RECOMMENDATION

THAT Report MO-06-05 entitled “Emergency Medical Services (EMS) 10-Year Master Plan” be adopted as a strategic planning framework (blueprint) for public policy, organizational, capital and operational decisions pertaining to the delivery of emergency medical services.

REPORT

The purpose of this staff report is to present the Emergency Medical Services (EMS) 10-year Master Plan. The complete Master Plan report was sent to Regional Councillors under separate cover on April 1st. Regional Council directed staff in 2002 to prepare this Master Plan. There will be a staff presentation at Health & Social Services Committee on the Plan.

Background

In Report MO-32-02, Regional Council approved the creation of a 10-Year Master Plan for Emergency Medical Services (EMS). The services of IBI Group were retained for the Master Plan. In 2003, the public accounting firm of KPMG was retained to complete a quality assurance review of EMS compliance with Ministry of Health and Long-term Care (MOHLTC) certification standards. In April of 2004, the MOHLTC conducted a pre-scheduled, triennial, Ambulance Service Review of the EMS Division. All three reviews included consultations with stakeholders, including the Mississauga Central Ambulance Communications Centre and the Base Hospital Program for Halton that is responsible for the oversight of controlled medical acts performed by paramedics. The master plan was developed based on information from the KMPG report and the MOHLTC Ambulance Service Review, with the IBI report serving as a detailed technical document.
The legislation governing provincial EMS operations is the *Ambulance Act, RSO, 1990 c. A.192* and Ontario Regulation 257/00. The MOHLTC has established EMS certification standards based on the legislation. All ambulance service providers within Ontario must comply with the certification standards. Compliance with the certification standards is observed during the triennial Ambulance Service Review conducted by MOHLTC as noted above.

For the past 3-years, EMS staff have participated with other Ontario municipal EMS in the Ontario Municipal Benchmarking Initiative (OMBI). Participation in OMBI provides an opportunity for staff to compare core service delivery issues, through the sharing of EMS data and performance statistics. This provides staff an opportunity to develop and review best practices related to operational matters. Halton’s results compare favourably to the results identified in other participating municipalities in most categories.

Since assuming responsibility for the provision of ambulance services in 2000, Regional Council has approved additional funding that has allowed the Division to increase staffing hours, construct new ambulance response stations and expand paramedic skills and scope of practice through advanced defibrillation equipment and educational programs. The expanded service levels have enabled the Region to be one of only a few Ontario municipalities to meet, or exceed their legislated response time standard.

**INTENT OF THE MASTER PLAN**

Although Halton Region continues to meet the legislated response time standard, system analysis identified that there were a number of challenges and pressures that would impact upon future EMS service operations. To address these pressures, the objective of the Master Plan is to serve as a strategic planning framework (blueprint) for public policy, organizational, capital and operational decisions pertaining to the delivery of timely, cost effective accountable emergency medical services of a high quality. It is also intended to provide equitable EMS across the region, to the extent that such services are affordable and practical. This includes minimum response time performance and strategies that will allow Halton Region to adequately address the various pressures on the provision of emergency medical services over the next 10 years.

An environmental scan was completed that reviews present day service capabilities, and future challenges and priorities. Where appropriate, the Master Plan provides recommendations and strategies to manage the increasing call volume in a cost effective manner, utilizing various methods to deliver pre-hospital emergency medical services in Halton Region.

**CHALLENGES/PRESSURES**

As noted in the Master Plan, the five main challenges facing Halton Region EMS are:

1. Managing increased call volume associated with residential and industrial growth and special call generators.
2. Maintaining and improving EMS response times, given the issues noted in item #1.
3. Managing the changes in call volume trends and patient conditions associated with an ageing population and provincial healthcare restructuring.
4. Managing educational requirements related to changing demographics, patient acuity, patient needs, the new normals related to infectious disease, and emergency preparedness, including Chemical, Biological, Radioactive, Nuclear and Environmental (CBRNE).
5. Evolving the Division to one that is prepared to meet the challenges through advanced technology, new industry performance measures and best practices.

GROWTH IN EMS DEMAND

In 2003, Halton Region EMS responded to approximately 45,000 calls, an increase of 103 percent since 1996. While increased demand has been observed in all types of calls, the majority of the growth has occurred in emergency calls. The growth in call volume (2001 to 2011) is affected by several factors, including population growth, (estimated to increase by 30 percent), and employment growth (estimated to increase by 42 percent). The elderly population is projected to increase to 14 percent of the general population over the same time period. The elderly population has a greater dependence on medical transportation by ambulance for emergency service, as well as scheduled medical tests and treatments.

In addition to the three primary call generators noted above, there are other factors that will continue to increase demand for ambulance services. These include the provincial restructuring of healthcare services, in hospital off-load delays due to crowded emergency departments, motor vehicle collisions related to the four major multi-lane highways that transverse the Region, increased numbers of long-term care/retirement facilities, the expansion of the Maplehurst Correctional Centre and the proposed expansion of facilities related to the Mohawk raceway and casino. All these factors will contribute to an average call volume growth that is projected to continue to increase between 6 and 10 percent annually over the next 10 years.

RESOURCE REQUIREMENTS

A total of 10.4 FTE are required to staff 1 ambulance, 24-hours a day, 7-days a week, which provides 8,760 hours of staffing annually. Currently, the 2005 approved budget provides for 100, 735 hours of annual paramedic staffing with 123.7 paramedic FTE. The IBI technical document identified an immediate requirement to increase resources by 12,500 hours, with a further 18,690 annual vehicle hours within 5-years and 48, 600 annual vehicle hours within 10-years. In order to achieve the required level of conventional staffing, it would require 15 additional FTE immediately, 19 additional FTE within 5-years and 54 additional FTE within 10 years. The Master Plan identifies a more cost effective option by introducing Emergency Response Units (ERU) staffed by a single paramedic, which is discussed in more detail in the following section.

As the paramedic workforce increases in size, so too will the demand on the supervisory and administrative support services.

Given the hourly variations in call demand, any new resources added to the current system should be initially targeted to periods of peak demand (mid-morning to late evening). The EMS Division currently staffs 3 peak demand ambulances that are centrally located and deployed to all areas of the Region as required by the provincially operated Central Ambulance Communication Centre (CACC). These peak demand ambulances provide an increased level of staffing during periods of high demand, while a reduced number of ambulances are staffed during the late-night/early morning hours when demand is the lowest.
EMERGENCY RESPONSE UNITS AS OPTION FOR ADDRESSING INCREASED DEMAND

ERUs staffed by a single paramedic can serve several functions in addressing the anticipated growth the Region will experience over the next 10-years:

1. Response time compliance - The Ministry of Health and Long-Term Care (MOHLTC) only recognizes fully staffed ambulances and ERUs for purposes of reporting response time compliance under the *Ambulance Act*.

2. Gap coverage – ERUs can be deployed as required to areas outside of identified station coverage contours, or in areas of high call demand and at specific periods such as during rush-hour traffic, until such time as pending station requirements are addressed.

3. A comprehensive ERU program could reduce the reliance on allied agencies through the tiered response protocol and provide an overall improvement to area coverage and service delivery.

4. The cost of a fully equipped ERU is approximately fifty percent (50%) of the cost of a fully equipped ambulance.

VEHICLES AND EQUIPMENT

In conjunction with the recommended increases in staffing, the Master Plan identifies the requirement for a minimum of 1 to 3 additional ambulances in the 0 to 5-year timeframe and 5 to 12 additional ambulances in the 6 to 10-year timeframe. The actual number required will depend on the service model utilized and the rate of growth in call demand across the Region.

RECOMMENDATION

1. That dedicated Emergency Response Units be introduced to maintain/improve response times and defer the associated costs of introducing fully conventional ambulance units until patient transport requirements warrant it. The need for additional resources should be reviewed on an annual basis and factor call volume demand, response times, and population/employment coverage into the equation.

2. That an additional 37 to 54 paramedic FTE be considered within the next 10 years.

3. That the current paramedic to operations supervisor ratio of 20:1 be maintained, which will require two additional FTEs over the next 10 years.

4. That a combination of ambulance and ERU vehicles be utilized to address future fleet requirements.

RESPONSE TIME PERFORMANCE

In Report MO-32-02 and Report MO-36-04, staff updated Regional Council on EMS response times. Under the *Ambulance Act*, Halton Region is required to maintain a 90th percentile response time performance standard less than, or equal to, the 90th percentile response time standard for priority four (4) emergency calls set by the operator who provided land ambulance and emergency response service.
in the area in 1996. Halton Region’s 1996 response time standard is 10 minutes and 32 seconds, at the 90th percentile. The MOHLTC defines response time as the elapsed time from when paramedics are notified of the call, to the time that paramedics arrive on the scene of the call (Time 2 to Time 4). Since 2001, the Region has been in compliance with the legislated response time standard.

While the MOHLTC uses the above noted standard, medical research acknowledges that a rapid EMS response by paramedics can directly impact on patient outcomes, particularly where advanced life support interventions are related to the treatment of cardiac conditions, respiratory conditions, trauma, stroke and diabetes, to mention a few. In North America, the EMS industry standard response time is 8 minutes and 59 seconds at the 90th percentile for urban areas. This industry standard response time is measured from the time that the call is received in the communications centre until the time that paramedics arrive on the scene (Time 0 to Time 4).

Halton’s projected 2004 Time 2 to Time 4, 90th percentile response time of 10:15 is longer than the North American industry standard of 8:59, measured from Time 0 to Time 4. The Master Plan identifies that the two most vulnerable components of response time are the time utilized by the ambulance communications centre (Time 0 to Time 2) and the time required for paramedics to travel to the call (Time 3 to Time 4).

Response Time Segments

Time 0 to Time 2

While EMS staff dictates the ambulance strategic deployment plan, the Region’s resources are actually dispatched by the Mississauga CACC, which is operated by the MOHLTC. The CACC is solely responsible for the Time 0 to Time 2 response time segment. In 2003, Mississauga CACC’s handling time was 30% longer than the MOHLTC standard of 2 minutes. CACC performance has a direct impact on the overall response time experienced by the patient/caller.

Both the Region and the MOHLTC have taken steps to improve CACC performance through the implementation of Automated Vehicle Locating/Global Positioning System (AVL/GPS) technology. MOHLTC initiatives include the recruitment and training of additional emergency communicators, implementation of a new computer aided dispatch system and the relocation of the responsibility for dispatching York Regional ambulances to a CACC in Barrie.

Time 2 to Time 3 (Chute Time)

Chute time is defined as the elapsed from paramedic notification of the call by the CACC until the time that the ambulance is enroute to the call. The Master Plan identifies a number of site and service evaluation criteria related to ambulance station requirements that support timely chute times.

Time 3 to Time 4 (Ambulance Travel Time)

There are a number of factors that impact upon travel time, which include, street restrictions, traffic patterns, the time of day, road/weather conditions, the location of the ambulance in relation to the call, CACC compliance with established deployment strategies and the ability of paramedics to reference call locations via the provincially provided map books. The most important factor in addressing ambulance travel time is to ensure the optimum number of ambulance resources are available to address existing call demand, and that the appropriate number of ambulance stations are strategically
located throughout the Region based on historical and projected call demand. Given the fluid movement of the ambulance fleet, ideally, ambulance station coverage areas should overlap in areas where significant emergency call volume is experienced on a regular basis. There are also two primary technological enhancements that could assist in improving travel time factors. These include traffic signal pre-emption systems (opticom) and in-vehicle mapping capabilities.

Traffic Signal Pre-emption (OPTICOM)

The four local municipalities are in various stages of implementing traffic signal pre-emption devices in their respective municipalities. As fire service response requirements are different from EMS in certain areas/locations, further analysis of how the existing systems would meet EMS needs require additional investigation, as indicated in Report MO-08-05. A transportation consultant has been contracted to evaluate and make recommendations regarding traffic signal pre-emption for EMS. The consultant’s recommendations will be brought forward in a future staff report.

In-Vehilce Electronic Mapping

The existing provincial map books are updated on an annual basis at best by MOHLTC. Paramedics are often left to rely on dispatcher direction, particularly in new subdivisions and areas of significant growth. The province recently indicated that limited funding is available to assist municipalities in implementing an up to date in-vehicle mapping system for use in EMS vehicles. In vehicle mapping would provide paramedics with current street data and rapid access to routing information for call locations, thus potentially reducing response time.

RECOMMENDATION

5. That Halton Region EMS staff continue to monitor CACC performance and adherence to local deployment strategies and resource utilization. Future call volume and response time reports should include information related to compliance with deployment strategies and dispatcher handling time.

6. That the physical, operational, administrative, and site selection standards designed for the ambulance stations be adopted for any future standalone facilities and/or partnerships with allied agencies or long-term care facilities.

7. That in-vehicle mapping is identified as a technology services priority for evaluation and implementation in EMS response vehicles.

EMERGENCY CALL COVERAGE CAPABILITY

The analysis conducted during the creation of the Master Plan defined station contours in terms of an 8 minute and 59 second response time based on the North American industry standard.

There are three exhibits within the Master Plan that compare historical ambulance call data from the MOHLTC CACC related to:

- emergency ambulance calls originating within the predefined station contour areas
- population and employment within the predefined station contour areas.
The analysis identified current service gap areas in the following locations:

**Southeast Burlington/Southwest Oakville**

An area South of New and Rebecca Streets to Lake Ontario, between Appleby and Third Line.

**Southeast Oakville**

An area south of the QEW to Lake Ontario, between Trafalgar Rd and Winston Churchill Boulevard.

**North Burlington**

An area North of the QEW, West to the Hamilton-Halton border and East to the 407 & Dundas interchange.

As well, the analysis projected future growth related gap areas in Northwest Oakville and South Milton.

The Master Plan identifies short-term strategies to address existing gap areas through the use of ERU’s strategically deployed during periods of peak demand, followed by staffing with transport capable ambulances for these areas. Upon implementation of the EMS response stations identified in the Master Plan, consideration should then be given to cover any evolving gap areas through the use of ERU’s and scaled back ambulance response facilities designated as “posts”. Accordingly, the evaluation of posts will be initiated towards the end of the 10-year forecast.

**RECOMMENDATION**

8. That staff continue to explore options for co-location with other Regional or local municipal facilities, provided that the minimum station requirements as identified in section 2.6 of the EMS Master Plan are met.

9. That the dedicated Emergency Response Unit program is dispatched by the provincial CACC via a comprehensive deployment strategy, based on peak demand periods and historical call volume, to provide interim coverage to service gap areas, until such time as response stations and additional transport capable resources are made available.

10. That upon implementation of the EMS stations identified in the Master Plan, staff investigate towards the end of the 10-year forecast the opportunities to construct scaled back ambulance station facilities that would be designated as “posts”, in order to address areas demonstrating gaps related to peak traffic periods or high call demand.

**TIERED RESPONSE**

The local fire services are currently operating under a tiered response agreement entered into with the MOHLTC and Mississauga CACC prior to the assumption of EMS by Halton Region in 2000. Burlington and Oakville participate in a Category ‘A’ agreement that sees fire department staff tiered to heart attacks, difficulty breathing, bleeding and motor vehicle collisions. Halton Hills and Milton fire are only tiered to medical calls when the responding EMS are expected to be significantly delayed.
The existing agreement speaks exclusively to criteria requiring the notification of fire departments regarding EMS calls, but does not speak to any requirement for the fire departments to notify EMS of incidents such as structure and vehicle fires, or hazardous materials incidents that could potentially cause injury or illness.

Firefighters are trained in first aid, CPR and basic care, with Milton, Oakville and Burlington firefighters being trained in automated defibrillation as well. As the Region is not a party to the existing informal tiered response agreements, the Master Plan has identified a requirement to revise and formalize these agreements.

The Halton Regional Police Service participates in a modified tiered response program featuring public access defibrillation (PAD) units in the police vehicles that patrol the rural area of Nassageweya. The main focus of response is to provide care to real or suspected heart attack victims.

RECOMMENDATION

11. That the tiered response program with allied agencies in Halton be reviewed to investigate potential tiered response efficiencies, and to formalize and ensure current response criteria, policies, quality assurance and medical oversight are appropriate.

EDUCATIONAL ACTIVITIES

The minimum qualification for a Primary Care Paramedic (PCP) is a 2-year community college program, that includes a clinical rotation in the hospital and field instruction by an experienced PCP, followed by certification by the MOHLTC as an Advanced Emergency Medical Care Assistant (A-EMCA). Following certification by MOHLTC, the base hospital medical director certifies PCP’s in order to perform semi-automated defibrillation, ECG interpretation and symptom relief (glucagon, oral glucose, epinephrine, nitroglycerine, salbutamol and ASA). Approximately 80% of the full-time PCP’s are also certified by the base hospital to perform intravenous therapy.

To become an Advanced Care Paramedic, (ACP), an experienced PCP attends a Canadian Medical Association accredited training program that takes approximately 20 weeks and includes a 6-week clinical rotation in the hospital, followed by preceptorship under the direction of an experienced ACP. In addition to the PCP skill set, ACP’s are certified to perform endotracheal intubation, manual defibrillation and administer a large profile of medications. The base hospital medical director provides medical oversight and quality assurance for all aspects of patient care provided by paramedics.

In order to keep up with new treatment procedures and patient needs, the Master Plan suggests an evaluation of the benefits of an intermediate paramedic classification within the next 3 to 5 years.

NEW NORMALS RELATED TO INFECTIOUS DISEASE

The SARS emergency in 2003 resulted in significant revisions to patient care standards by the MOHLTC that now mandate the use of additional protective equipment both for paramedics and patients. Several items that were previously re-usable are now single use/disposable. These changes have significantly increased the workload associated with training and the procurement/distribution of supplies and equipment. This has increased the requirement for continuing medical education.
focused on the management of patients with suspected infectious disease and emergency preparedness.

QUALITY ASSURANCE/CONTINUOUS QUALITY IMPROVEMENT (QA/CQI)

QA/CQI is an ongoing process within the Division with the majority of these efforts focused on patient care activities. This involves the collection, review and analysis of all encompassing patient and operational related data from the various program areas. The QA/CQI program requires technological advancements to provide electronic statistical data relevant to system surveillance and program development. In order to assist with planning and research activities, the Division needs to evolve to a paperless Ambulance Call Report system, integrated with in-vehicle mapping capabilities and a comprehensive information management system. Additional data analyst resources will be required to complement the advanced technology.

RECOMMENDATION

12. That the Division investigate the benefits of an intermediate paramedic classification within the next three (3) to five (5) years.

13. That the Division implements a paperless Ambulance Call Report (ACR) system integrated with in-vehicle mapping capabilities.

14. That the Division implements a comprehensive Information Management System.

15. That new data analyst resources be considered with recommendations 13 and 14.

Staffing and capital resources necessary to achieve service goals over the next 10 years are subject to legislative and regulatory requirements.

FINANCIAL/PROGRAM IMPLICATIONS

Many of the requirements identified in the Master Plan are included in the Region’s 2005 Budget and Business Plan. The following discussion compares the 10-year business plan approved by Council with the requirements identified in the Master Plan and outlines the next steps to accommodate the additional needs currently not included in the Business Plan. It is important to note that any of the requirements identified in the Master Plan will be subject to review in the annual Budget process.

Stations

The Stations identified in the Master Plan are consistent with those included in the Region’s 10-year forecast. The Master Plan identifies the following stations:

- Southeast Oakville Ambulance Station (construction 2006)
- Northwest Oakville (2010)
- South Milton (2008)
- Southwest Oakville (2006)

The total capital cost of these stations in the forecast is estimated at $3.6 million, which is expected to be sufficient at this time.
Technology

The Master Plan identified the following Technology-related capital items:

1. Automatic Vehicle Locating System (AVLS)
2. IMEDIC
3. New EMS Ambulance Stations
4. In-Vehicle Mapping
5. Electronic Ambulance Call Reports (ACR)
6. Information Management System (IMS)

Of these items, the 2005 Budget and Business Plan incorporated in the forecast the AVLS, IMEDIC and Technology requirements related to new EMS stations (items 1-3) at an estimated cost of $119,000. It is expected that this budget allocation is sufficient to address these requirements at this time. However, the remaining requirements (items 4-6) have not yet been addressed in the budget forecast and will be incorporated as follows:

- **In-Vehicle Mapping**: In 2005, technology evaluation will be performed to assess the type of hardware equipment needed for the ambulance vehicles. This evaluation will be undertaken using existing resources in the 2005 budget. The purchase of hardware for the Ambulance vehicles will be addressed as part of the 2006 Capital budget process. A preliminary estimate of hardware costs for the Ambulance vehicles is in the range of $5,000-$7,000 per vehicle for a total budget of $115,000-$161,000. In addition, a replacement program will be evaluated and incorporated into the 2006 budget process. The software will be acquired from the Province at no cost. Given that the supervisor vehicles are already equipped with necessary hardware, the software from the Province will be installed in the vehicles in 2005 at no additional cost.

- **Electronic Ambulance Call Reports**: Technology evaluation will be performed in 2006 and purchase of software will be incorporated into the Capital budget for 2007 forecast. There are no additional hardware requirements to implement this program as the software can be loaded onto the hardware already purchased for the In-Vehicle Mapping. Preliminary software costs are estimated at $5,000 per vehicle for a total estimated budget of $115,000.

- **Information Management System**: It is proposed that a study of all Ambulance information systems be completed in 2006, in order to evaluate overall EMS-related technology needs and to propose an implementation plan. If implemented, the system will effectively incorporate all electronic data sources and produce various desired reports. Then the goal would be to evaluate software and implement the system requirements identified in the Master Plan in 2007-2009. The cost to facilitate this study along with preliminary software costs will be reviewed during the 2006 budget process.

Any operating budget impact arising from these new initiatives, such as system maintenance and costs associated with airtime, will also be reviewed during the 2006 budget process.

**Traffic Signal Pre-emption (OPTICOM)**

Staff report MO-08-05 (re: Traffic Signal Pre-emption for EMS Vehicles) has recently been presented to Council. The $1.5 million funding has been allocated between 2004 and 2010 in the budget to accommodate the consultant’s review and the implementation of the program.
Any financial impacts arising from any of the above noted implementation processes would be reported back to Council prior to the annual budget process and will be incorporated into the annual budget and forecast.

**Facilities Staffing - Paramedics**

The Master Plan recommends a total increase in staff complement of 31.4 FTE to meet the program requirements related to the new EMS facilities over the next 10 years.

The 2005 operating forecast included an additional 26.2 FTE to provide staffing for the new stations. This resulted in a net operating budget impact of $2.1 million by the end of 2014. The projected impact of the additional staffing of 5.2 FTE (26.2 FTE to 31.4 FTE) as provided in the Master Plan results in a forecast expenditure increase of $2.7 million.

As such, the recommendations in the Master Plan represent an increase of approximately $600,000 more than was incorporated in the 2005 Budget Forecast. These increased expenditures, which will be considered as part of the 2006 budget process, are primarily a result of the additional 5.2 FTEs.

**ERU Staffing**

In addition to staffing required to operate the ambulance stations, the Master Plan also recommends that additional staff be hired to operate ERUs, which was not contemplated in the budget forecast. The 2006 budget process will need to consider the incorporation of a net increase of 5.6 FTEs for ERUs, which would result in an expenditure increase of $506,000 over the forecast period.

**Supervisory and Administrative Support**

The Master Plan recommends additional staff to support and maintain the existing ratio of operations supervisors to paramedic ratio of 20:1 with the addition of two supervisors over the forecast period as well as a data analyst (recommendation 15). These positions were not included in the 2005 budget forecast and they must be considered as part of the 2006 budget process to be addressed in the 10 year forecast.

**Ambulance Vehicles and ERUs**

The Master Plan recommends the acquisition of 5 new ambulance vehicles over the forecast as well as an additional 3 ERU vehicles. The 2005 budget forecast included a provision for an additional 6 ambulances and 8 new ERUs. Accordingly as part of the 2006 Budget process, the forecast for ambulances and ERU vehicles can be reduced by $660,000.

Since the Master Plan recommends 10.8 additional staff for ambulance facilities and ERUs and the acquisition of fewer vehicles than originally forecast, the combined impact of these amendments will result in a net increase of approximately $500,000 by 2014 when compared to the amounts forecast in the 2005 Budget. The update to the forecast and financing strategies will be considered as part of the 2006 Budget process to smooth the operating budget impact based on the Master Plan requirements.

**RECOMMENDATION**

16. That any of the financial requirements identified in the Master Plan will be subject to review in the annual Budget process.
RELATIONSHIP TO THE STRATEGIC PLAN

The 10-year Ambulance Services Master Plan provides a strategic planning framework (blueprint) for public policy, organizational, capital and operational decisions pertaining to the delivery of timely, cost effective and accountable emergency medical services.

Respectfully submitted,

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Robert M. Nosal MD FRCPC
Commissioner and Medical Officer of Health

Approved by

A. Brent Marshall
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If you have any questions on the content of this report, please contact: Jim King Tel. # 7988