

**EMS SYSTEM EVALUATION
EAST MOLINE FIRE DEPARTMENT
PROPOSAL FOR TRANSPORT AMBULANCE
NOVEMBER 2009**

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ILLINI EMS SYSTEM

BACKGROUND:

The Illini EMS System is currently comprised of the following EMS Services:

Critical Care and ALS:

- East Moline Fire Department (Non-Transport)
- Illini Ambulance
- Quad City Helicopter EMS (Med-Force)
- Superior Ambulance, Burlington, IA
- University of Iowa Hospitals and Clinics

Intermediate level:

- Barstow Fire Department (Non-Transport)
- Colona Fire Department (Non-Transport)
- Erie Ambulance

Basic Level:

- Cordova Fire Department (Non-Transport)
- Cordova Raceway Park (Non-Transport)
- Hampton Fire Department (Non-Transport)
- Port Byron Fire Department (Non-Transport)

First Responders:

- Hillsdale Fire Department (Non-Transport)
- John Deere Harvester (Non-Transport)
- John Deere Seeding and Cylinder (Non-Transport)

In the State of Illinois, it is required for each EMS service program to align with an EMS system which is affiliated with a resource hospital. Through this affiliation, the EMS service program receives medical direction, regulatory guidance through an EMS system plan, and oversight of quality improvement and education programs. Each EMS system employs an EMS System Coordinator, who acts as a liaison between the Illinois Department of Public Health, physician medical direction and the EMS system programs. This includes components of both quality and regulatory oversight. It is the goal of the EMS system to provide the highest quality EMS response to all citizens within the response area of the EMS system as well as providing mutual aid to other systems.

The following document represents a systematic review of the impact of the East Moline Fire Department proposal to begin providing transport ambulance service to the citizens of the City of East Moline.

FINANCIAL VIABILITY:

This issue appears to be of the most interest to taxpayers that have voiced concerns about the implementation of ambulance services. This review will attempt to review the current financial projection of the City of East Moline, historical data provided by the Genesis-Illini Ambulance and industry standards currently appreciated throughout the region and country.

Income from Operations:

At first glance of the City of East Moline Proposal, hereinafter proposal, the financial projections in regard to revenue are very accurate when compared to the historical data provided by Genesis-Illini. These projections are noted on page 23 of the proposal.

The projections lack a major component, which is listed by the proposal on page 22. The second two tables on the page list the number of calls less than one hour apart, and overlapping calls. These calls total a number of 902, which are illustrative of calls that cannot be handled by a single ambulance system provider. In CY2008, the reported 2029 incidents listed by the proposal on page 22 is accurate. That being said, with a single ambulance, EMFD could expect to be available to respond with a transporting vehicle to only 1127 of the reported 2029 incidents.

Income projections list a total of 1400 revenue generating transports which is grossly overestimated. With a response to only 1127 calls, there is no way to transport 100% of patients. Genesis-Illini shows a historical 27% refusal rate, which does not result in the ability to bill the patient for services. This shows an actual 823 revenue generating calls. At that level of revenue generating calls, there should be an estimated reimbursement of 220,300.64, less billing expense of 13,218.04 for a net 207,082.60 to the city. The conclusion is that city revenue is overestimated by 41%.

Expenditure:

Most all expenses are underestimated, or completely omitted from the proposal. It is unclear where the projections for expenses are derived from in the proposal, but based on Genesis-Illini historical data are grossly underestimated.

Fuel: Fuel is estimated at 9.00 per call. That is considered a low projection, however, city government may be able to purchase fuel at a lower rate than a private entity. One should consider an estimated 7-9 mpg of fuel cost, and also realize that the ambulance will be driven on occasions other than when it is on a call.

Medical Supplies: The proposal estimates this at 25.00 per call, but reports a total of 14,400.00. Even assuming 1400 calls with a 27% refusal rate where supplies are typically not used, or not used in significant amount, that number would be 25,550.00. Based on historical data from Genesis-Illini, it was determined that an average of 60.47 was present for medical supplies per call. However, this number seems abnormally high, and may include minor equipment that does not directly apply to disposable supplies. Using the 25.00 benchmark purported by the proposal and a more realistic call volume, this number may be more accurately represented closer to 19,752.00.

Maintenance: The proposal finds maintenance to have a per call expense which is typically not a standard for the budgeting of this expense. Using MEDIC EMS in Davenport, who has a more conditioned fleet and robust fleet management system seems to bring a better estimate of this expense from an average cost perspective. MEDIC EMS estimates that 10,000.00 per year best represents the

maintenance expense of a vehicle, which includes preventative maintenance and repairs from mechanical failure. In review, the historical cost absorbed by Genesis-Illini for vehicle repairs is abnormally high, and a review of the current fleet status demonstrates a fleet that is significantly older than that of the industry standard. Current industry standard for the lifespan of a front line ambulance is 3-5 years.

New Ambulance Payment: It is not understood how the amortization of a purchased ambulance could equal 20,000 per year. Assuming that a new ambulance could be purchased for 130,000.00, dividing that by 5 would equal 26,000 per year. There are two other assumptions in the amortization, which include that all of the funds could be obtained interest free, and that a new ambulance could be purchased at that price. Current ambulance pricing is more realistically 145,000.00 to 160,000.00. Also not included is the purchase of a second, used unit as described in the plan. A used ambulance should be in the area of 80,000.00, and would result in additional amortization expense of 16,000 per year, again assuming 0% interest over 5 years. There is a note on page 24 of the proposal that states "The fire department has \$134,000 in the Vehicle and Equipment fund that would be used toward some of these expenses" which may represent an offset in initial cost, but does not represent funds that are not already the burden of the taxpayer.

Radio Equipment: This cost is estimated at 7000.00. The figure may be accurate in the short term, but this appears to be the expense only associated with the installation of a new RACOM radio in the new vehicle, in addition to a federally required VHF radio. It is unclear if this expense includes two additional portable radios for extra staff or cellular equipment for communication should radios fail. Also not included in the cost projection are the monthly fees for the additional RACOM equipment. For purposes of overall evaluation this figure will be accepted with the assumption that ongoing fees are omitted.

Medical Supplies and Miscellaneous Equipment: Separated as line items at 25,000.00 and 10,000.00 respectively, this number is likely high for medical supplies for one vehicle and relatively accurate for miscellaneous equipment. However, there are no supplies appreciated for the second, back-up vehicle. Based on the current EMS system bid for medical supplies from Alliance Medical, it is estimated that medical supplies would be 40,350.00 for both vehicles. This number represents little to no excess supply to restock ambulances after supplies are used. **Note: Currently the East Moline Fire Department receives supplies for free from Genesis-Illini. This represents a de facto subsidy to the department. There is no de jure subsidy on behalf of the hospital in respect to supplies, and to the contrary may be prohibited under federal law should EMFD begin transporting patients as an enticement to transport to the Genesis-Illini facility.*

12-Lead/Lifepack: There are multiple issues from an EMS System standpoint and several unappreciated issues from the proposal standpoint. Typically using used medical equipment is not an issue. However, in the event of a LifePack (Medtronic/Physio-Control, Redmond Washington), if the device is used, the manufacturer no longer warranties device failure. This represents an extreme liability to the provider using the device. Also, only 12,000 is listed. The department, currently operating on a non-transport standard, would have to upgrade every responding and licensed vehicle with the same transport standard. Even purchasing used equipment at 12,000 per device this is a cost of 60,000.00. (Assumption of 3 engines, one ambulance and one reserve unit.) Expenses for this device were not included in the reserve unit cost estimate, causing that vehicle to not be licensed. An unlicensed vehicle cannot be used unless it is replacing another licensed unit for a period of 10 days or less (typically appreciated during mechanical problems). This refutes the contention of the proposal on page 27 that the reserve ambulance can be staffed. These vehicles cannot be used in concert unless both are fully stocked and licensed.

Costs omitted from proposal: This list is likely not all inclusive, and represents only a minimum representation of costs that were not included in either start-up costs or ongoing expenses:

- *Oxygen:* Oxygen expense per ambulance based on Genesis-Illini historical data is about 3000.00 per year. This number is historical and was representative of a larger contract that may result in lower pricing than the fire department could anticipate. In addition, this cost is spread over 8 vehicles, which represents several vehicles not being used as “front line” ambulances.
- *Cellular Communication:* Because of the diversity in receiving hospitals and the requirement for redundant communication to hospitals, this is a required device and that expense is not noted.
- *12-Lead Transmission:* 12-Leads must be transmitted to the hospital for interpretation. This includes the purchased of a modem for the LifePack, a registration fee for receiving software and data network access charges.
- *Charting software:* Currently East Moline fire utilizes FireHouse software for the completion of patient care reports. Beginning in 2010, the State of Illinois will require NEMSIS compliant software for the transmission of data. At this time, non-transport agencies do not transmit data and will not undergo this expense. There is also no plan to include non-transport agencies in data transmission, as that will result in a redundant transmission of data for a single patient. Charting software can range from tens of thousands to hundreds of thousands of dollars. Currently, Genesis-Illini contracts with MEDIC EMS to provide software and hardware support under a confidential contract. That cost was not available to the EMS system at this time.
- *Insurance:* There is no line item for insurance. The city cannot self insure an ambulance and obtain a license for it in the State of Illinois. It is also very risky to practice medical interventions without professional medical liability insurance. This can result in a drastic burden to the taxpayer to not only pay a single claim, but to also pay the legal fees for defending even frivolous or fraudulent claims.
- *Capital equipment replacement:* In only a few short years all of the initial start-up equipment will need to be replaced. Ambulance (front line, used daily) has a life span of 3-5 years, LifePack devices should not be trusted past 7-8 years, even with a maintenance contract, ambulance cots normally do not exceed the lifespan of the ambulance itself, and other major equipment such as intraosseous drills, stair chairs, and radio equipment all need replacement which is not budgeted for.
- *Maintenance contracts:* As listed above, the LifePack monitors will need maintenance agreements (listed on page 18 of the proposal as 7,000.00 and not appreciated in the expense summary elsewhere) as well as the ambulance cot and computer equipment for documentation.
- *Upgrade for entire department:* The expenses listed for the upgrade from the non-transport protocol to the full transport protocol only include the transporting vehicles. There will be significant expense in upgrading all vehicles. All vehicles on an individual department must be at the same level and standard. Currently there are multiple procedures, interventions and medications that the department does not carry that will have to be added.
- *Training expense:* To have a full time EMS Coordinator that performs quality assurance and quality improvement functions, there is a significant expense in sending that staff to conferences and education that is beyond that of the scope of initial paramedic education. It should also be noted on page 18 of the proposal that a listed expense of 1,200.00 for ACLS training, which was provided to the department at no charge by Genesis-Illini. It is unclear if that represents a line item for personnel payroll expense.
- *Initial paramedic training:* This training is estimated at 10,000.00 per new firefighter. It is unclear, and based on tuition at Black Hawk for a new paramedic, it is unlikely that this includes any personnel expense or overtime for training purposes.

- *Overtime:* Additional overtime is appreciated by ambulance providers as opposed to those providing only fire service. An ambulance that proceeds to a call within 15 minutes of the end of shift, will appreciate at least 2 hours of overtime for two personnel plus time for documentation by one of the providers. Ambulance providers are also frequently called to testify in court and participate in depositions for either calls related to criminal activity or claims of malpractice resulting in further overtime.

Summary of financial viability: There is a gross overestimation of income from operations and underreported expenses based on historical data. Using realistic numbers there is an anticipated loss of over 75,000 with the addition of one firefighter and over 260,000 after adding the expense of the payroll change from the recent arbitration and staffing change. Also, there is no mention of a delay of reimbursement of Medicare, which is 71% of Genesis-Illini Ambulance current revenue, for a period of at least 6 months and more realistically 9 months. This would demonstrate a devastating loss to the city in the first year. The addition of an additional ambulance, despite the increase in call volume, would result in a loss approaching 600,000 as opposed to the estimated 453,000 estimated by the proposal and would still not mitigate the delay in Medicare reimbursement.

OVERALL SYSTEM FINANCIAL ANALYSIS:

The goal of any EMS system is to make maximum use of potential revenue streams. The overall cost to the taxpayer should be closely evaluated, as the total cost of service delivery versus utilization of resources is of utmost importance to an efficient system that delivers the most expedient service delivery with minimal subsidization. The overall goal is to appreciate less cost for each component of service delivery. Currently, the Illini Ambulance accrues losses in upwards of 100,000.00 per annum which are absorbed by the Genesis Health System. If the East Moline Ambulance proposal is implemented, and current losses that exist are accrued by the East Moline Ambulance operation, those losses would become the burden of the taxpayer.

Most hospitals accrue losses from the operation and/or subsidy of ambulance services. It is of benefit to hospitals to have ambulance services available to transport patients from the hospital to other medical facilities. The transfer market, or transporting patients from one facility to another, typically generates a much higher reimbursement rate, as these transports are pre-approved by insurance carriers, or deemed "medically necessary" by a physician before transport. "Medical necessity" is a common source of denial of Medicare claims and results in significant loss to ambulance transport agencies. Due to the higher reimbursement rate of transfers, not typically handled by fire department ambulances, this typically lessens taxpayer burden to subsidize EMS services.

Currently, ambulances find most expense to be in that of personnel. This expense is noted as being much lower in private or hospital based ambulance services as opposed to fire based. Fire based ambulance services, who also employ ambulance providers as firefighters, will pay a much higher annual salary, in addition to pension and healthcare to not only the direct employee, but to their families. With anticipated call volume increases, it would be difficult for East Moline Fire Department to continually increase staff to keep up with demand. Also, as demand increases, the availability of the firefighters that are assigned to an ambulance, becomes lower and negates the premise of why the staff are needed in accordance with NFPA 1710.

Finally, it should be noted that East Moline will see a loss of funds by the proposal estimate close to 23,000.00, and by the projection forecasted in the aforementioned of 13,000.00, to a third party billing company. This represents funds that are no longer available to the EMS system as a whole. Managing revenue stream is paramount to providing the lowest cost service, and this represents a waste of funds

through redundancy that does not make up for the loss it creates. By adding increased personnel expense, loss of revenue to redundant services and costs for pension and healthcare, it is easily demonstrated that the same service is being presented to the taxpayer, at an increased overall expense. By increasing expense for the same service, this contradicts the goal of EMS systems of maximizing the use of revenue streams.

REVIEW OF SYSTEM STATUS:

System status management is a complex system of looking at all available resources and sending the closest appropriate resource. Currently, the Genesis-Illini Ambulance practices this concept which is rapidly becoming an industry standard. There are two dominant components to system status management which are Peak Demand Staffing and Dynamic Deployment.

Peak Demand Staffing involves the scheduling of shifts designed to provide the number of ambulances needed for the time of day and day of week projected demand. Shift start times and shift lengths vary based on projected call demand based on certain times of day. By practicing this, the EMS system can match resources to demand more accurately than the fire based static model of fixed staffing. Though not typically noticeable to the public, Genesis-Illini ambulance currently practices this and also increases staffing for weather and special events.

Dynamic Deployment is a system in which ambulances are geographically deployed based on projected demand by the time of day and day of week using historic demand data. This model represents movements in population from home to work and back and these patterns vary. Using dynamic deployment, ambulances do not respond from fixed stations as in the fire model, but are “posted” to street corners based on time of day and the overall number of response vehicles available. This concept, though quite expensive due to software and manpower for implementation, is the gold standard in handling EMS response.

The proposal makes the following statements:

- The primary ambulance will be placed in service at Station 21.
- The ambulance will be deemed available when it clears an Illinois Quad-City Hospital en-route back to East Moline
- The ambulance will be deemed available with it crosses the river into Illinois.

These statements in the proposal are examples of why system status management was developed. The aforementioned illustrates that there are multiple opportunities for there to be a closer available ambulance, however, if the East Moline unit is available, regardless of their location which may be Trinity West in Rock Island, they have the opportunity to not only respond past closer Illini Ambulances, but also closer Moline Ambulances.

Currently, here is how the system responds to an EMS call:

When an address is entered into the computer, the dispatcher is presented with something called a candidate ranking as illustrated below:

Candidate Rankings				
▲ ETA	Vehicle	Status	Distance	Type
00:00:00	32	EnR Post	0.0	Ambulance - ILLINI
00:23:29	30	At Post	13.7	Ambulance - ILLINI
Unknowr	31	At Post	Unknown	Ambulance - ILLINI

This illustration shows the dispatch screen showing a simulation of an address entered. One Illini Ambulance identified as 32, is right by or at the scene of the call. A second Illini ambulance is 13.7 miles away. The dispatch information was altered to illustrate what East Moline Ambulance would look like in system status. As illustrated, the ETA and location are unknown, so there may be one or two ambulances closer than the East Moline vehicle. There may also be Moline vehicles closer, however they do not participate in the Illini EMS System and do not practice system status management.

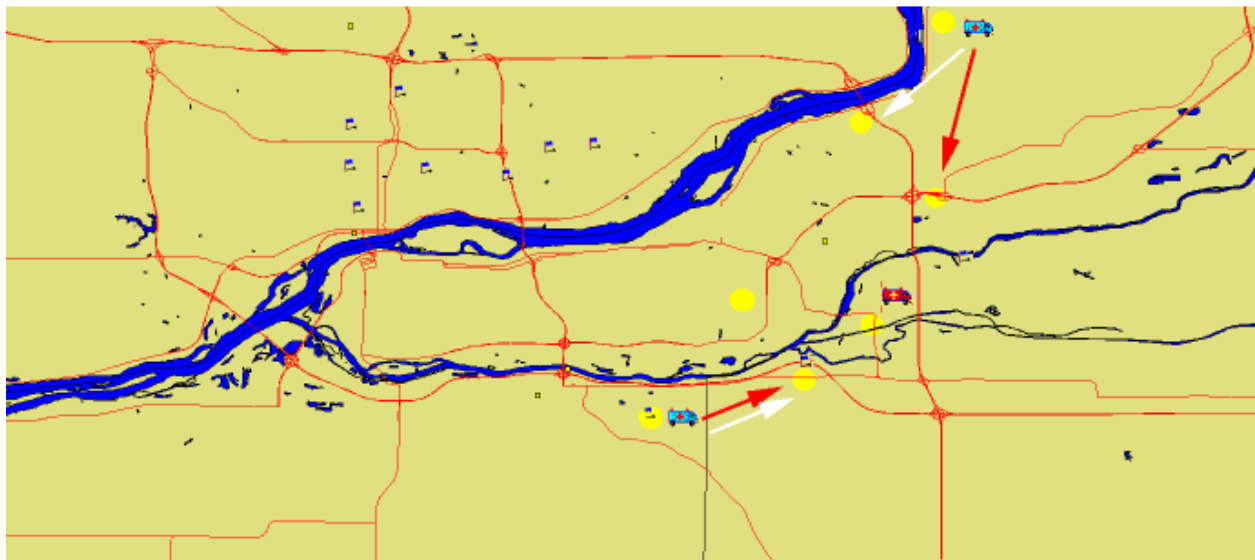
In addition, the movement of vehicles is dynamic, to position vehicles in the most appropriate location, based on the number of vehicles available. Below illustrates the typical Illini Ambulance posting locations, or areas where the ambulance may station themselves based on multiple circumstances.



Typical posting is done based on call volume. The following map illustrates monthly call volume. There were an additional 100 responses to Moline last year for calls where Moline Fire did not have an ambulance available on the eastern portion of their response area.



A change in system status management would occur should East Moline begin transporting. Due to a lower demand in East Moline, the volume demand shifts to the east, thereby causing the system status plan to shift vehicles in that direction. This is yet another demonstration on how East Moline residents would realize an increase in response time. The proposed change would result in the elimination of an Illini Ambulance and a change in posting when one or more ambulances are on a call as illustrated here:



Where in the current scenario when there are 2 ambulances available the ambulance in Upper Rock Island County comes to the border of Port Byron and Hampton, to position themselves closer to East Moline. With the loss of demand from East Moline, when 2 ambulances are available, that vehicle would move closer to Hillsdale. In addition, by eliminating an Illini Ambulance, this puts this scenario into play more often, and also limits the ability of Illini Ambulance to respond to mutual aid calls to Moline.

In a study of the similarly situated Scott County EMS System in the Iowa Quad-Cities it was recommended that "...the communities in Scott County should strongly consider a coordinated, systems approach to EMS delivery that utilizes all of the resources in the area in a coordinated fashion. This includes a unified approach to PSAP, dispatch, and EMS resource utilization. While challenging, it has been accomplished by other communities with tremendous improvements in quality and

effectiveness.”¹ The same study also indicated at that time that “... implementation of an ambulance service by the Davenport Fire Department is NOT a good idea at this time. While it might help the City of Davenport, it will cause damage, in the areas of response coverage, funding/reimbursement and mutual aid to cover the rest of the Scott County EMS system. Our recommendation will provide for overall Scott County EMS system enhancement... including improvement of service within the City of Davenport.”

The Scott County EMS System Evaluation looked at many of the aspects involved in this review. It agreed that there will be revenue to offset cost of service implementation, but that revenue would likely not completely offset that cost. It should be noted that the proposed Davenport system would include three ambulances with an exponentially higher call volume than that of East Moline. More so the concerns provided by the consultants was the overall damage done by eliminating a major component of a broader based system that serves a community en total as opposed to by tighter jurisdictional boundaries. By operating a coordinated system to best respond using true system status management.

Overall, with East Moline not participating in system status management, the isolation of that ambulance and the City of East Moline will result in an increase in response time for not only the City of East Moline, but all outlying areas and the City of Moline.

QUALITY OF SERVICE:

There is a common misconception in the public that more paramedics are better for the public. This concept has been tested on multiple occasions and has been proven that less is more. A positive correlation exists between more cases treated per paramedic and survival to discharge.² By having fewer paramedics in the system that more frequently treat critically ill patients, there are better patient outcomes most easily correlated to the experience level of that Paramedic. This relates to the Genesis-Illini Ambulance in a more profound way than most. With the increased call volume of Genesis-Illini Ambulance and the fact that when not practicing on an ambulance, they are afforded additional contact with critically ill patients in the emergency room at the Genesis-Illini Campus. This creates an optimum scenario for ongoing experience and the ability to more frequently perform lifesaving interventions. Limited exposure to critically ill adult and pediatric patients reaffirms that high risk skills are performed infrequently.³ That statement is prevalent throughout EMS, however this is less a concern with Illini Ambulance paramedics due to their increased exposure to high risk skills.

Another concern is the credentialing of paramedics. Initial training programs may not prepare providers to practice independently.⁴ Common lifesaving technical patient care interventions that EMS providers perform include endotracheal intubation, 12-lead electrocardiogram (ECG) interpretation, medication administration, and intravenous (IV) access initiation. Literature shows that within 6 to 12 months of initial training, skill deterioration occurs.⁵ In addition, the most advanced psychomotor skills deteriorate most rapidly.^{6 7} Most of the firefighters that would be assigned to practice on the

¹ Paturas, et. al. Scott County Iowa EMS System Evaluation, Leadership Directions Ltd. 2 Feb 1996

² Sayre, et. al. Cardiac Arrest Survival Rates Depend on Paramedic Experience, Acad. Emer. Med. 2006; 13 (5 (supp));s55-56

³ Vrostos, et. al. Does the Number of System Paramedics Affect Clinical Benchmark Thresholds? Pre Hosp. Emerg. Care. 2008 Jul-Sep; 12 (3):302-6

⁴ Pointer, J.E., Experience and mentoring requirements for competence in new/inexperienced paramedics. Pre Hosp. Emerg. Care; 2001;5: 379-83

⁵ Miller, et. al. Pediatric Continuing Education for EMT's, Recommendations for Content, Method and Frequency. Pedr. Emerg. Care, 2004;2:269-72

⁶ Zautcke, et. al. Paramedic Skill Decay. J. Emer. Med. 1987;5:505-12

ambulance do not have adequate experience and are not credentialed to practice on an ambulance. There is no question the East Moline Fire Department is staffed with competent Paramedic level first responders. With the current system and literature that illustrates consistently that skills deteriorate over time without frequent use, it is safe to say without question or emotion that the skill level of a large department of certified paramedics that have limited patient contact and have never transported, or have limited experience in transporting patients, is not as proficient as credentialed transport paramedics. The East Moline Fire Union's contention that an equal or better level of service is directly contradicted in literature unless a 'multifaceted approach for maintaining provider competency'⁸, as the model currently in place at Genesis-Illini, can be developed.

QUALITY MANAGEMENT:

The proposal illustrates on page 33 that the department will conduct a continuous EMS system review through debriefing, critique sessions, chart review and chart audit. At this time, the department does not have any staff qualified to perform this function. This is a major concern of the EMS system, as EMFD has not been compliant with non-transport QA/QI standards and has not participated in the Pre-Hospital Advisory Committee Meetings since 2007, which disseminates important quality and operational information.

INHERENT PROBLEMS WITH PROPOSED PLAN:

In conclusion the following represents the items that are viewed as challenges and other questions that arise from the current proposal:

- The fire department repeatedly defends the unavailability of ambulance coverage in the proposal by stating that they would request mutual aid for an ambulance if needed. If the department is willing to rely on mutual aid for ambulance coverage, why would they not rely on mutual aid for fire suppression?
- How does the department expect an exhausted, potentially overheated paramedic to adequately treat a critically injured or ill patient from a structure fire?
- The proposal financial calculations are grossly inaccurate.
- There are not adequate personnel that are qualified to perform quality assurance and quality improvement functions.
- The proposal will result in an increase in overall cost to the taxpayer for the delivery of the same service.
- A fire emergency will result in the entire city being without ambulance coverage without increased response time for mutual aid.
- Through the reduction in staff of up to 25% and the removal of an ambulance from the EMS system the proposal will limit the ability of Genesis-Illini to expand coverage and staffing quickly to respond to large scale incidents (i.e. weather events, Trice shooting and subsequent disturbance, etc.).
- The reduction of the department to a Basic level first response service would cause less taxpayer burden than the generation of an ambulance service. In addition, each additional firefighter added for fire suppression would be added at a lower cost both from education and salary.

⁷ Latman, et. al. Knowledge and Retention of Emergency Care Attendants, EMT-A's and EMT-P's; Ann Emer. Med. 1980;9;183-9

⁸ Vrostos, et. al. Does the Number of System Paramedics Affect Clinical Benchmark Thresholds? Pre Hosp. Emerg. Care. 2008 Jul-Sep; 12 (3):302-6