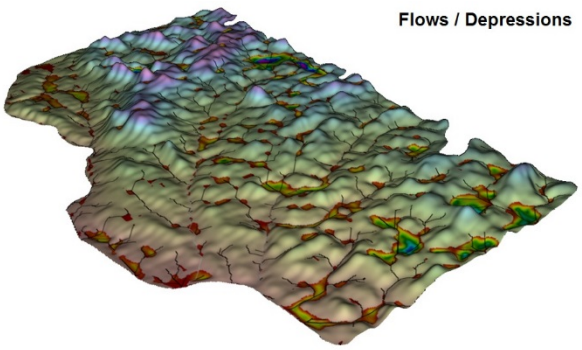
Thank you for choosing SWAT MAPS to be the soil potential based foundation of your variable-rate services. SWAT MAPS is a proprietary process and system that integrates all soil related layers into a single map. Any single layer is basically useless on its own, they each just identify single features about the soil properties, water models, and topographic influences of the field.

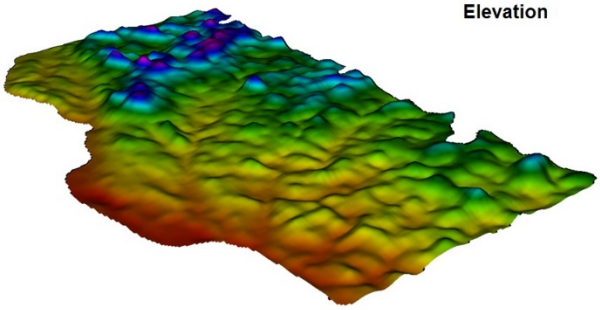












The SWAT MAPS process and software require excellent agronomy and technical people to have successful implementation with farmers. The objective of the partner program is to identify relationships that can be leveraged to support existing agronomists, consultants, retailers, and machinery dealers to implement these maps into their existing business.

The partner program will outline our business model and the basic principles behind the process, pricing,

software, brand use, ag data policies and other important aspects of how we do business with you. Standard Operating Procedures (SOP) for various technical tasks the partners will be doing will be added to the manual in section 10 once a signed agreement is in place.

2.0 SWAT MAPS Process

The partner program will outline our business model and the basic principles behind the process. The process is very intensive in setting up the first year with field data and boundary collection, field mapping, layer and zone creation, ground truthing and laying out soil sample points. In subsequent years the work and fees drop considerably as the zone maps and sample points are now established. Value creation from SWAT MAPS will also be outlined as it can take many forms, not just yield potential.

2.1 New fields: The 12 Step Process

First Year of SWAT VR	STEPS
MAPPING / ZONES	**1** Field Data Collection: EC, elevation, OM layers
	2 Field Data Collection: clean/prep for development
	3 SWAT MAPS Zone and Layer Development
	4 Ground Truthing
	5 CropRecords Fee for SWAT MAPS Module
SAMPLING / PLANS	**6** Soil Sampling - 5 Zones
	7 Soil Test Fees
	8 VR Reports / Fertility Plans / Advice
PRESCRIPTIONS / AGRONOMY	**9** Prescriptions / On-Farm, Phone Controller Support
	10 SWAT Process and System Tools
	11 Post-Seeding On-Farm Agronomic Assessment
	12 Pre-Harvest On-Farm Agronomic Assessment

MAPPING/ZONES (Steps 1- 5):

1. Field Data Collection

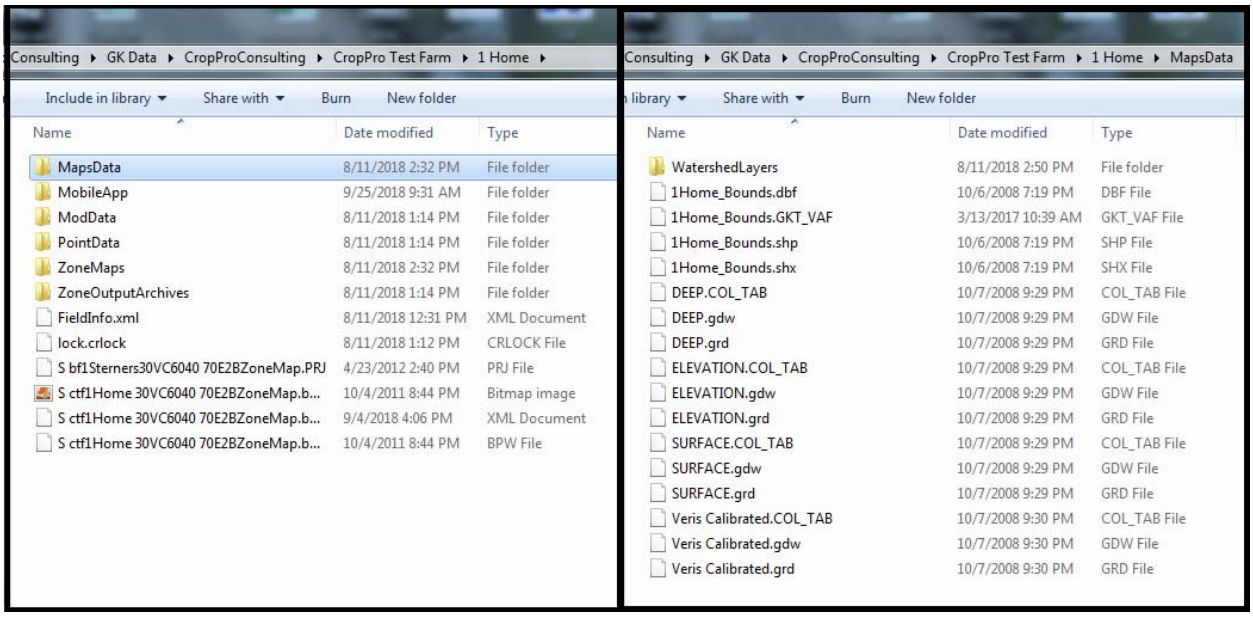
- Electrical conductivity and high grade elevation are required, organic matter optional.
  - Elevation can be acquired with vehicles (quads, UTVs, trucks) equipped with RTK receiver and base station. LiDAR can be used if it is of acceptable quality. Farmer generated RTK data from equipment is generally of poor quality as travel paths can be wide and cell connection signals (via towers) are often too far away.
  - Electrical conductivity - SWAT BOX is preferred - our new autonomous EC mapping unit that sends EC recordings to our CropRecords server in real-time. Any type of EC unit data (Veris, EM38, TSM, Dual EM) will work as long as it is acceptable quality. A border file is required.
  - All data must be collected in according to the protocol required to be high quality and this will be outlined in section 10 in the SOP.

2. Clean / Prep for development

- Boundary files are collected and finalized. Raw data from field mapping and sensors needs to be prepared into the proper structure, cleaned, and checked for errors. Data clipped to field boundary. Data is now ready for layer and zone map development procedures.

3. SWAT MAPS Zone and Layer Development

- Many layers of information are developed such as normalized EC, topography, depressions, water flows. From these various layers, a selection of multiple SWAT zone map options are all synched to the CropRecords app to the consultants' file sync.
- Example of folder structure populated for a single field (1 Home) and a single folder (MapsData). There are extensive amounts files created for the process.



4. Ground Truthing

- This is the process of the precision ag agronomist driving the field to make sure the correct SWAT zones are depicted. Observing the layers for the field such as soil properties, water and salinity patterns, topography, etc. will aid in selecting the right SWAT map. Choose % correct and note any issues or artifacts (such as old yard sites or new breaking) that should be changed to make the maps as correct as possible. SOP for ground truthing and map naming will be outlined in section 10.

5. CropRecords Fee - SWAT MAPS Module

- These are the consultants cost to use the Windows CropRecords system and GK viewer integration. Includes database, file sync, and app use. It also includes the SWAT MAPS module - our system that simplifies the prescription report creation, adds exclusive topography models, and builds on our fertilizer and crop response database (more information to follow in section 3.0).

SAMPLING / PLANS (Steps 6 – 8):

6. Soil Sampling

- Zone sampling - gps sample points on 5 zones is the minimum requirement unless they are very small fields; one set of samples at each end of the extremes (zone 1 and 10), then 3 sets of samples in-between (typically around zones 3, 5-6, and 8). There are typically 20 – 40 sample points in the fields depending on the size of it.
- SWAT Grid sampling – this is a grid sampling alternative. Use the existing zone map and points but do not put all of the zone sample points together into one composite sample. The 20 - 40 sample points on the map are sampled individually, not into 5 composite zone samples.
- Artifacts – old yard sites, new breaking, old well sites, manured portions, etc are all areas of the field that may require a "mod zone", a modified area of the zone map that is different from the rest of the field and needs a separate sample and prescription rate.

7. Soil Test Fees

- First year typically a complete test including OM, macro and micro nutrients. Additional tests (base saturations, sodium, textures, etc) can be conducted depending on the area and what the potential problems are. This is up to the agronomist but must contain the basics of OM, N, P, K, S, Cl, Cu, Zn and pH at a bare minimum. Single or multiple depths are configurable. Section 6.5 has more information on accepted lab information.
- Once soil tests are imported to the database they go directly into reports and on to the client's app. It is a requirement to import the soil test data to insure client data ownership.

8. VR Reports / Fertility Plans / Advice

- This is the primary agronomist advisory portion of the process. The scouting trips during the year will help validate the recommendations given. Biomass and yield maps (BAY MAPS) can also be used to support yield goals of zones.
- The primary job for this component is to get the farmers seeding equipment, machinery, logistics, fertilizer products, crops, and other general fertility and seed plans in place. Assessment of the general plan is a critical component to the farm fertility plan. Once this is established, individual field reports are made to vary the products throughout the zones.

PRESCRIPTIONS / AGRONOMY (Steps 9-10):

9. Prescriptions / Controller Support

- Once the VR reports and fertility plan are completed in CropRecords, it must be approved by the farm client. Then the prescriptions files are built for the controller(s) that the client has. Files are transferred to the appropriate contact or via telemetry services if the client subscribes to them. Controller support must be made available by phone or a farm visit at a mutually agreeable time prior to field work. Someone in the support system is required to show up to the farm and help the client load files if they have never done it before and this must be included in first year service fees. Controller loading cheat sheets will be included in section 10 in the SOP.

10. SWAT Process and system tools

- This fee is not a charge to the service provider. This fee is a charge from the service provider to the client for all the labour associated with training, operating, and supporting the platform during the year. The labour and tools are outlined in section 9.0. These define why partners need to keep charging clients or consultants doing it on their own.

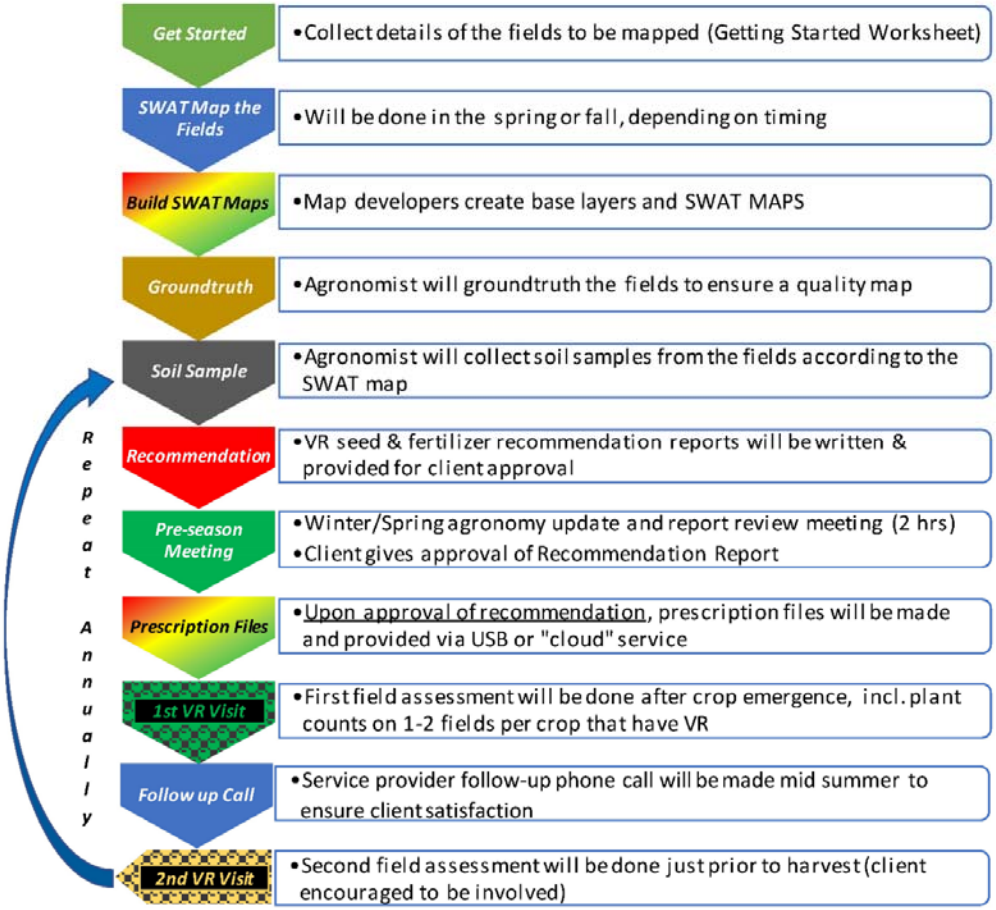
11. Farm Trip 1 Agronomic Assessment

- This visit is to assess plant stands of various crops by zone and take zone pictures of the fields checked. Satellite imagery may or may not be used to ground truth but often isn't of great value at early stages. This is also a general farm visit to see how the process worked and a general farm agronomy check to see any patterns, issues, and general overview.

12. Farm Trip 2 Agronomic Assessment

- This is a pre-harvest visit to see if there is lodging and maturity differences, and other possible issues such as disease or insect damage. It is a general farm check to see if any agronomic issues or opportunities related to VR fertilizer and seed are present. Satellite images may be used to confirm seasonal changes in growth. It is also a good time to do a farm client visit and assess the overall service feedback.

2.2 Summary of the Process



2.3 Annual fields

In subsequent years, the process begins at soil sampling (Steps 6-7), then the same process of agronomic recommendations and prescriptions is required (Steps 8-12). Once zone maps are created and are deemed acceptable, there are no more fees or work associated with Steps 1-5.

Services Included in the Second and Following Years of Variable Rate	
SAMPLING / PLANS	6 Soil Sampling - 5 Zones
	7 Soil Test Fees
	8 VR Reports / Fertility Plans / Advice
	9 CropRecords Fee for SWAT MAPS Technology
PRESCRIPTIONS / AGRONOMY	10 Prescriptions / Controller Support (on-farm, phone)
	11 SWAT Process and System Tools
	12 Farm Trip 1 Agronomic Assessment
	13 Farm Trip 2 Agronomic Assessment
	CropRecords Fee for SWAT MAPS Technology

Annual fields may not need to be resampled for nutrients if they are for pulse and legume crops that fix nitrogen. This should be left as an option for the client. Prescriptions for VR P, K and seed could be made from previous years sample results. Also, immobile nutrient and soil properties are fairly stable so they likely do not need to be tested every year. This keeps soil tests costs down.

2.4 Value Statements

SWAT MAPS are management zone maps derived using multiple layers including soil, water and topography. This makes a SWAT MAP unique because:

1. It has the ability to delineate management zones that combine water driven yield potential *and* nutrient responsiveness for VR fertility. Both yield potential and responsiveness of the soil are the most important factors in determining applied fertilizer rates, and therefore ROI. Soil responsiveness and yield potential are independent of each other; in other words, a high yielding area is not always highly responsive to nutrients, nor is a low yielding area always poorly responsive.
2. It models water flow and accumulation. Water is the foundation of understanding crop variability. It is a major factor in soil acidification, organic matter, mineralization, and nutrient loss. It is the cause of salinity, nutrient movement downslope, and is the driver of yield potential. Water is the root cause of most soil variability.
3. It is based on stable soil and topography factors and therefore doesn't change every year.

For a variable rate fertilizer program to be effective, it should be able to delineate the areas mentioned in the chart below. Not every situation will necessarily exist in every field, every year, but it's important to be able to identify them if they do. Yield potential is determined by water, primarily affected by landscape position, water flow, and soil texture. Fertilizer response probability is determined by soil testing and is specific to each individual nutrient. SWAT MAPS simply give us the ability to apply existing, proven soil science principles *spatially within a field*, at a higher resolution of management compared to traditional composite samples on one field.

As an example, a field with some salinity might look like this in respect to nitrogen:

Yield potential ↑

High yield potential **Low fertilizer response**	**High yield potential** **Medium fertilizer response** **Zone 6-7 lower midslope**	**High yield potential** **High fertilizer response** **Zone 4-5 midslope**
Average yield potential **Low fertilizer response** **Zone 9 toe-slope**	**Average yield potential** **Medium fertilizer response** **Zone 8 toe-slope**	**Average yield potential** **High fertilizer response** **Zone 2-3 upper midslope**
Low yield potential **Low fertilizer response** **Zone 10 saline depression**	**Low yield potential** **Medium fertilizer response**	**Low yield potential** **High fertilizer response** **Zone 1 eroded knoll**

↓ Yield potential

Fertilizer response probability →

SWAT MAPS actionable value tactics

There is no single answer to the value of SWAT MAPS because there are often multiple objectives, which vary from farm to farm. It is a cumulative effect of multiple actions that lead to positive value, both short-term and long-term. Yield, quality, harvestability, and harvest timing are common benefits.

Regardless of farm location or specific goals, the objective is proper allocation of resources for better return on investment.

ROI on applied nutrients

- Apply more nutrients where the probability of response is the highest, and lower rates where the soil nutrient supply is sufficient or excessive. For example, cutting nitrogen rates on high organic matter peat soils that have high available nitrate, and applying more on upper mid-slopes. Micronutrients have a particularly good opportunity for VR due to the cost of these nutrients. This strategy can also be applied to manures and composts, where nutrient balances and crop lodging can be difficult to manage when applied at a flat rate.
- Nutrients can be allocated from field to field as well, not just within a field. There is often just as much field to field variability as there is within field variability. Having five soil tests per field gives our agronomists a much deeper understanding of the field than a simple composite sample. The ***goal is to allocate nutrients across the farm to where there is the highest chance of return***.

Uneven crop staging and maturity

- VR seed and nutrition will promote even crop staging and maturity. Achieving a proper plant stand will minimize excessive tillers that delay maturity and cause uneven crop staging though the season. Balanced nutrition will add additional value in minimizing lodging and delayed maturity. ***This can significantly help improve control of diseases like FHB and hasten maturity in low areas that are normally too delayed*** to harvest when the rest of the field is ready. This has very high value for seed growers that need quality or can't use a glyphosate as a pre-harvest aid.

Lodging

- Crop lodging is typically predictable and occurs in lower slope positions and high yielding depressions. The cause is often nutrient imbalance combined with high water driven yield potential and excess vegetative growth. This can be managed by addressing specific nutrient balances in each zone and achieving target plant stands with VR seed, as well as utilizing PGRs in high risk zones if needed.

Salinity and drainage

- SWAT MAPS are the best way to delineate areas of salinity, even if a field has a mix of saline and non-saline depressions. Often the opportunity with salinity, if these soils can't be drained and improved, is to cut nutrient applications based on their limited yield potential and increase seeding rate to try and get better crop establishment to use soil water and compete with saline tolerant weeds. In some cases, it makes sense to take areas out of production, even if it's just for a few years seeded to a perennial, salt tolerant grass.

Sodic soils

- Ripping and/or treatment of sodic soils with gypsum can be better directed using SWAT zones for a better ROI, since these activities are rarely needed in a whole field and are expensive. SWAT MAPS are particularly effective at delineating solonetzic soils with high sodium (Na).

Acid soils

- The combination of layers that go into SWAT MAPS often provides a strong trend in soil pH and correlation to zones in areas with acid soils. Acidification is the result of crop removal, lower CEC soil (more sand), and high nitrogen loss. This provides the ability to only lime zones where it is necessary for a much better ROI than a flat rate, blanket application.

Nitrogen loss

- SWAT MAPS are very effective at identifying areas that will be prone to nitrogen loss from leaching or denitrification (water-logging). This enables the use of nitrogen stabilizers or specific nitrogen sources in the areas where loss is expected, reducing the overall cost compared to a flat rate application, but still getting most of the benefit.

Maximizing genetic potential

- VR seed rates are commonly used to take advantage of differences in available water holding capacity and yield potential, for using multiple hybrids that are suited to specific soil types or conditions. Having water as a layer in SWAT MAPS allows us to tailor planting rates or hybrids by moisture environment. This is well researched in corn, but the same principles can apply to other crops as well.

Eroded knolls

- SWAT MAPS can identify opportunities for landscape restoration; for example, pulling rich topsoil out of a non-saline depression and moving it upslope to an eroded knoll to improve its potential. Recent research in Manitoba has shown yield improvements on knolls of 10-133% depending on crop and precipitation, with payback expected in 4-6 years (D.M. Smith, 2008).

Soil applied herbicide performance

- Depending on the extent of variability and distribution of target weed species, SWAT MAPS can be used for VR soil-applied herbicides. Most herbicides applied to the soil as a pre-emergent have rate ranges based on soil properties that are mapped and measured with SWAT MAPS and soil sampling. This enables use of VR to apply the correct rate of herbicide in each zone to avoid poor weed control in some areas, and potential carryover in other areas. Also, some weed species are highly adapted and problematic in only certain areas of the field, such as foxtail barley or kochia in saline areas, or wild oats in higher moisture areas.

Environmental stewardship

- While it is hard to put a monetary value on environmental stewardship, almost all of the above value statements have a strong environmental value component. Whether it is managing excessive water, reducing over-application of nutrients and nutrient loss, or even reducing pesticide use, these are all goals that farms should be striving for to improve long-term sustainability.

3.0 Pricing

The SWAT MAPS fee structure is simple. Whoever does the work gets paid for that portion of the service and makes their margin on it. It is typically charged at about cost plus 20% but this value is assuming a basic scale of acres and staff. Typically a mapping truck should do 18,000 acres to break even if it is staffed with a person plus fuel, R&M and depreciation for example. There is no margin opportunity for just being sales people and not actually doing any work. There are also no finders fees with this service.

First year fees are higher as this is the setup year. Fields are mapped and that component does not need to be done again. Zone map development and intense soil test fees are also a higher cost in the first year.

3.1 First Year Fees

It is required that who is doing what work is determined at start of any business cycle. We will go through the 12 step process slowly so you can easily see how the costs are determined.

First Cycle of SWAT VR	STEPS		
MAPPING / ZONES	**1** Field Data Collection: EC, elevation, OM layers		
	2 Field Data Collection: clean/prep for development	**b**	$0.25
	3 SWAT MAPS Zone and Layer Development	**c**	$0.50
	4 Ground Truthing		
	5 CropRecords Fee for SWAT MAPS Module	**a**	$0.50
SAMPLING / PLANS	**6** Soil Sampling - 5 Zones		
	7 Soil Test Fees		
	8 VR Reports / Fertility Plans / Advice		
PRESCRIPTIONS / AGRONOMY	**9** Prescriptions / On-Farm, Phone Controller Support		
	10 SWAT Process and System Tools		
	11 Post-Seeding On-Farm Agronomic Assessment		
	12 Pre-Harvest On-Farm Agronomic Assessment		

This first example is what a typical dealer or master dealer (service providers doing nearly all the work themselves) would pay. On step 5, the **a** on the right denotes the base $0.50 per acre fee that everyone must pay. This is for the use of the SWAT MAPS Module that builds the zone maps. If an experienced master dealer was doing all the work – they would only pay $0.50 per acre to CropRecords. NOTE: this is the only payment to CropRecords – all of the other work is done by SWAT MAPS staff at a master dealer. There are no discounts applied to CropRecords fees.

If a dealer did all the work but had SWAT MAPS staff do steps 2 and 3 then they would also pay the master dealer for **b** and **c**, an additional $0.25 and $0.50 per acre. This is common with early dealer start-ups. They have their hands full getting the main part of the service done and do not have experienced GIS staff in the early stages of business. An example of a western Canada complete price list is shown below. All of the step details were discussed in section 2.1 and the price list is setup to be an “ad lib” agreement between the partner and the SWAT MAPS team and dealers. All of these prices will vary by area depending on the size of fields and the complexity of operations (except step 5 - the CropRecords Fee).

First Cycle of VR	Steps		
MAPPING / ZONES	1 Field Data Collection: EC, elevation, OM layers	$	5.95
	2 Field Data Collection: clean/prep for development	$	0.25
	3 SWAT MAPS Zone and Layer Development	$	0.50
	4 Ground Truthing	$	0.17
	5 CropRecords Fee for SWAT MAPS Module (No discounts)	$	0.50
SAMPLING / PLANS	6 Soil Sampling - 5 Zones	$	1.75
	7 Soil Test Fees (140ac min / standard test / 1 depth)	$	1.13
	8 VR Reports / Fertility Plans / Advice	$	0.50
PRESCRIPTIONS / AGRONOMY	9 Prescriptions / On-Farm, Phone Controller Support	$	0.50
	10 SWAT Process and System Tools	$	0.25
	11 Post-Seeding On-Farm Agronomic Assessment	$	0.25
	12 Pre-Harvest On-Farm Agronomic Assessment	$	0.25
	Total Standard Fee	$	12.00

For example, the entire job of “Mapping / Zones” in steps 1 to 5 could be done as custom work for you and you do the rest. Or perhaps you don’t want to write any prescription files and you add step 9 to the list that is done as custom work for you.

If the partner was just a single consultant who wasn’t interested in investing in any of the equipment and adding staff then a SWAT MAPS dealer could do all of the steps except Steps 8, 11 and 12 which are the primary agronomist advice steps. The options are open for every business model.

As discussed, significant interaction can occur between partners whether they are dealers, consultants or SWAT MAPS staff. Everyone’s strengths can be empowered to deliver the service.

If significant custom work is being conducted discounts are typically available. An example of a discount structure from 5-25% off is shown in section 10.1.

3.2 Annual Fees

Once the first year is complete, the cycle begins again at soil sampling after harvest. Similar to the first year, any service can be done custom work or completely by the partner.

The only fees for subsequent years are the CropRecords Fee for SWAT MAPS technology shown as **d** at $0.10 per acre in the spring invoicing cycle and $0.10 per acre in the fall invoicing cycle.

All other fees for services need to be completed by you, or another partner, or with the SWAT MAPS team.

Subsequent Years Fees				
SAMPLING / PLANS	6 Soil Sampling - 5 Zones		$	1.75
	7 Soil Test Fees		$	0.80
	8 VR Reports / Fertility Plans / Advice		$	0.50
	CropRecords Fee for SWAT MAPS Technology	**d**	$	0.10
PRESCRIPTIONS / AGRONOMY	9 Prescriptions / Controller Support (phone)		$	0.50
	10 SWAT Process and System Tools		$	0.25
	11 Farm Trip 1 Agronomic Assessment		$	0.25
	12 Farm Trip 2 Agronomic Assessment		$	0.25
	CropRecords Fee for SWAT MAPS Technology	**d**	$	0.10
		Total Standard Fee	$	4.50

3.3 SWAT BOX fees

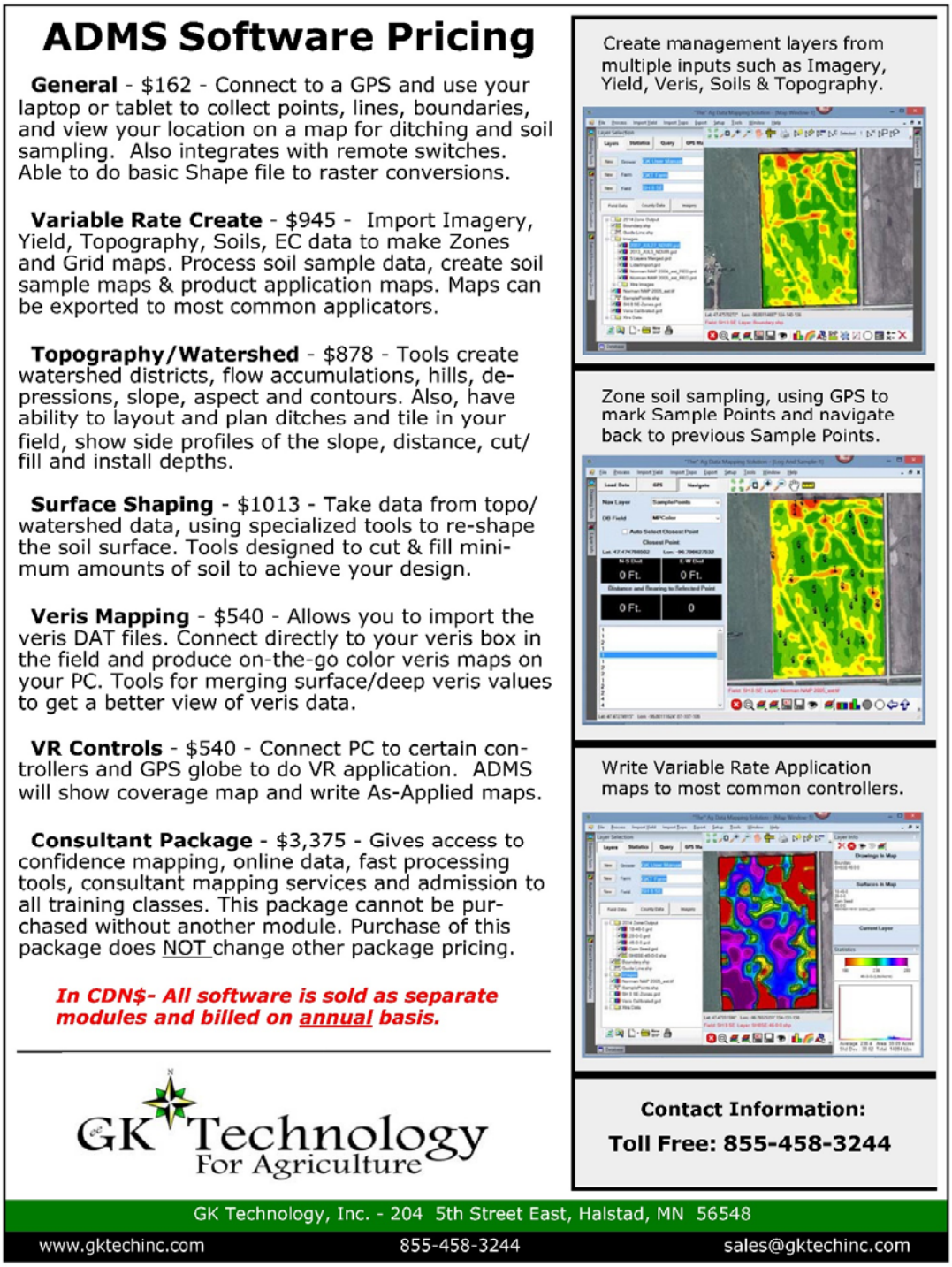
For SWAT BOX, a signed purchase order and payment is required to establish the order. Once it is completed and signed, this is a legally binding order for product. 60 days is typical to receive an EM38 and SWAT BOX hardware. Full purchase option details are viewable on our website at https://www.swatmaps.com/purchase-option

There are annual fees for the SWAT BOX also for the cellular data connection and web server connectivity. These are also outlined in the price list.

3.4 ADMS fees

GK Technology (owners of ADMS) and Croptimistic Technology Inc (owners of CropRecords) have been working together since 2008 and have had software license agreement in place for many years. These two systems were built to interoperate, they are built to work together.

Croptimistic does all the invoicing for CropRecords and for ADMS software sales to our network of partners in Canada, as we are a licensed reseller. The fees shown are current March 2019 and shown in CDN$. They are ANNUAL fees for software subscription.



3.5 Payment policy

Invoicing from CropRecords for software fees typically occurs twice per year (spring and fall) but can be more frequent if a lot of acres are being covered. Payment Terms are Net 30 days. Check and credit card accepted. After 30 days, interest is charged at 4.6% per month (2% interest plus 2.6% credit card fee). After 60 days the account is deemed delinquent and services/software can be temporarily shut down until payment is received.

Who is invoiced? The intent is that we (the contacts of the SWAT MAPS software and support team) work with the service provider and the service provider invoices the client. We require full disclosure of the clients' information for legal purposes (confirmation and consent to map their field and agreement to pay), but prefer to uphold the relationship as the service provider desires. In specific cases, the invoice can be made directly to the farmer but this cannot be done without prior approval.

We have an agreement with the consultant/dealer/master dealer. We do not invoice farmers if they are your customers. We don't know them, we don't have accounts with them, we don't have their address, and we do not want to be collecting accounts from people we did not enter directly into an agreement with. They are YOUR customers – YOU are our customer.

4.0 Software

CropRecords and ADMS are required software for SWAT MAPS. Licensing for SWAT MAPS will not be granted to users attempting to use it primarily in other platforms. It can be used for the odd feature in other programs but the bulk of the work is long term in these two platforms. There are 4 main reasons:

Reason 1 is because of our Ag Data Policy. CropRecords file sync and database sync system transfers the SWAT MAPS files and data to the farm client that purchased them. This insures that the farmer owns and control their "raw" data. Our system insures they get the files and are not controlled by the software platform or consultant. ADMS works seamlessly with this open file structure as well, no other GIS system does. CropRecords and ADMS provide clients with full GIS file control.

Reason 2 is that nobody else in industry has built a system and process for SWAT MAPS. Other systems do many wonderful things but they have zero insight on the zone layers and attributes for soil potential maps. The SWAT Module for developing zones, the apps for zone based records, the soil sampling module, etc it is all specifically designed for our process. The software we have chosen is the only system designed for SWAT MAPS service and support.

Reason 3 is that executing all of these steps from start to finish is a very complex process. Even our own staff who have worked with the systems for years are challenged with the nuances of variable-rate controllers, configurations, new software updates, file types, etc. This service is highly technical and we are challenged to support 1 system – the two pieces of software we use. We cannot and will not be providing support for 100 different GIS and record keeping systems.

Reason 4 is that we are not developing a "one and done" type service. SWAT MAPS process and service is continually evolving and we are finding many new partnerships with products and software. This is how we make a living – we sell a process and a software system. We cannot survive on single map sales unless we dramatically increase the fees. This is not our business model. SWAT is a long term plan for farmers and agronomists to add value, and we are also in it for the long term looking for business partners that feel the same way. We make a great map and then add great value to it in many ways.

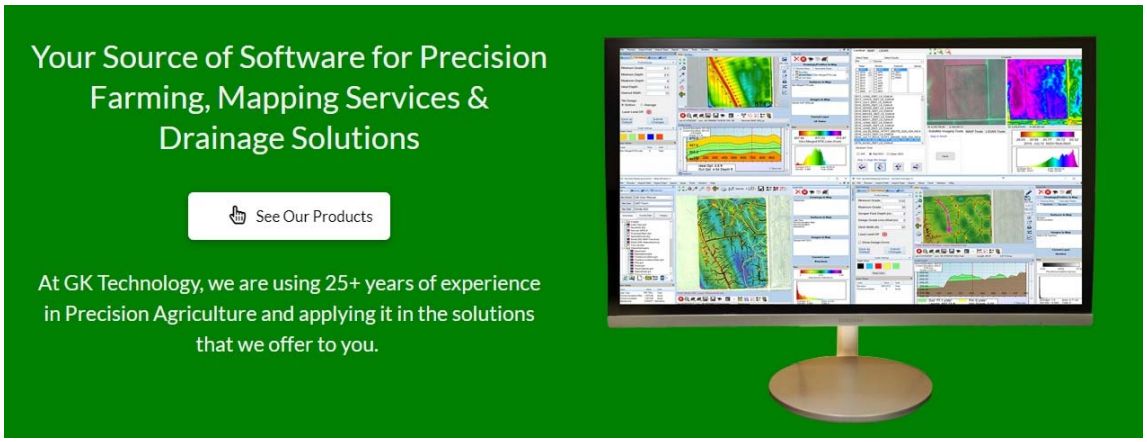
4.1 CropRecords

The CropRecords software is the development platform for the entire SWAT MAPS brand. This software is designed as a crop consulting system. It is the backend system that synchronizes all the files between users and software platforms. It is also an excellent platform for crop record keeping, scouting, making recommendations and jobs, and synchronizing all of this information between multiple agronomy staff and farm staff. It also has the advantage of the software being free to farmers (except the SWAT MAPS module and functions which is strictly a consulting function).

As a variable-rate fertilizer system it imports soil tests right into the farm and field, it allows easy data export to make prescription files, it makes many reports, it develops fertility plans, and more on the ag data side. On the file sync side it builds a set of folders on your windows system and then will synchronize all files between field mapping, agronomists, GIS office staff, and the farm clients computers. It also syncs maps and soil test results to the apps for easy field viewing.

CropRecords is the database of information, data sync, file sync, reporting, and app side of the SWAT MAPS software system.

4.2 ADMS



The “Ag Data Mapping Solution” from GK Technology is the best map building system available. Many systems have great features, but they don’t come close to the quality of high resolution maps and prescriptions that ADMS can offer. The other key attribute is the ability to use files freely. It works great with our file sync system for sharing files between all the users.

ADMS is a “power user” platform. There are many functions that can be used or custom built through scripting. It is also an excellent watershed modelling and drainage software system.

ADMS is the GIS power user platform side of the SWAT MAPS software system.

4.3 APIs and Interoperability

There are many API’s (Application Programming Interface) currently in development, the MOU stage, the NDA stage and in discussions.

For example, the John Deere API has been in development since 2018. We are pulling yield data, application maps, and other forms of data from JD. Clients using that portal can “share” their data with us by pressing the share button and then it will stream automatically. This will allow agronomists to take yield data and do analysis as they see fit to help the farmer make better decisions on things such as yield potentials of zones.

A common question is “can you software do this…?” and people looking for a system that “does everything”. This does not exist, nor will it anytime soon. The number of software companies, technology, sensors, analytics, etc is growing rapidly. There are many, many pieces of technology that will just have to bolt on to other providers to connect everything. The key to the future is an interconnected network of providers. We are the industries best variable-rate soil potential map and agronomic solution for variable-rate implementation from it. We don’t do data collection from combines, or financial analysis, or grain marketing, or bin sensing. All of these industries will have to connect or die.

A good example of interoperability via connecting is CropRecords and ADMS. We are two smaller companies doing great things that are completely complementary and have built our products to work together. This is a perfect example of how solutions need to come to market.

As future API and interoperability agreements get finalized we will announce them.

5.0 Contacts

Our contact list is a collection of experienced people. They range from software developers, to GIS specialists, to precision agronomy experts. These are the people our partners will most likely be dealing with on all aspects of business.

You are welcome to contact any staff with questions. However, each does specialize in certain areas of work. When it's possible, please direct your questions to the staff whose company position is most in line with your question.

5.1 CropRecords and SWAT MAPS

For sales related SWAT questions contact sales@croprecords.com

For support related SWAT questions contact support@croprecords.com

For agronomy related SWAT questions contact agronomy@croprecords.com

Support Staff Contact List and Hours of Operation

Name	Company Position	Area	Phone	Email
Brad Dunnington	SWAT MAPS + ADMS Manager	Canada/USA	(306) 874-8112	brad@croprecords.com
Derek Rude	SWAT BOX + R & D Manager	Canada/USA	(306) 231-3122	derek.rude@croprecords.com
Kerrie de Gooijer	Agronomy Manager	SK/Canada	(306) 269-7395	kerrie@croprecords.com
Wes Anderson	Senior Fertility Specialist	AB/Canada	(306) 209-8056	wes@croprecords.com
Derek Massey	CropRecords VP Operations	Canada/USA	(250) 253-8079	derek@croprecords.com
Chris Hawkins	Client Relations Manager	SK/Canada	(306) 621-9592	chris.hawkins@croprecords.com
Tracy Fehr	SWAT MAPS Specialist	SK/Canada	(306) 921-8087	tracy@croprecords.com
Trevor Friesen	CropRecords Training + Support	MB/Canada	(204) 750-0075	trevor@croprecords.com
Jeff Bronsch	Water/Irrigation Specialist	AB/Canada	(403) 892-9764	jeff@croprecords.com
Admin Staff				
Cory Willness	General Manager	Canada/USA	(306) 874-8118	cory@croprecords.com
Shelly Samson	Office Manager	Naicam, SK	(306) 874-9225	shelly@croprecords.com

Head Office, Naicam, SK - Hours of Operation

Monday to Friday, 8am to 5pm

Office is closed on statutory holidays.

Office is closed between Christmas and New Years Day every year.

Head Office Address is 206 1st Ave, Box 608, Naicam, SK S0K 2Z0

5.2 GK Technology and ADMS

Name	Company Position	Area	Phone	Email
Kelly Sharpe	Agronomist / Sales / Support	Canada/USA	701-361-8199	kelly@gktechinc.com
Darin Johnson	Product Development / Support	Canada/USA	218-791-2424	darin@gktechinc.com
Paul Fuller	Drainage Consultant / Sales	SD / USA	605-237-1134	paul@gktechinc.com
Ernie Johnson	Sales / Support	MN / USA	507-329-0715	ernie@gktechinc.com
Clint Streeter	GIS Mapping Specialist	MN / USA	218-230-4892	clint@gktechinc.com
Michael Holte	Sales / Support	MN / USA		michael@gktechinc.com
Travis Yeik	Product Development	MT / USA		travis@gktechinc.com
Admin Staff				
Cheryl Johnson	Office Administrator	Canada/USA	855-458-3244 ext 0	cheryl@gktechinc.com

Head Office, Halstad MN - Hours of Operation

Monday to Friday, 8am to 5pm

Office is closed on statutory holidays.

Head Office Address is 204 5th Street East, Halstad, MN 56548

5.3 Training and manuals

There are manuals available for CropRecords and ADMS software systems. The CropRecords manual is in the early stages so it has mostly basic functionality. The ADMS manual is

Software and app training can be conducted through predetermined locations and times as developed by the companies. Training can also be done with TeamViewer sessions and by using online video materials.

SWAT MAPS training for process, agronomy, ground truthing, etc can be done in the field or through teamviewer sessions.

If there is something specific you need just contact us. We will arrange the appropriate training. Sometimes it may be just be necessary to do a one on one call.

6.0 Partner program

Our business Model caters to independence for our partners while working together to grow:

1. We allow service providers to be independent. They have their own brand and business already. They simply add the SWAT MAPS brand and become variable-rate capable through our system.
2. CropRecords.com software allows farmers to connect for free and is generic. Your logos and names appear on the reports. It costs all of your clients nothing for you to connect to them, they don't get software bills.
3. The business model is fluid. You can get started with nothing as roles can be broken up and shared to what works best for everyone. As you develop capabilities and grow your staff and equipment you can continue to do more and more yourself and capture all the value yourself.

Becoming a SWAT MAPS partner:

We recognize the importance of people, that is why we are looking for partners. Local agronomy experience and knowledge with established customer trust in relationships are valuable assets that are difficult to put in place for variable-rate services. Approximately 50% of the service is technology and software based and we have a great system in place to service that. The other 50% is the agronomy, the boots on the ground component that local partnerships can flourish with.

The SWAT MAPS price list is itemized so that partners can easily see the different components and costs of the service. Each partner is unique. Some may have established agronomy business models while others may be only selling precision ag equipment and hardware. The itemized service model allows partners to identify what they do well and what they need our service and support system for.

Partners MUST use our suite of software. The SWAT MAPS process is enabled, supported, and delivered with CropRecords and ADMS systems.

It is important to note that the margin opportunity on the business model is only harnessed by "doing". There are no finders fees or commissions paid for referrals. If you want to get into the business there is a good margin opportunity on the work that you do to help the process succeed. As your business grows, you will receive a discount structure on certain services, software and products.

Partners get to remain independent. This is one of the strengths of our business model. Your existing brands and business names remain, you simply add the SWAT MAPS and CropRecords brands to your business.

The **SWAT MAPS brand package starter kit** is outlined in section 7.1 and is an excellent way to easily add SWAT MAPS to your existing business right away.

Types Of Partners:

6.1 Consultant

Consultants are entry level partners, typically doing only a few parts of the SWAT MAPS service model. They rarely have equipment for mapping and may or may not have sampling equipment. Their knowledge of controllers, file types and GIS map development is usually very basic. They are often looking for a strong partner that they trust in to help them get into the variable-rate business with their clients. Becoming a consultant can allow qualified agronomists and technology service providers to add SWAT MAPS to their existing agronomy and/or precision ag service programs.

Consultants do not have to purchase any equipment or expensive GIS modules. In this arrangement, some or all of the agronomy service or technical work is done by a dealer or master dealer. The parties agree who will do what and together – they deliver the full service. As time passes, the arrangement can be modified to meet the needs of the consultant – they can continue to add expertise, staff and equipment to build their own business.

This type of partnership is very low risk. The annual acreage requirements to be a consultant are 1000 acres of new mapping per year. It allows partners to test the business model and process to make sure it works for them and their clients. The partner is allowed to test other systems unless they are deemed competitor products as outlined in section 6.4. If they are competitive, no license agreement will be offered, they will just be a user like farmers are. The potential partner can choose try our services and the competitors until they make their decision. A consultant cannot be licensed unless the SWAT MAPS brand becomes their foundation map process. They have made a choice that SWAT is their foundation soil potential map.

SUMMARY: entry level partners, typically doing only parts of the service model, do not have to own any equipment, minimum 1000 acres per year new mapped acres, ADMS General module unlock, CropRecords VR module unlock, SWAT brand package purchased, no discounts on services, software or products.

6.1 Dealer

To become a dealer, the partner must own their own SWAT BOX or accepted EC device (EM38, Veris, TSM, Dual EM) plus have access to RTK GPS or acceptable LiDAR. Soil OM sensors may also work as data layers, but should be in addition to EC data, not in place of it. Dealers must be in the soil mapping business.

Dealers must also be able to do all the soil sampling and agronomy work such as soil sampling and variable-rate field checks. They need agronomists and equipment in place to conduct these tasks.

Dealers require the basic GIS software packages from ADMS (Variable-rate Create is mandatory, Watersheds is optional depending on the arrangement). Dealers do not require a GIS expert, that can still be sourced through the Master Dealer.

Dealers can (but are not required to) support consultants throughout their trading area and beyond. If there are opportunities to partner with people they should be explored. Every partnered consultant still needs to sign a license agreement unless they are employees of the dealer.

SUMMARY: established business model, must own mapping and sampling equipment, minimum 1000 acres per year new mapped acres, ADMS General + VR Create module unlock, CropRecords VR module unlock, SWAT brand package purchased, SWAT brand displayed on vehicles and sotores, 5% discounts on selected services and software when new mapped acres exceed 10,000 annually.

6.3 Master Dealer

Master dealers are enablers of the SWAT BOX, SWAT MAPS, CropRecords and ADMS brands. They become a distribution centre for all of the equipment, software, agronomy and tech support. They desire to be full service dealers on every aspect. Masters must put a growth plan in place to grow the knowledge, experience, and support systems for their staff and the dealers/consultants they serve.

Masters are expected to not only serve themselves and grow their own internal business. They are expected to help others succeed. Masters will identify key partners in all areas of expertise and work together with them to advance their business. Machinery dealers, soil test labs, agronomy service companies, ag retailers, farmers with precision ag staff, and more… all of these can become partners if they are a good fit philosophically and in business.

They will be given agreements that will require signing by all consultants/dealers they develop. This will insure a consistent and reputable brand of professional services.

They must have at least one “Power User” GIS expert on staff. They are required to have ADMS modules Variable-rate Create, Watersheds, and Consultant package. The expert must be trained on all aspects of the software required to service the local equipment. They must have at least one accredited agronomist on staff.

Masters can negotiate for some exclusivity. The exclusivity may be “territory” related or it may be “service” related. We respect intellectual property and established markets.

Master dealers can be setup when 90% or more of the requirements are met, but exclusivity is not an option until the Master has fulfilled 100% of the obligations required. The privilege of the Master is that they share in the benefits of servicing and supporting a strong network. It does not mean that everyone works for them, most in the network may actually work independently and only require certain services from the Master.

SUMMARY (all dealer requirements met PLUS): minimum of one power user of ADMS consultant package, ability to train and support all consultants and dealers in their network, must own mapping and sampling equipment, minimum 1000 acres per year new mapped acres, ADMS General + VR Create module unlock, CropRecords VR module unlock, SWAT brand package purchased, 10% discounts on SWAT BOX (not EM38 component), selected services and software when new mapped acres in the network exceed 50,000 annually.

6.4 Exclusivity and Territories

No affiliations with primary competitors are allowed (*Farmers Edge, Decisive, Echelon, South Dakota Wheat Growers-MZB, Growers, Soil Optix dealers). Partners cannot offer competing foundation maps for VR, you have to make a choice.

Partners can use anyones EC equipment (EM38, Veris, TSM, Dual EM) but not their zone development tools. Example (Veris + FieldFusion, TSM + AgX). The zone development tools of partners have zero fit with SWAT MAPS and furthermore, why would anyone use two competing process? You have to choose.

Territories are generally not in play. Exclusivity may be negotiated for some service aspects with Master Dealers. Please contact the GM Cory Willness directly for any inquiries in this section.

6.5 Soil Test Analysis

Soil test lab services are generally non-exclusive. CropRecords and its partners are willing to work with Canada and USA soil test companies such as: Agvise, A&L, Western Ag, Next Level Ag, Midwest, and SGS (we will not work with Farmers Edge lab or other direct competitors). Contact us if your lab is not indicated.

There are many direct measurement devices coming to market. These new types of sensors are being tested for in-situ soil nutrient content. These will be evaluated and added if they work.

There may be discounts on services available to SWAT MAPS partners (we can supply a form for acceptance to these lab partners). These labs are currently connecting via API and offer SWAT based sampling and support:

Current partnership developments are with Agvise and Next Level Ag.

7.0 Brand Use and Marketing

The **SWAT MAPS** brand is the highest value soil zone brand in North America. Users of the process have developed and delivered on their promises, including adding real value to farmers. The value of the brand must be, and will be, upheld to the highest standards possible. Previous sections detailed the process, fees, and support systems for the brand. The following section details the marketing details that are also very important to promote and uphold.

7.1 Promotional Items

The **SWAT MAPS Starter Kit** will be delivered upon signing of a partner agreement. It is mandatory to purchase this kit This will include: Hats, office signage, field signs, vehicle decals, 2 roll-up trade show banners, notepads, pens, advertising document template, brochures, an introductory slide set, and logo files. Exact details and pricing will follow.

Additional promotional items can be purchased if desired.

Logo use and brand use is allowed for all marketing materials partners seek to use it for. It must abide within the documentation outlined in this package.

7.2 Commitments and Expectations

The Foundation of a Win/Win Relationship
This is the biggest part of the brand - Morality, Integrity, Ethics, Respect

For our partnership to be strong, these are some things you have the right to expect from us:

- **Integrity -** We will be good for our word. For example, if we tell you we intend to do a task, it will be done. If we say we'll be somewhere, we'll be there. If ever we cannot meet an obligation due to unforeseen circumstances, we will communicate this at the earliest possible time.
- We will always be honest, professional, respectful and courteous.
- We will always maintain confidentiality with regards to our clients. Employees will not discuss or share any confidential information concerning the work they've done for clients with any outside organization, including social media.
- The advice we give will be in your best interest, based on the knowledge we have. We are an independent company and are not influenced by any third-party businesses.

For our partnership to be strong, these are some things we would appreciate from you:

- **Integrity** - Please be honest, respectful and good for your word.
- Please discuss with us any concerns you may have with our service or staff so we can have the opportunity to correct any issues.

- If we are building the prescription files we require you to review the provided recommendation reports in a timely fashion. We cannot make prescription files until these reports have been approved by you. We require 48 hours of notice to make prescriptions.
- Please familiarize yourself and your staff with your equipment's controllers (monitors), learn how to load prescription files, and to know how to activate the variable rate features. We do supply variable rate cheat sheets for the most common monitors for customers that are new to variable rate.
- We encourage you to refer to your operator's manual and to ensure your dealer can support the products and equipment they sold to you.

A note on CLIENT Retention: If its not 99% then something is wrong.

7.3 Website and Social Media

Our brands should be promoted on social media outlets. Other opportunities may exist for co-marketing and branding including guest speakers, tour attendance, social media promotion, demo fields and more. A marker and your contact information will be setup on the SWATMAPS.com website.

7.4 Audits

Services offered do not need to be delivered exactly as outlined in the 12 step process but that is the minimum requirement. For example you cannot "never go to the field during the year". You cannot "not meet with the farmer to go over their spring plans". You have to abide within the general context of the integrity of the service.

Random audits of the SWAT MAPS and CropRecords brand and any part of the SWAT MAPS process may occur. We must maintain a very high level of integrity and professionalism. Abuse will not be tolerated. Users that violate the brand agreement on social media will also not be tolerated. Partners that disregard any items in section 7 may have their license revoked or suspended.

7.5 Other Brands and IP

The SWAT MAPS brand is trademarked in Canada and the USA. We can also include licensing of other brands such as BAY MAPS, VRX MAPS, MAPS (Mapping Agriculture Production Systems).

The SWAT MAPS process is patented. The SWAT BOX product is patent pending. Any attempts to copy, steal, or reverse engineer these products violates the license agreement and will be punishable by law.

8.0 Ag Data Policies

As discussed in Section 4.0, our ag data policies are intended to protect and insure farmers retain rights and ownership control of their data. Once a farmers account is setup they have full access to all their information and no partner can control them.

Our ag data policy, privacy policy, and EULA is all on CropRecords software. These are currently being updated to meet updated industry standards including the Ag Data Transparent Seal.

9.0 Special Cases

There will be many special cases that need to be dealt with one on one. Following are a couple examples but feel free to contact us if more evolve.

9.1 Farmers doing it on their own

Using SWAT MAPS on a long-term basis:

1. OPTION 1 – Use our process and software system

"You become your own consultant and we train you and support you on our system."

CropRecords: fee for SWAT MAPS Technology Maintenance" is $0.16 per acre annually and covers:

- Database imports and sync to all your clients for soil testing data, crop and fertility plans, etc.
- File sync all your maps to GK ADMS, your clients free CropRecords apps, and to other staff
- VR database unlock for reports, configurations, export rates with products as headers in csv format
- API's, secure backup, support and updates

GK ADMS: subscriptions/support/training/annual updates

- Create interpolated prescription layers, export to controller files
- Annual training and basic support (basic support for prescription writing and the tasks above. This does not include support for specific tasks such as modelling drainage systems, yield map cleaning, etc.)

$700 USD per year - Variable Rate unlock – required to write prescriptions

$650 USD per year – Watershed modelling unlock – required if further drainage planning desired

$2500 USD per year – Consultant package unlock – required for power users of the platform

2. OPTION 2 – Do it on your own system your way

"Take the files and go do your own thing - but you receive zero service or support"

We are strongly opposed to using SWAT MAPS in any other files types and in other platforms and software systems. We do not offer any services or support (soil sampling, field checks, file or controller support) if our process and software system is not used. There are many complex skills and features that are required and we have chosen and developed the best software systems to do that. Other systems have not been optimized for these maps. We 100% allow users to do what they want with their files, but we will not have anything to do with it once it leaves our system to analyze and write prescriptions in other systems.

A common request is for maps as shape files. If you want to convert files out of our native format (grd) then we suggest purchasing ADMS and doing that yourself for two reasons:

1. We are strongly opposed to using shp files with SWAT MAPS because they are vector files (hard zones of polygons). Our zone maps and prescriptions are all interpolated (raster) and that makes them the highest resolution we can get. We do not support the low resolution shp files result in – it is not good enough for us.
2. We can't convert files for people for other programs. Partly because we do not support our files with other software programs, the geo-referencing may be different, they may sample down the data to make them smaller files, there are many reasons why we do not support other file types. Another one is time, we continually add more staff to meet the needs of our existing process and software.

You are on your own with shp files and exports and we strongly advise against it.

9.2 Consultants doing it on their own

Similar to section 9.1, consultants who abandon the software requirements and attempt to use other systems to build maps and prescriptions and manage their SWAT MAPS business must choose between the same two options.

10.0 Appendix

10.1 Full service fee examples

All partners can build their own price sheets that reflect their areas. Examples will follow:

CropPro Consulting – western Canada; large fields, salinity, and basic crops like canola, wheat, barley

Fieldwalker Agronomy – eastern Canada; small fields, no salinity and crops are corn and soybeans

Next Level Ag – USA; small to medium fields, lots of crop and soil diversity

10.2 Standard Operating Procedures

Once an agreement is signed, SOP's will be delivered based on the components of the services they are conducting. These documents are helpful sheets that describe tried, tested and true protocols we have developed for many things.

Variable-rate controller cheat sheets
Equipment configuration spreadsheets
Mapping fields and data collection
Ground truthing
SWAT MAPS naming and file structure
Variable-rate Report Approvals for Prescriptions
Getting Started Worksheet for New Clients
Soil Sampling Protocols